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MOVECIT

# TRANSNATIONAL BENCHMARKING AND EVALUATION REPORT ON PILOT ACTION IMPLEMENTATION

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# Content

# 1. Summary

The Summary of Benchmarking and Evaluation Report on Implementation of Pilot actions gives a short overview on mobility measures, which were implemented during MOVECIT project to reduce CO2 emissions by fostering sustainable commuting in municipalities and public institutions. Different approaches, aims and target groups of pilot actions of MOVECIT project partners are presented:

| Project Partner | Central European Country | Pilot Action | Aim of pilot | Partner municipality/ institution | Target group |
|---|---|---|---|---|---|
| LP | Slovenia | 3 Personalized Mobility Plans<br>Bike Shed (3 e-bikes) | Strategically issue (SUMP)<br>Foster sustainable commuting regional role model | Municipality of Ljutomer | Employees of Municipal Admininstration |
| PP 2 | Czech Republic | 10 E-Bikes<br>4 charging stations<br>helmets & maintenance package | Strategically issue:<br>Local leader on energy efficiency | Municipality of Litomerice<br>Hospital of Litmerice | Employees of:<br>Municipal Administration<br>Police Department<br>Public & employees of the Hospital |
| PP 3 | Austria | Walking Competition campaign "Walking Award" | Awareness raising on sustainable and healthy transport mode "walking" | Municipalities of<br>Baden<br>Leoben<br>Mödling | Municipal employees (different departments) |
| PP 4 | Hungary | Online tool for sustainable travel route planning | Foster sustainable commuting:<br>Support sustainable travel decisions | Technical University Budapest | Employees & Students of Faculty of Transportation Engineering |
| PP 5 | Slovakia | Bike Point:<br>- 18 lockable spaces for bikes (bike boxes & stands)<br>- 10 boxes for small luggage<br>- self service stand<br>- walkability map | Strategically issue:<br>Development of sustainable traffic infrastructure | Municipality of Bansky Bystrica | Public<br>Train station Banska Bystrica |
| PP 7 | Italy | Traffic counting sensor | Information source for further actions on sustainable mobility<br>Awareness raising | City of Modena | Public<br>Main traffic route in Modena |
| PP 11 | Germany | 4 pedelecs, 1 cargo bike<br>5 bike boxes<br>Fleet management system | Foster sustainable commuting<br>Awareness raising | City of Leipzig | Employees of<br>Office of Traffic planning and Road Contstruction Leipzig |

Pilot Actions

Within the MOVECIT project eight pilot actions in context of sustainable mobility were implemented and evaluated in seven central European countries (see table above). Five of the pilot actions were infrastructural measures and three of them soft measures in form of personalized mobility plans, a campaign and an online tool.

Four of the implemented hard measures focussed on infrastructure for bicycle traffic like the purchase of e-bikes, cargo-bikes, charging stations, bike boxes, self-service station, etc. Meanwhile the traffic counting sensor in Italy was installed as a measure tool for monitoring traffic behaviour in general.

Concerning soft measures, one pilot action had the focus on sustainable transport mode "walking" and two of them on mobility behaviour in general.

Aims of Pilot Actions

In general all pilot actions aimed to have role model character on regional or even state level. Although, aims of the pilot actions are often overlapping, depending on different initial situation at the partner municipality or institutions specific targets were in the foreground. In most cases pilot actions were bedded in a bigger strategic frame related to sustainable mobility. However, especially in regions where

few or none experience with projects in the context of sustainable mobility was given like in Ljutomer (SI) and Banska Bystrica (SK) the role model function and to develop sophisticated infrastructure for sustainable transport were most important aspects. In partner municipalities, where infrastructure on sustainable mobility already is provided like in Modena (IT), Baden and Mödling (AT) awareness raising and measuring tools for further actions became relevant.
E-bikes or cargo-bikes for official journeys and online or personal support to find sustainable travel routes were punctually provided at specific departments of municipalities or institutions to influence employees' individual travel behaviour.

Partner municipalities and institutions for implementation of pilot actions
Pilot actions on sustainable mobility were implemented in six small- and mid-sized municipalities like Ljutomer (SI), Litomerice (CZ), Baden, Mödling, Leoben (AT), Banska Bystrica (SK), in two bigger cities Modena (IT) and Leipzig (DE) and in two public institutions: the Hospital of Litomerice (CZ) and the Technical University Budapest (HU).

Target groups
Five MOVECIT pilot actions were targeting employees/ students of municipalities or public institutions. Here the location of pilot action implementation was limited to one or more departments of municipalities/ institutions like administration of Ljutomer, administration and police of Litomerice, different departments of Austrian municipalities, Faculty of transportation at Technical University Budapest and office of traffic planning and road construction Leipzig.
Three other pilot actions were implemented in a more public context. In Modena, Banska Bystrica and at the Hospital of Litomerice, where infrastructure was installed on a main traffic route, at the train station and in front of the hospital. Here pilot actions are targeting citizens, visitors and employees of the municipality or institution.

In following chapters Implementation processes and analyzing results are described in more detail. The conclusion gives an summarizing overview on outcomes and made experienceces like on cost benefit ratio of pilot actions and on learned lessons.

# 2. Aim of the Document

MOVECIT project addresses challenge of arising number of individual motorized transportation. Employees of city public institutions are responsible for development of city, why couldn´t cities' authorities be responsible for own travel commuting habits and impact on low carbon environment. Therefore, the employees were chosen as a target group in order to play a role of best example in the city and start to follow the new paradigm focusing on changing transport mode from traditional to alternative ones.

To set the standards and activate the employees from city hall (municipal administration) the project consortium has developed 13 strategic workplace mobility plans for public institutions. The plans have been elaborated within eight to nine months based on the methodology that has been developed by MOVECIT project team:

- Development Agency Sinergija (Slovenia)
- Environment Foundation (Czech Republic)
- Climate Alliance Austria (Austria)
- University of Budapest (Hungary)
- Ekopolis Foundation (Slovakia)
- City of Modena (Italy)
- Aufbauwerk Leipzig (Germany)
- Municiaplity of Ljutomer (Slovenia)

- Municipality of Litomerice (Czech Republic)
- Municipaliy of Banska Bystrica (Slovakia)
- City of Leipzig (Germany)

Within this process of developing Workplace Mobility plans specific mobility measures had been chosen to be implemented and monitored by project partners to serve pilot actions with model character for other municipalities and public institutions. The document seeks to capture successes, failures, best practices and processes and overall lessons learned during pilot action implementation; to provide further understanding for other future workplaces on action/measure implementation.

The following document summarizes a transnational report on benchmarking and evaluation concerning implementation of pilot actions in context of sustainable mobility in Central Europe (CE) regions. The pilot actions were developed and implemented with 13 pilot institutions in seven European countries. The pilot institutions have very different initial situations as the following presentation shows.

- **Municipality of Ljutomer (Slovenia): Number of staff 30**

In the municipality of Ljutomer, as in other Slovenian municipalities, they have no tradition of strategic transport planning. The bulk of the existing strategic transport decisions are formed within the spatial planning documents of the municipality. These focus on transport infrastructure and overall do not address the transport system and its management, there are absent strategies for individual elements of the transport system as well, such as public transport or parking. Recently they revised Sustainbale urban mobility plan and are expected to improve the traffic situation in the municipality.

- **Municipality of Litomerice (Czech Republic): Number of staff 178**

The stakeholders have been connected into the project QUEST, which goal was quality management system implementation within the sustainable urban mobility planning. These stakeholders are also members of work group for preparation of SUMP.

- **Municipal hospital of Litomerice (Czech Republic): Number of staff 500**

The hospital has no previous experience in mobility planning. However, there is a document which Proposes the solutions for the transportation in the hospital premises. Unfortunately, this document didn't lead to any improvement of the transport situation in reality.

- **Municipality of Baden (Austria): Number of staff 597**

During the last years also Baden had undergone changes and improvements of sustainable transport modes. These measures were the reconstruction of the railway station with attractive bike and ride facilities for 600 bikes, the introduction of a good cycling guidance system and the improvement of cycling paths and routes to neighbouring cities e.g. Bad Vöslau and Pfaffstätten. Baden was the first Austrian municipality on board of the MOVECIT project and shows strong commitment to realize a sustainable mobility plan.

- **Municipality of Mödling (Austria): Number of staff 70**

Mödling has quite a lot of experience in the mobility sector, they already implemented a lot of projects fostering sustainable mobility; but the city lacks of having an institutional and structured mobility plan like MOVECIT is suggesting; Mödling participated in a project where they developed a traffic concept for soft mobility but the city has never developed a mobility plan of this kind for employees of the city, which is more extensive than the concept;

- **Municipality of Leoben (Austria): Number of staff 510**

Leoben's objective is a totally car-free city centre contributing to a high standard living quality. Measures to support this goal have been started installing a tactile leading system for pedestrians and traffic lights with acoustic signals. Another important milestone is the reconstruction of sidewalks to increase security

and the desirability to explore the city per pedes. As „Smart City" Leoben's vision 2025 is a population with increased awareness of flexible, event-driven choice of transport (cycling, car sharing, inter-modality is integrated in everyday life).

- **Budapest University of Technology BME (Hungary): Number of staff 160**

On institutional level, there were no extensive surveys about mobility and behaviour. The leadership of the university is committed to environment protection and the university has an institutional development plan, but it does not include information of workplace mobility. Among the employees there are some experts, who know SUMP methodology and have experience with mobility plans. However, this knowledge is not general among all of them.

- **Municipality of Banská Bystrica (Slovakia): Number of staff 250**

The City hall of Banská Bystrica made no particular initiatives and effort in changing of employees travel behaviour yet. Only two initiatives were developed: building of small bike shelter in the City Hall's yard and annual participation of the highest representatives of the City Hall in the Bike to Work competition.

- **City hall of Modena (Italy): Number of staff 1186**

The municipality of Modena was approving its new Cyclist Mobility Plan, written by Mobility and Traffic Service department, which analyses the current situation of mobility for cyclist and proposes several actions and infrastructures to increase the bike modal share.

- **Administration of the City of Leipzig: Number of staff 350**

The city of Leipzig was involved in different pilot projects for different topics in relation to mobility management and developed the concept 'efficient mobile' which is dealing with mobility management.

# 3. Benchmarking Categories of Pilot Actions

## 3.1. Type of the actions

**Municipality of Ljutomer, SLOVENIA**

Slovenia's pilot activity included both soft measures and hard, infrastructural measures. The soft action was carried out by the leading partner, Sinergija Development Agency, which tested the preparation of Personalized Mobility Plans for three selected employees at the Ljutomer Municipality. The latter carried out an infrastructural measure, namely the installation of a bike shed and the purchase of three electric bicycles with equipment (helmets and pumps).

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

The pilot action in Litoměřice belongs among hard measures. It is an investment in municipality equipment. More precisely, the pilot consisted from purchase of 10 e-bikes and of 4 bike charging stations. The respective departments and the municipality police are also responsible for maintenance of "their" e-bike. There is a reservation system especially developed and accessible to all employees through the municipality intranet.

Regarding the charging stations, 1 of them (for 4 e-bikes) was installed at the premises of hospital and can be accessed and used by general public. The other 3 were installed in the municipality premises: at Pekařská workplace (1 charging station for 3 e-bikes) and Topolčanská workplace (2 charging stations, each for 4 bikes). After reconstruction of the inner yard in Mírové náměstí workplace one of the charging stations from Topolčanská will be moved to Mírové náměstí.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

The Pilot Action, which was implemented by CAA (PP3) was a soft measure in form of a Walking Competition. With the, so called Walking Award CAA pursued the goal to increase short travel trips done by foot and to decrease number of short travel trips done by car. With the walking competition campaign, CAA invited participants to count their steps over a period of four weeks. All employees who reached at least 60.000 steps were allowed to participate on prize draw. Participants were allowed to count all steps from Monday to Friday. Three of four Austrian municipalities Baden, Leoben and Mödling participated on the Walking Award, so that, not only individual persons, but also the municipalities where in competition with each other. Before they started the Walking-Award-Competition with the employees in September 2018, CAA implemented campaign actions like experts' lectures on health aspects of walking & cycling and mobility quizzes for promoting the Walking Award and to raise the awareness in this context of sustainable mobility.

**BME, HUNGARY**

During the pilot action a new online service was introduced to compare different transportation modes of home-work trips made by employees. The comparison includes several indicators related to travel time, cost, emission and healthiness. The specific routes between work and home are shown on a map with indicators. The employees can set the indicators, how important travel time, cost, emission and healthiness is on the specific day, and the online service shows routes with different transportation modes (car, public transport, bike, walk) and a comparison of the routes is presented in a graphical form (e.g. chart) as well as in a table. The users could state, which transportation mode they would choose after knowing the results and comparison. Using the online service is a cost-effective approach to show sustainable opportunities and encourage change of travel behaviour.

Budapest University of Technology and Economics (BME) is responsible for the implementation and dissemination of the online tool, which is a soft measure.

**Municipality of Banská Bystrica, SLOVAKIA**

Pilot Action is the bike point at the train and bus station in Banská Bystrica. The final technical solution of the bike point is to include 18 lockable spaces for bikes, out of this 12 in bike boxes equipped with e-bike chargers and 6 roofed bike stands, 10 boxes for helmets and other smaller luggage, self-service stand and informational map of town and its walkability;

**City of Modena, ITALY**

The pilot action MOVECITfor the city of Modena, is the installation of a new automated traffic counting sensor, for vehicle and bicycle counting. It's considered a HARD measure: the sensor is an electronic device, physically installed on a lamppost.

The new counting section has been installed in a strategic location, i.e. along Via Emilia Est, which is one of the most important urban roads of the city, with a new and very used bikeway right next to the roadway. The aim is to monitor the variations of car and bicycle traffic.

All the data from this new sensor, as for the existing ones, will have to be available to both the Municipality and the citizens, through an easily consultable web platform. Thus, the evolutions of car and bicycle flows will be analyzed.

**City of Leipzig, GERMANY**

The pilot action consisted of the purchase of 4 company pedelecs, 1 cargobike and the construction of 5 bike boxes. The second part of the pilot action is the establishment of a booking and fleet management system for company cars, bikes and carsharing vehicles. The idea is that all of the technical equipment can be used by the employees of the Office for Traffic Planning and Road Construction of the City of Leipzig.

## 3.2. Aim of the Pilot Actions

**Municipality of Ljutomer, SLOVENIA**

The aim of the bike shed installed and 3-bikes purchased is to foster the sustainable commuting within municipality employees. Although the installing of the bike sheds is from European point of view not an innovative investment, it is claimed that from regional aspects is rather innovative, especially due the reason that none of the regional municipalities have ever installed such bike sheds. The municipality Ljutomer is surrounded by other small municipalities which are connected to administrative unit. The distances between municipalities are easy to reach by bicycle; therefore, the municipality Ljutomer has decided to promote and enhance the cycling opportunities within and across the municipality's border. The instalment of the bike sheds will give the good example to other small or medium sized neighbouring municipalities as well, additionally also to capital city of Slovenia which does not poses such bike sheds. Bike sheds acts as an application of better solutions that meet new requirements in municipality and for existing needs. The investment is effective and, as a consequence, new, that "breaks into" the society (e.g. employees). Innovative aspects can be measured on an organisational level which will benefit from reduce travel costs, employees' motivation and improved health condition. From political level the municipality will benefit from region competitive advantage and financial input in development of municipality. Learning by doing or using approach will be transferred to other regions not on the national level but it will serve as a benchmark for all small municipalities beyond the country.

The Personalized mobility plan is introduced due to the methodology which is a cost-effective approach to address those people who both have the opportunity and the willingness to change, and uses innovative and compelling engagement techniques to support continued travel behaviour change. The travel advisor (in our case this is the plan developer) encourages the beneficiary to identify any barriers they have to using sustainable transport for their regular journeys and offers information and support exactly tailored to their needs. By identifying their own barriers and solutions, the beneficiary is in control of the situation and feels empowered to make the change: that's what makes it personal!

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

The city of Litoměřice is a local leader in energy efficiency and energy management in the Czech Republic. Litoměřice has been focusing on usage of geothermal energy and photovoltaic energy and has been looking for possibilities to use renewable energy also in transport for several years. In 2019 the city plans to install accumulation systems to accumulate photovoltaic energy and use it for charging cars and bikes. Litoměřice has also a fleet of e-cars and a support of e-bikes is another logical step in its strategy. There is a range of short-distance trips which might be comfortably done by e-bikes, and furthermore e-bikes are more acceptable than "normal" bikes because riding e-bikes does not allow so much energy or changing clothes after a ride.

The aim of the pilot action is to promote sustainable way of travelling and commuting among employees of Litoměřice and promote e-bikes (and e-mobility in general) within the public. One of the main goals is to significantly increase usage of bikes for business trip purposes, especially within the town and its close surroundings. Since there are three municipal building and there is a need for employees to often visit the

other buildings, usage of the e-bikes can save time, environment and money. E-bikes were chosen instead of regular bikes because one of the municipal building (Topolčanská) is slightly up hill which could cause trouble for some employees. E-bikes are also a very friendly solution even for those who aren't active sportsmen.

The charging stations are not only a necessary infrastructure for the e-bikes usage, but their goal is also to promote e-bike commuting from the FUA of the municipality and use of e-vehicles in general. The pilot aims to motivate people to change their mode from cars to a more environmentally friendly mode by offering the possibility to charge e-bike for free on a public place such as near the hospital entrance. E-bikes are considered the best alternative to cars in this case since they are also an individual transport mode and they are less physically challenging as regular bicycles. The three charging stations at the municipal building can also motivate the employees to purchase their own e-bikes and to rise the share of e-bikes commuters even more.

The pilot helps us test how much the e-bikes will be used by the staff of the city hall and what effects they will have on their transport behaviour (not only on business trips and commuting to work but also on trips for other purposes not connected with work).

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

The Pilot Action Walking Award is introduced because Austrian's MOVECIT Municipalities implemented during the last years lots of infrastructure for sustainable transport modes like walking, cycling, e-car sharing, etc. But still lots of employees use their private car even for short travel distances. On the other hand, it became visible that from municipalities' side, concerning 'healthy' transport modes there was a focus on cycling measures and less on walking measures. For this reason, we decided to focus on the transport mode 'walking' and on awareness for its health and environmental aspects and for existing well-developed pedestrian's infrastructure.

The city halls are those locations, where most of the municipalities' employees have their working places and were most of the employees do sedentary work. In Baden and Möddling, both city halls are located in the city centres, which are declared as pedestrian zones. The pedestrian zones are equipped with guiding systems, which lead to public transport hubs but also to further foot paths and easy walking trails to neighbouring municipalities.

With the implementation of the Walking Award an increase of the share of walking shall be achieved at least at travel distances of one to two kilometres to reduce CO2 emissions on short travel distances.

**BME, HUNGARY**

As the university wants to be a leader in sustainable mobility, BME was looking for a powerful and innovative way to help its colleagues and all citizens of Budapest to travel in a more sustainable way.

How it can be powerful? Commuting to the workplace and back home has the highest share of urban trips. Thus, if travellers can change the way they commute, it will have a strong effect not just on their daily trips, but in general on the quality of urban life in Budapest.

How can it be innovative? In most cases commuters are not aware of all factors connected to their mobility and thus do not see the whole picture. In order to support conscious travel choices, a new online service was introduced. The tool collects travel information, shows every aspect of the travel: travel time, travel costs, healthiness and environmental effects and provides the best choice. The application concentrates on the long-term decisions with the goal to promote the usage of sustainable transportation modes, such as public transport, walking or cycling.

The pilot action does not have an institutional limitation, but a geographical, since the software behind the tool is based on Budapest related travel databases. However, the goal was that this online tool shall be as universal as it can be.

**Municipality of Banská Bystrica, SLOVAKIA**

The overall aim of the pilot action is to contribute to development of the infrastructure for more sustainable mobility in the city of Banska Bystrica. The infrastructure for biking in the city is so far only very limited. On the other side the demand from the public increases as the city suffers from trafic jams and lack of parking space. Thus the pilot action is part of the strategy to motivate people to switch from cars to other transort modes. By placing the modern bike point in the frequently used location, the pilot project will constitute an important contribution to gradualy built infrastructure for better mobility in the City of Banska Bystrica.

**City of Modena, ITALY**

The sensor has been introduced to monitor the daily/seasonal variations of car and bicycle traffic on urban roads. This kind of action had double goals: by one side the sensor collected data are a precious source of information to develop further actions, secondary, the data dissemination could be useful to increase the citizens' awareness. In Modena urban area there was two other sensors to count car and bicycle traffic flows on urban roads: this technology is useful to analyze punctual modal shift in order to help the Municipality defining policies to increase sustainable mode of transport, especially for commuting trips. The city of Modena adopted its BikePlan on December 2016, it proposed several actions to promote bike use which include also a sensor net to count bike passages. The city of Modena is currently completing the drafting of SUMP, so MOVECIT's pilot action could be useful also for FUA policies.The aim is to obtain data from traffic flows on the main urban roads. This data will help the offices to define policies, initiatives, infrastructural project to increase the number of people that choose sustainable mode of transport for their urban trips (commuting).

**Administration of the City of Leipzig, GERMANY**

There are three goals this pilot action achieved; first to raise awareness of municipalities employees of the impact of their mobility behavior and to motivate and achieve changes in this behavior. The second is to introduce the pilot action plan as a strategic document of the city in the daily work agenda and pass it through the city council to gain wider acceptance. The third main goal is to decrease CO2 emissions by up to 20% per year among the municipality's staff through the implementation of this pilot and by changing transport mode to a more sustainable means of transport.

## 3.3. Target groups

**Municipality of Ljutomer, SLOVENIA**

The target group, which was included in the additional activity, are employees of the municipal administration of the municipality of Ljutomer. In soft measures, in the preparation of Personalized Mobility Plans, we covered three employees, for whom we prepared a Personalized mobility plan, in order to better achieve their personal goals. Each of these employees was selected because it represents a different group of daily migrants. They are divided into three groups, those with up to 3-5 km to the workplace, the second group up to 10-15 km to the workplace, and the last group that has to complete more than 30 km. All three people travel to work with a car. Their age is between 35 and 45. They were also selected because they showed the potential for changes in travel habits (e.g. shorter distances that could be made by bicycle and own engagement). Their general needs are as follows: better public transport, flexible working hours, shower and wardrobe, and above all need some encouragement, promotions and good arguments, why decide to change travel habits.

In the infrastructure measure, the target group was all employees of the municipal administration. With the bike shed, we wanted to encourage cycling to work, as about 80% of all employees have between 1 and 10 kilometres to the workplace, which is a good starting point for changes. Until now, the municipality did not have a similar facility, the bikes were parked by employees in front of the municipal building, in an open and unsuitable place.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

The mobility manager under the Smart City department at the Municipality of Litoměřice is responsible for the successful implementation. Our target groups of this pilot are primarily:

- employees of the Municipality of Litoměřice (up to 218 employees, especially for business trips and commuting)
- employees of the Municipal Police department (up to 33 people, especially for daily work-related rounds and patrols)
- employees of the Litoměřice hospital (up to 933 employees, especially for commuting)
- and in further extent even the public from Litoměřice and its FUAs by using the charging stations (roughly 25 000 citizens, can be used for visiting the hospital or its surroundings).

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

In Austria's MOVECIT Municipalities daily working trips of the employees are quite short. More than a half has daily travel trips of less than 5 kilometres and at the same time e.g. in Mödling at travel distances of more than one-kilometre 49% percent use their private car for transport. On the other hand, many of the municipalities' employees do sedentary work, especially those, who work at the city hall where the highest share of employees has its working place. So, we wanted to motivate those, who do short travel trips by car and do sedentary work to use healthy sustainable transport modes. In Austria Bike2Work-Campaign had been implemented several years ago and already is promoted at the CAA's partner municipalities. For that reason, a Walking Award offered a good opportunity to tackle another target group – those who prefer to walk.

**BME, HUNGARY**

The primary target group was the employees and partially students of BME Faculty of Transportation Engineering and Vehicle Engineering. The number of employees is around 200. Most employees are commuting either by public transport or by private car. Pedestrians and cyclists do not make 15%. Since the institution does not provide a company car, private car users are commuting on their own costs. At the

same time flexible working hours make it possible to avoid congestion at the city center and the parking situation is acceptable. With increasing commuting distance, individual traffic has an increasing share, while walking and cycling completely disappear. It would be desirable to reduce the use of individual vehicles in commuting shorter than 2 km. Over 10 km commuting distance the share of public transport drastically decreases, which is the distance of the border between the city and the functional urban area. The employees of BKK Centre for Budapest Transport, as an associated partner, had also the chance to try the online tool. The approach and the methodology are transferable and can be used for international dissemination. Since the application uses public transport data of Budapest, the necessary datasets have to be collected from the implementation area.

**Municipality of Banská Bystrica, SLOVAKIASLOVAKIA**

Target group of the pilot action is mainly adult commuters coming to and out from the city by train or bus. The separate target group are visitors of the city who wish to park their bike or also charge the e-bike on the safe place. The area offers various services including shopping, eating, café, etc. therefore possible group is really wide.

Theoretically the target group is unlimited (several thousands of passengers passes the area). Separate issue however is, how many of them will start to use the bike point and its services. The purpose of the bike point is also to motivate people to use the public transport and biking more than so far.

**City of Modena, ITALY**

All the data collected by this new sensor are referred both to employees and citizens: the sensor has been installed on a public bike lane, so it counts obviously all passages (vehicles and bycicles). The counting sections in quite near the historical city centre, along one of the most important urban roads: the type of travel intercepted are mainly referred to commuting; a small part is referred to recreation, tourism and shopping trips.

**City of Leipzig, GERMANY**

The target groups of this pilot are primarily the employees of the Office for Traffic Planning and Road Construction of the city of Leipzig (approx. 270).

The Office for Traffic Planning and Road construction of the city of Leipzig is an appropriate target group, as the improvement of service and work routes lies very much in the expertise of this office which deals with similar topics in the city administration. Furthermore, it could be proven by an office-wide survey of 2019 that about 70% of the responding employees use public transport or bicycles.

## 3.4. Procedure of implementation

**Municipality of Ljutomer, SLOVENIA**

BIKE SHEDS

**Selection phase:** Due to short distances within the municipality Ljutomer (having 11.000 inhabitants and only 4000 in the city) the municipal administration has decided to promote the cycling not only between inhabitants but also among administration employees. One of the reasons for cycling promotion is also the municipal strategic document SUMP which supports the cycling and the municipality follows the SUMP's objectives. Installation of bike shed is a logical measure though.

**Planning phase:** The planning stage for the construction of a bike shed was actually started with the overhaul of a possible location for the layout. For these purposes, we organized meetings with the

remaining stakeholders and searched for common solutions. Since the city centre of Ljutomer is a cultural and monumental protected, it was necessary to check additional requirements and conditions of the Institute for the Protection of Cultural Heritage of Slovenia. Also, there were two options for the location among the proposals, which we also had to consider. Finally, we chose the location right next to the municipal building, where a charging station for electric vehicles was already installed, which perfectly rounded up the sensibility of the location. During the planning process, we also came to the conclusion that the bike shed itself does not make sense as such, so we asked the Joint Secretariat for minor changes in the investment. On the basis of their confirmation, the municipality could purchase 3 electric bicycles.

**Implementation phase:** The choice was followed by bidders for the installation of a bike shed and the supply of electric bicycles.Since there was no need to obtain any documentation for the installation of a bike shed other documents, the installation itself was quite simple. However, some construction work had to be carried out, for example, mechanical and manual excavations, basement planning, gravel plowing, plastering and curbing, concrete casting, installation of bike shed.

**Montoring:** In April 2018, the Municipality of Ljutomer thus put into operation the bike shed for all employees. From that month, the number of parked bicycles at the bike shed started to be monitored. Monitoring was carried out by a person who was directly responsible for this work. The use of three electric bicycles was also monitored by the municipality. This was arranged through a book of rental vehicles entries that already exist for renting a car. Just electric bicycles served to perform shorter service routes.

PERSONALIZED MOBILITY PLANS

**Selection phase:** The Personalized mobility plan was an idea launched by the EU-based PTP-Cycle project, Personalized travel planning for cycling. The project supported personal cooperation with selected persons and personalized counselling for changes in mobility behaviour. Since this approach was only completed in Slovenia theoretically, PP 2 decided to test it in practice.

**Planning phase:** In the preparation of Personalized mobility plans, we first had to prepare a draft plan or how it will look like a final document and define specific planning procedures. We also put emphasis on communication between the person and the developer/adviser, what kind of questions to ask and how to ask them. For these purposes we also prepared a questionnaire, which could be completed by the person from the beginning, so that the developer gets as much concrete inputs as possible for the preparation of the plan. They also conducted three interviews, which additionally highlighted issues, goals and needs.On the basis of the responses from the questionnaire and interviews, the developer prepared three Personalized mobility plans and submitted them to employees for review. They have committed themselves to implement it and follow the objectives set out in the plan.

**Implementation phase:** The implementation of Personalised mobility plans started in June 18, as we were of opinion that it was easier to change travel habits in spring or summer, warm days. The monitoring and implementation period lasted 4 months. For these purposes, we prepared forms where people could select the vehicle's choice on a daily basis and what time it was.

**Promotion:** The promotion of the pilot activity was carried out in parallel with the promotional campaign led by the leading partner. This campaign targeted employees directly and focused on changes in traffic behaviour. The campaign covered mainly soft measures that affect employees and allow discussion and communication. Thus, the leading partner prepared a thematic leaflet for employees on cycling, then prepared 3 different thematic posters, which the municipality put in the toilet facilities, to keep employees informed about the benefits of walking, cycling and traveling. During the summer months, the Lead Partner informed the employees via e-mail and sent three e-newsletters, also on various topics. For the purposes of disseminating information to wider surroundings, employees also received promotional t-shirts that they use at major events and thus disseminate information. As part of the increased capacity,

the leading partner also carried out the training of employees, where he presented the planned measures and ranged them together.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

The pilot action consisted of purchase of 10 e-bikes, 4 charging stations (3 stations for 4 bikes and 1 station for 3 bikes). Beside the e-bikes and bike charging stations, also helmets and bike maintenance package have been purchased for each bike and distributed to the bike caretakers at respective departments.

**Selection phase**: Litoměřice has been focusing on usage of geothermal energy and photovoltaic energy and has been looking for possibilities to use renewable energy also in transport for several years. In 2019 the city plans to install accumulation systems to accumulate photovoltaic energy and use it for charging cars and bikes. Litoměřice has also a fleet of e-cars and a support of e-bikes is another logical step in its strategy.

**Planning phase**: The pilot was specified during creation of the period of the Workplace Mobility Plans of the Municipality of Litoměřice and Litoměřice hospital. Throughout the mobility planning process there were several meetings of the working group (internal stakeholders), where the pilot was discussed from many points of view. Setting the details of the pilot was important, as well as what kind of bikes and equipment will be purchased, which and how many charging stations will be installed and where, etc. A part of the planning was also tendering to determine providers. Two tenders took place – a tender for e-bikes and a tender for bike charging stations. Unlike in the e-bike case, tendering charging stations was quite challenging because of a limited number of potential suppliers. We had to look for them carefully not only in Czechia but also abroad. However finally after a substantial effort we received an offer which was corresponding with our needs and requirements.

**Implementation phase**: After the purchase of the equipment it was necessary to get in line the usage of the e-bikes and its infrastructure. Several rules including safety measures needed to be set up. Another important issue was the insurance of the equipment, so the employees are not afraid to use it. Some legal issues regarding the purpose and personal usage were set. After several meetings each e-bike got its caretaker who is the person who is responsible for each bike, handles its borrowing and also has a repair kit which can be used by anybody to fix small damages on bikes. The charging stations needed to be installed which required some expertize in installation. Apart from physical installation, the hospital required a legal consultancy on matters of ownership and maintenance as well as the distribution of electric power. One charging station was installed into its temporary location (at Topolčanská building) as there are plans to conduct a reconstruction of its original intended location (at Mírové náměstí building). This charging station will be reinstalled after this planned reconstruction.

**Promotion**: The news about the pilot was spread via intranet system among the employees of the Municipality. There also was a press release published along with a press conference. Article about this pilot action and how to use it will be also published in a newsletter as part of an awareness raising campaign.

**Stakeholders involvement**: Throughout the mobility planning process there were several meetings with the working group (internal stakeholders), where the pilot was discussed. This will be described in more detail in D.T3.3.9.: Stakeholders' input on CZ pilot action.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

**Selection phase:** The high share of individual car usage even on travel distances of less than two kilometres, like 49% in Mödling, was one of the key issues which convinced us to put the focus on walking and awareness rising in this area. Further, the Austrian MOVECIT municipalities are small scale cities which can be covered within a 2kilometre radius, which have already implemented well developed

walking infrastructure and where more than a half of the employees have less than 5km daily travel distance.

**Planning phase:** At first we collected internal experiences at CAA with price sponsoring and asked for relevant contacts and for experiences at Bike2Work Austria concerning winner's determination and how to make competition fun. As a result of the experience exchange with Bike2Work we decided to offer a reachable goal of 60.000 steps in four weeks to encourage also these employees, who are not the most sportive ones. Within an internal Workshop of the CAA MOVECIT Team we developed a Walking Award concept with all components of the Walking Award. We clarified its promotion, fixed a timetable and clarified responsibilities within the CAA MOVECIT team. Main issues were the different kind of print forms which we needed for promotion, further coordination with sponsors, public relations work, Workshops on Health Aspects of Walking and Cycling which should be held in advance at the municipalities to promote the Walking Award and further the evaluation and award ceremonies after the Walking Awards implementation. As we chose an awareness raising campaign as pilot action it was necessary to develop an appealing design and to choose a meaningful logo. For this reason, we did some research on similar campaigns and found a running competition which took place in the US. The competition was organized by a company for its employees and we decided to use a similar image or to overtake an edited version. It took us some time to clear legal conditions for using that image, to find out the creator and to clarify copyrights.

**Promotion:** For promotion of the Walking Award we used three channels:
1) Promotion via campaign action: This was an expert's lectures & mobility quiz: In Baden and Mödling we had expert's lectures with Dr.med. H.P. Hutter on health aspects on walking and cycling and we made a guessing game with participants, who had to guess steps on a given distance and to count them with pedometer to receive the correct answer. At these events we spread the Walking Award leaflets.
2) Promotion via print forms: we prepared posters, leaflets, booklets and stickers.*Posters* and *leaflets* were developed to promote the Walking Award in advance. We spread them almost two months before the Walking Award between the mobility teams in printed and digital versions. And we added an information sheet for the mobility teams with instructions for the Walking Award procedure.The *Walking Award Booklet* and *Stickers* overtook the functionality of registration, documentation and motivation during the Walking Award. One section of the booklet was registration card and counting table and was sent back by participants at the end of the Walking Award for winner's determination. We spread the booklet two weeks before the Walking Award started, so that the mobility teams had enough time for distributing them. But it was really tight with the printing company because in the end we had to overwork some details which took more time than expected.
3) Promotion via public relations: We prepared reports of the Expert's lecture which were posted in social media and published in two journals for Austrian's municipalities. The journals were published in the beginning of September 2018 and we promoted the Walking Award Climate Alliance's magazine and made press releases on and press conferences releated to Walking Award Ceremonies.

**Implementation phase:** The implementation phase was split into three stages of walking competition, evalution and award ceremonies. The walking competition ran from 17$^{th}$ of September to 12$^{th}$ of October 2018 and three Austrian municipalities - Baden, Mödling, Leoben - participated. The mobility teams in the municipalities were introduced to spread the Walking Award Booklets with the registration card and step counters before the 17$^{th}$ of September to the municipalities' departments. This was organised very differently at the municipalities for instance Mödling and Leoben focussed on the town hall employees, in Baden different locations were addressed to take part. That had effects on the number of participants and on reached number of steps. Firstly, in Baden more than 100 employees participated on the Walking Award, while in Mödling and Leoben approximately 20 persons took part. Secondly, in Baden the employees of the municipal parks and the police men and women participated and expectably they received the highest amounts of steps.

For evaluation we introduced the municipalities to collect the registration cards with included step counting tables within one week and to send them to CAA for evaluation. For determining the winners and evaluation of the steps we used excel sheets.
For handover of prices we organized official events with the mobility teams. So, we had an award ceremony in each participating municipality, where the mobility teams, important representatives of the municipalities like the mayor, the winners of the competition and representatives of CAA took part. The final event of the Walking Award was the main prize for the Winner municipality Baden, which won a multimedia presentation of Gregor Sieböck, who became famous when he travelled around the world by walking. We reported about the award ceremonies and Mr Sieböck's presentation on our Website, on social media and in regional newspapers.

**Stakeholder Involvement:** Stakeholders were involved through all steps of pilot action implementation. As we developed a prototype version of a Walking Award it was very important to coordinate with the mobility teams because they were responsible for implementation out on the spot and our 'products' had to be well adopted to their requirements and possibilities. Especially with mobility teams of Mödling and Baden we had some meetings and were in regular phone and email contact for coordination.

**Technical aspects:** The campaign didn't have many technical aspects. Only the step counting app and pedometers were relevant aspects. Here we had diffent counting results between pedometers and app – some people used both – and least expensive pedometers didn't work properly.Pedometers were provided by the municipalities and given as a goody to employees when they registered for the Walking Award.

**BME, HUNGARY**

**Selections phase:**The selection of this pilot was based on the following considerations. In the Workplace Mobility Plan of BME several measures were defined. We wanted to create such a pilot, which is useful and scalable. The idea was to support the decision making process of the employees, which can be best realized by showing the potential options and the benefits of each transportation mode.

**Stakeholder Involvement & planning phase:**From May to November the project partners and various stakeholders had meetings to discuss the idea, the goals, the methodology, and in the final stages the actual solutions of the application. During the discussions several requests were formed and changes were made to support the development of the online tool. The stakeholders were involved in the development process to achieve a final solution, which is easy-to-understand and informative.During stakeholder meetings, the idea and the original goal were successfully preserved, whereas the methodologies and solutions changed a lot. The application needed good balance, as if the application is too simplistic, the results are not reliable. Also, if the application is too complex, users will turn away. As a final solution, the application provides pre-settings for parameters, and lets the users (who are interested) to fine tune the parameters.

**Implementation phase:** After three stakeholder input meetings and several other meetings, conversations and brain-storming, the application was implemented, and ready to spread amongst colleagues. The application is hoped to be a very useful tool in the future also for citizens in Budapest and its functional urban area.

**Technical aspects:** The application has a strong visual identity to grab users' attention. The specific routes between work and home are shown on a map with indicators. The users can to set the indicators with sliders, how important travel time, cost, emission and healthiness is for them, and the online service shows the routes of different transportation modes with different colours and numbers both on a map, and in a table view, where the calculated values of the parameters are also presented.
The following technical parameters describes the online tool:
- front end components (HTML, CSS, JavaScript)
- server components (Java, REST, JSON)
- database components (MySQL)

**Municipality of Banská Bystrica, SLOVAKIA**

**Selection phase:** The pilot action has been selected by the project partners – Ekopolis and the City of Banska Bystrica as the measure which has optimal potential to extend the provided services for users of biking transport in the city. The key factor was the strategic location of the pilot action.

**Planning phase** was important to reach the agreements on specific parameters of the shelter. The exact position in the broader area was one of the main reasons for time delay as it had to wait till the completion of the Terminal Vlak Bus Shopping Centre.

**The main phase of the implementation** – it means start of the usage, will follow after the construction of the shelter is finished. However, during several public events the construction of the shelter was promoted and the idea of the bike point was received very positively.

**Promotion:** The pilot project has been promoted on several events – for example on the discussions with public during the March 2018 "Transport, City and People", when Ekopolis was mapping the problems and suggestions related to transport in the city. At that time, 5 discussions were organised, one in each of the five city parts. Main public action was "Opening of the cycling season" regular mass ride each spring before the Bike to work campaign organised by the local cycling groups. During this action the questionnaires were distributed to the participants to find out their interest in future use of the bike shelter in the area of the bus and train station.

**Stakeholder Involvement:** Due to complex character of the pilot action, involvement of many stakeholders was a natural necessity. The reasons of their involvement included addressing and solving particular issues: locality of the shelter, architectonical study, technical parameters, and permission related issues (statements/approvals of various institutions).
There was intensive stakeholders' communication going on throughout the period 6. Stakeholders involved mainly the City Hall, State Railways Company and Ekopolis. Ekopolis was involved as facilitator of the process, to speed up the administrative process. City of Banska Bystrica as the main responsible institution was involved most intensively – through its Departments of Main architect and Department of Project Implementation.

**Technical aspects:** The bike point is located at the train and bus station in Banská Bystrica. The final technical includes the folowing:

- 18 lockable spaces for bikes, out of this 12 in bike boxes equipped with e-bike chargers and 6 are roofed bike stands
- 10 boxes for helmets and other smaller luggage
- self-service stand;
- informational map of town and its walkability

**City of Modena, ITALY**

**Selection phase:** The implementation of a sensor is useful to monitor the efficiency of infrastructural bike net and to increase the awareness both of citizen and employees. The stakeholders were also positively oriented to promote these devices on the urban roads: whereas numerous projects and experiences have confirmed that the dissemination of good practices among citizens represent a good lever to create more sustainable habits.

**Planning phase**: In order to obtain the new sensor to monitor the traffic flows, the municipality needed to plan the implementation and to provide a public procurement. The offices asked for the best offer on the market and after that it has been possible to implement the device. The technicians chose the installation point by one of the most important urban roads, where the municipality built up recently a new cycle lane separated from the vehicles: this is a perfect situation to monitor the change of habits related to a transport capacity decrease for cars and vice-versa to bike spaces increase.

Implementation phase: In our case, the implementation was quite simple compared to the planning phase. The device is quite small, and it has been attached to a lamppost. It's powered with solar panel and it works 24/24h 7/7

**Promotion:** The new device installation has been communicated to stakeholder during the meetings. Even the SUMP contains the information about the sensor.

**Stakeholder Involvment:** The new device installation has been communicated and discussed with stakeholder during several meetings. At the beginning of the process we involve a first group of stakeholders for a recognition of the state of the art in mobility process: in this frame, we collect from them suggestions, opinions and useful knowledges, in order to implement an efficient model for mobility planning and strategic processes. The stakeholder supported from the start our idea to implement an innovative technology to collect more data from the territory, hopefully in real-time.
During following stakeholder meetings, the mobility head officer explained them the technological potentiality of the devices found on market: all the stakeholders were positively oriented so, the offices started the public procurement to implement the device. The stakeholders have been obviously involved also during installation phase, in order to share opinions about the most interest and efficient localization for the passages counting considering the specific characteristics of the sensor and of the bike net.
In the end, during last meetings about with the stakeholders about the WMP and the SUMP, the offices have shown the first data collected from the device: it was quite interesting for stakeholder to see real data about bike use on urban bike lane and how the municipality was using that data to refine the WMP.
Even employees have been invited to visit the data sharing platform in order to see how many people already use the bike along urban net usually as commuting way of transport.
Stakeholders and employees became in this way the first witnesses of the sensor functionality, so they represented the firs communication channel.
Even the SUMP contains the information about the sensor: in this way, the municipality mobility offices tried to promote this practice as a replicable action on several strategical point around the city.
Technical aspects: The counting section is based on the "Motion Detection On Video" (MDOV) technology. This allows the detection of motion – people or object – from video recorded with IP cameras, analog or digital. After a brief "learning" phase, the algorithm can recognize, under specific lightning condition and angle, the different types of objects moving in the video (pedestrians, bicycles, cars, etc.), and provides as an output the counting of the objects class crossing a section during a certain period. An innovative feature of this typology of traffic counting sensor lies in the concept of "digital measurement line", i.e. the measurement section is virtually traced on the video, thus avoiding any physical intervention on the road, and allowing to change the counting section at any time (or adding more digital measurement lines using the same recording).

**City of Leipzig, GERMANY**

**Selection Phase:** This pilot was selected during the project MOVECIT proposal writing due to reasons described in chapter 3.

**Planning Phase:** During this phase stakeholder meetings have been organised and tenders have been published. In addition, it turned out that the 5 bike boxes could not be implemented because the bicycle boxes could potentially damage the batteries of the bicycles during high summer temperatures. The weather conditions were the main reason not to buy bike boxes.

**Implementation Phase:** The cooperation agreement between The Aufbauwerk Region Leipzig GmbH and the Office for Traffic Planning and Road Construction was signed in February 2017. The loan agreement for the whole equipment in October 2018. The bikes were ordered in November 2018 and handed over to the Office for Traffic Planning and Road Construction in March 2019.

**Promotion:** Since the pilot refers to the employees of the Office for Traffic Planning and Road Construction, there was no classic advertising on a large scale, but an internal promotion to reach as many employees as possible. The cargobike was marked with appropriate logos.

**Stakeholder involvement:** Three stakeholder meetings have been taken place between November 2018 and March 2019. During the stakeholder meetings several topics could be discussed with the stakeholders from the City of Leipzig and the Office for Traffic Planning and Road Construction. The stakeholders gave a lot of valuable input for the further development of the MOVECIT project. As initially planned, the investment of 5 bikes (4 e-bikes and 1 e-cargo bike) could be fulfilled. On the other hand, during these meetings it has been ascertained that the purchase of 5 bike boxes cannot be fulfilled because these boxes could potentially damage the batteries of the bicycles during high summer temperatures. The weather conditions were the main reason not to buy bike boxes.
For this problem a solution has been found in the meetings, which has been proposed to the lead partner of the project and been accepted by the JS. The solution is to store the 4 pedelecs and the cargo bike in the underground garage of the Technisches Rathaus (Technical Townhall)
Besides the pilot investments, the topic of the dissemination events was tackled. Within the stakeholder meetings the participation in the “Ökofete” and “Mobile wins” has been organised. During these events the MOVECIT project and its goal could be promoted among the citizens of Leipzig.

## 3.5. Duration of implementation

**Municipality of Ljutomer, SLOVENIA**

Pilot activity started in March 2018. The Workplace mobility plan for employees was completed and prepared in the months of October and November 2017, in October 2017 we presented it to the employees, so that they were acquainted with the objectives and planned measures for the future.

In March and April 2018, we actively began to plan a pilot campaign, first with the first stakeholder meetings. In March, we also agreed to conduct the first interviews for the preparation of Personalized mobility plans, after which we also conducted them in April. On this basis, Personalized mobility plans were prepared in May 18, which we then tested in the summer months. In September 18, we obtained data that can serve us in reviewing the achieved goals.

Concerning the infrastructure measure, the construction of a bike shed and the purchase of e-bikes, we began with the discussion towards the end of 2017. The Municipality of Ljutomer collected the bids for the equipment and then agreed on the supplier in February 2018. The installation of the equipment was carried out in March, and in April we could already monitor the arrival of bicycles and the use of the bike shed and the use of electric bicycles for short business trips.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

The purchase of 10 e-bikes started in November 2017 and of 4 bike charging stations in May 2018. The e-bikes were distributed to six municipality departments and 4 of them to the municipal police by start of the cycling season in 2018, so that they can be used for business trips and local commuting. The charging stations are in operation since their installation in June 2018.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

Climate Alliance started with pilot activities in April 2018 and finished pilot action in February 2019. For planning phase, prepartion of campaign material and promotion of the pilot action we had 5 month from April to August 2018. Implementation of the Walking Award took 6 month - the Walking Competition started during European Mobility Week in September 2018 and ran for one month. Collecting registration cards of all participants and its evaluation nearly on month. Walking Award Ceremonies in participating municipalities were implemented from November to December 2019 and the main prize event for winner municipality Baden – multimedia presentation of "World Wanderer" Gregor Sieböck took place in February 2019.

**BME, HUNGARY**

The timeframe of the implementation of the online tool for travel route planning was the following:

- 2018. June: signing the agreement, planning the functions
- 2018. July: creating the framework, developing the functions
- 2018. September: internal testing, fine tuning of the functions
- 2018. November: starting the pilot with the working online service

**Municipality of Banská Bystrica, SLOVAKIA**

Actual preparation of the technical documentation for the pilot action started in September 2017, after completion of the large construction of the new Bus Terminal and shopping centre. Preparation and approval process required numerous agreements among the owner of the area (Railways of the Slovak Republic) and the project partner City of Banska Bystrica as well as statements for other parties (e.g. the from State administration of historical monuments). As such it was lengthy and complicated. Land owner provided conditional agreement with the construction under the bike point in October 2018 as a pre-condition to start the construction permission process at the level of City Hall B. Bystrica. Construction permission and tender for supplier was finished in March 2019. On the May 3, 2019 final approval was issued by the Railways of the Slovak Republic and during the month of May 2019 the construction was completed.

**City of Modena, ITALY**

The discussion about pilot action and the public procurement process took a quite long time: we started to discuss with stakeholder about technical characteristics and about localization since November 2016. The physical device installation took place in November 2018, the first data have been collected since 15th November 2018. It will count passages for 12 months so the duration of the pilot action is over the end of the MOVECIT project.

**City of Leipzig, GERMANY**

The concrete preparations of the pilot started in 2018 with the organization of stakeholder meetings with the main focus on the pilots. Before that in 2017, workshops and seminars about the topic mobility have

taken place. The bikes were ordered in November 2018 and handed over to the Office for Traffic Planning and Road Construction in March 2019.

## 3.6. Level of acceptance among target group

**Municipality of Ljutomer, SLOVENIA**

The first part of the pilot was presented already at the stage of preparation of the Workplace mobility plan and agreed with all employees. The bike shed and electric bicycles are a great acquisition of the municipality, as bicycles usage has been increasing from month to month. The frequency of cycling on the workplace has increased, as is the use of electric bicycles for the purposes of shorter business trips. Occasionally, the bike shed has faced with the lack of the space, which is confirmed by the fact that the employees showed interest in cycling.

Three selected persons were at the beginning very keen on participating in creation of the Personalised mobility plan. They actively cooperated in interviews and plan development, they also suggested the objectives and the target values. When the theoretical phase turned into the practical one the situation changed. The level of readiness has dropped and the person had to be constantly reminded to meet the targets. The easiest part was with the persons that had short distances to overcome, more difficulty was in case of longer distances (around 60 km), the willingness was lower also due to the fact that the public transport is poor and does not provide the smooth use, while other person followed the objectives and achieve it accordingly. The carpooling was very challenging, the person that had to commute 60 km in one way has reached only 50% of the foreseen goal. The carpooling is not that well accepted as it hinder the flexibility of individual. The people are not yet ready to share the rides often.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

The pilot action was taken positively by employees of the both institutions and demonstrated a potential of e-bikes in the city and its surroundings, especially because 3 of them were used permanently by the members of the Municipal Police. The pilot action even motivated some employees of the municipality to buy their own private e-bikes.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

Concerning target groups of the Walking Award two main effects became visible: On one hand, there was a big difference in number of participants between the municipalities. In Baden the mobility partner climate and energy department put a lot of effort in encouraging employees and to involve as many departments as possible, while Mödling and Leoben mainly involved deparmtments which are located at the town hall. In Baden nearly a fifth of all municipal employees (111 persons) participated on the Walking Competition. On the other hand it became visible, that these employees reached most of the steps who do more physical work in general like gardeners or police officers, who are out on the street. It was another interesting aspect, that in Baden people who regularly cycle to work also wanted to participate on the competition. Since we decided only to allow step counting for the Walking Award and not to cycle, some employees started to walk to their working place instead of cycling.

**BME, HUNGARY**

The online tool was very positively accepted, several feedback and extension requests arrived, however the tool was not used by specific age groups (mostly elderly colleagues). Since the technical implementation was an external task, BME had the chance to focus on its own professional sections, e.g. handling objective (time, distance) and subjective (weights, preferences) parameters at the same time.

**Municipality of Banská Bystrica, SLOVAKIA**

The Pilot action was for objective reasons completed at the very end of the project implementation period, therefore hard data on the acceptance are not available. However, to find indicative data about the acceptance of the pilot, the project partners organised the survey among the target groups through a questionnaire, which was distributed to the respondents during the months April and May 2019, on several public events. On these events the bike point project was promoted by the banner presenting the technical parameters and functions of the bike point. The banner was also exposed and respondets approached directly the constrution site near the Bus Terminal and the Railway station.

In total, out of 118 respondents to the questionnaire, 99 people responded „YES“ (45) and „YES Sometimes“ (44) to the question „Do you visit or pass the area of the Railway station by bike?“. Than there were 29 answers “NO”. Out of those who responded YES to the first question, 65% responded positively to the question „Will you use the bike parking point once available?“ , 15% responded NO, and 20% Do not know.

**City of Modena, ITALY**

Many employees are counted daily by the sensor. Many colleagues asked for other devices on their own itinerary, in order to see the average number of transits. This represents an important goal because it means an increase of consciousness and a better involvement of employees in the mobility evolution. About the platform, many employees are already registered and waiting for customized suggestion by Mobility Manager.

**City of Leipzig, GERMANY**

The project has been adopted well by the employees and through the dedicated booking and fleet management system, the bicycles will see a lot of use in the form of short business and shopping trips.

## 3.7. Level of implementation effort

**Municipality of Ljutomer, SLOVENIA**

At the Ljutomer Municipality we tested two different pilot activities. The first concerned the installation of a bike shed and the purchase of 3 electric bicycles and it is of a more infrastructural nature, but the other activity was related to the soft measure, that is, the preparation of Personalized mobility plans that are individually tailored. Slovenian pilot activity is, in principle, easily feasible. It is also relatively affordable, with considerable impact and quick performance.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

At the municipality of Litoměřice, the implementation of the pilot action was quite a long process due to adequate preparation of the pilot. Since there were e-bikes, charging stations and accompanying accessories purchased by the city, there was a need to hold a public tender to choose the supplier, which can be seen as an administrative burden. There was also need to communicate this matter with the Litoměřice hospital, where one charging station is located. They had to deal with legal issues, as well as the municipality. Another issue was safety of using the bikes which could be problematic to the employer in case of accident or injury. However, the pilot was so far quite effective and the e-bikes are used, so if we would be comparing whether the implementation effort was difficult with the level of positive aspects the pilot introduced we can say it was worth the effort.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

The main effort for implementation of Austria's pilot action in form of a campaign was put into its development – to create and fix a procedure and components of the Walking Award, to develop a design and campaign material. But as soon these aspects are clear and developed, they can be easily used for further implementation of a Walking Award. From the municipalities we got the feedback, that in general the campaign was fairly easy to implement and a low cost measurement. However, they also pointed out that it needs someone who is coordinating the campaign within the municipality, who gives introductions on procedures and technical aspects (like apps and pedometers) and who is regularly encouraging participating employees to keep them walking.

**BME, HUNGARY**

The pilot action of BME concentrates on information providing and conscious mode choice decisions for their colleagues and citizens of Budapest generally. We wanted to create such a pilot, which is useful and scalable. During stakeholder meetings, the idea and the original goal were successfully preserved, whereas the methodologies and solutions changed a lot. The application needed good balance, as if the application is too simplistic, the results are not reliable. Also, if the application is too complex, users will turn away. As a final solution, the application provides pre-settings for parameters, and lets the users (who are interested) to fine tune the parameters. The most challenging part was to fit the required timeline and still provide a useful tool at the end. Also the several change requests and new features were hard to add, which were appearing during the implementation process.

**Municipality of Banská Bystrica, SLOVAKIA**

The pilot action in Slovakia was relatively complicated project. Several complications occurred during its preparation and implementation which led to few months delay in its completion. First complication, which was however realistically taken as a risk from the very beginning of the MOVECIT project was that actual planning of the design and position of the shelter had to wait till completion of a larger

construction of the new bus terminal and shopping centre. However, also the second phase of the actual implementation took much longer than expected and took much higher involvement of the stakeholder due to complex organisational structure of the Slovak State Railways – the owner of the land under the bike point. From that perspective the level of implementation effort was relatively high taken in consideration that the investment itself was not so extensive.

**City of Modena, ITALY**

The hardest part of implementation of the new sensor was the need for a public procurement: it was a quite long process, more than expectations, so the data collection hasn't started since November 2018. The system is although quite expensive: many money funds are needed to build up an efficient net with many detection points, so with this pilot action we could buy just one sensor. Anyway, the cost-benefit ratio is evaluated quite good because the device works continuously, and its efficiency is high. Even the number of bike passages is satisfactory: the constant increase bike number in encouraging for the urban transport mode evolution. Many employees have demonstrated interest in data collected and in the analysis process, so this pilot action has been useful also to increase consciousness among colleague and, consequently, citizens. With the first data collected through to the pilot action, the mobility office refined the Workplace Mobility Plan draft: the final version of the City of Modena Workplace Mobility Plan has been definitively approved by town council on 7th May 2019.

**City of Leipzig, GERMANY**

At the Office for Traffic Planning and Road Construction of the City of Leipzig, the implementation of the pilot action was a long process due to a prolonged approval process. The bicycles were ordered in 2018 and delivered at the beginning of 2019. As the Aufbauwerk Leipzig is the official project partner they had to draft a rental contract for the five bicycles. After five years the Office for Traffic Planning and Road Construction has the choice to extend the contract if they wish. Because of predicted heat problems, the projected bike boxes had to be replaced in a long process. In the end, the usage of an already existing basement garage at no additional cost was approved. The same finding process had to be followed to approve the already existing fleet management system of the City of Leipzig at no additional cost.

## 3.8. Total finance

**Municipality of Ljutomer, SLOVENIA**

The costs of the development and implementation of the personalized mobility plans were 10.000 EUR with VAT. The cost covered the plan preparation, interviews with the employees, mid-term monitoring and evaluation of the monitoring. The costs of purchase of 3 e-bikes with the equipment (helmet and pumps) were 3.555,53 EUR excluding VAT. Costs of purchase and installation of bike shed was 9.089,97 EUR excluding VAT. The total costs were 15.427,51 EUR with VAT, the municipality covers the difference above 15.000 EUR with VAT.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

Costs of purchase of e-bikes were 9,618 EUR. Costs of purchase and installation of charging stations were 4,805 EUR. The total costs were 14,423 EUR.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

The implementation of pilot action Walking Award cost approximately EUR 7.000. That sum includes staff costs, prints costs, small prices for winners and costs for external services like the presentation of

Austria's "World Wanderer" Gregor Sieböck. The experts lecture on health aspects of walking and cycling by Dr.med. Hutter is not included. – Each lecture costs EUR 400, -. For 20 pedometers the municipality of Mödling paid €250, which is also not included in EUR 7,000,-.

**BME, HUNGARY**

The pilot cost was 12.580 Euro, which was implemented by an external software developer. The cost-benefit ratio was not calculated directly, since the benefits can only be deducted from stated preferences, and thus are hardly to monetarize. Generally, the ratio can be high, if users really change travel behaviour based on the suggestion of the online tool.

**Municipality of Banská Bystrica, SLOVAKIA**

Eligible costs for pilot action bike shelter was 46.000 EUR. Eligible costs covered construction work, bike boxes, bicycle stands, public pump, e-bike charger and bike shelter. Other costs of approximately 6 490 € spent from financial resources of Municipality Banská Bystrica covered extra construction work costs and also 10 lockers for bike helmets and small personal luggage. Overall budget for pilot action was 52 490 €.

**City of Modena, ITALY**

The total cost of the sensor installation and data providing service has been EUR 14.993,80 (tax included).

**City of Leipzig, GERMANY**

The original total costs for the implementation of pilot action was 32.000,00 € and consists of

1. The purchase of 4 pedelecs and 1 cargo bike – 12.000,00 €,
2. The purchase of 5 bike boxes – 9.8000,00 € and
3. The implementation of a booking and fleet management system – 10.200,00 €.

The purchase of the 4 pedelecs and the cargo bike hat a final total cost of 18.338,18 €. For the long-time durability of the bikes a set of spare parts was purchased (total amount of 510,40 €), such as tire levers, a battery compressor air pump and inner tubes. This results in a total cost of 18.848,58 € for the implementation of the pilot action.

## 3.9. Cost-benefit ratio

**Municipality of Ljutomer, SLOVENIA**

The personalized mobility plan enabled the employees of the Municipality of Ljutomer to test the new approach in planning. It is personalized planning and is tailor made to the individual circumstances and needs for commuting. It is found out that the goals were reach for 100% for 1st and 2nd employee, for the 3rd employee the goal was reached for 50%. The goal of the 1$^{st}$ and 2$^{nd}$ employee was commuting by bike once per week and the goal of the 3$^{rd}$ employee was carpooling once per week.

The first two employees have changed their commuting behaviour in favour to sustainable commuting for 20 % and the 3rd employee for 10%. Considering this number of kilometres would be made by a car individually, we can claim that this pilot action in the period from June 2018 to September 2018 saved 94 kg of CO2. The cost-benefit ratio is high as the money invested gave the great impact, taking into account the investment and the percentage of the improvements.

The purchase of 3 e-bikes with the equipment (helmet and pumps) and installation of a bike shed enabled the employees of the Municipality of Ljutomer to cycle 3.501 km. Considering this number of kilometres

would be made by a car individually, we can claim that this pilot action in the period from April 2018 to September 2018 saved 563,70 kg of $CO_2$. The cost-benefit ratio is moderate, taking into account the investment and the $CO_2$ emissions savings.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

This pilot action enabled the employees of the Municipality of Litoměřice and the Municipal Police Department employees to cycle 5 657 km. Considering, this number of kilometres would be made by a car individually, we can claim that this pilot action in the period from April 2018 to November 2018 saved 1038.85 kg of $CO_2$. (This calculation was made by using the average production of $CO_2$ by car per km: 183.6401 g/km.) The cost-benefit ratio is moderate, taking into account the investment and the $CO_2$ emissions savings.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

With the Walking Award in three municipalities nearly 160 persons were achieved, when they took part on the walking competition Walking Award, which ran over a time period of one month. We expect that the campaign for some of the employees had influence on their regular mobility behaviour and that they serve multipliers within their social surroundings. Further, in this matter it must be considered, that at least a third of the costs of EUR 7,000,- were related to development of the campaign. In case of further implementations of the Walking Award it can be expected that these costs for development will decrease while the number of participants increases if the Walking Award is implemented in bigger context and targeting more municipalities or public institutions.

So, a good cost benefit ratio with quiet low impementation costs and high impact which means a high number of participants could be reached by regular implementation of the campaign over several years and by implementing it in a bigger spatial context. During the pilot action Walking Award 158 employees of Austrian municipalities Baden, Leoben and Mödling walked 21.702 km. Considering, this number of kilometres would be made by a car individually, we can claim that this pilot action in the period from 17$^{th}$ September to 12$^{th}$ October 2018 saved 3,25 tons of $CO_2$. (This calculation was made by using the average production of $CO_2$ by car per km).

**BME, HUNGARY**

The cost-benefit ratio was not calculated directly, since the benefits can only be deducted from stated preferences, and thus are hardly to monetarize. Generally, the ratio can be high, if users really change travel behaviour based on the suggestion of the online tool.

The online tool provides such information, which is important for users to make decisions about daily trips. It includes parameters that are hard to calculate, such as healthiness or environment friendliness of a route, but it also calculates with values, which are realistic, but people usually forget to count with, such as costs of owning and using a car, or the time of parking a car. More importantly the CO2 emission is calculated as a separate parameter based on the distance, mode of transport and type of vehicle (in case of car usage). With these concerns by showing the estimated CO2 usages, the application promotes sustainable commuting modes, and therefore helps decreasing CO2 emissions.

Although the pilot has been ended in February 2019, based on the feedback of the users, the online tool will be further developed and maintained at least until the end of the project. Thus it can serve as an efficient tool for demonstrating sustainable mode choice not only for the original target group, but also for a wider audience.

**Municipality of Banská Bystrica, SLOVAKIA**

The cost benefit ration should be evaluated in a broader context of long term effort of the municipality to enhance conditions for biking infrastructure in the city. The exclusive location of the bike point gives all the good preconditions to become an integrated part of the transport hub in the city. Cost benefit ratio can be also looked at from the point of view that this kind of well equipped bike point is not existing in broader region and thus it brings also model value, how such constructions should be installed.

**City of Modena, ITALY**

The sensor has been introduced to monitor the daily/seasonal variations of car and bicycle traffic on urban roads. This kind of action had double goals: by one side the sensor collected data are a precious source of information to develop further actions, secondary, the data dissemination could be useful to increase the citizens' awareness. Whereas numerous projects and experiences have confirmed that the dissemination of good practices among citizens represent a good lever to create more sustainable habits. The cost-benefit ratio is evaluated quite good because the device works continuously, and its efficiency is high. Even the number of bike passages is satisfactory: the constant increase bike number in encouraging for the urban transport mode evolution.

**City of Leipzig, GERMANY**

At the end of the project 20% of the surveyed employees reported that they rely less on their car to commute to work. At the same time a significant increase in ride sharing, bike use and travel on foot or by public transport for the commute to work could be observed. Because of these improvements the project budget directly resulted in a traffic relief and less $CO_2$ emission. The bicycles also have a model character as they are highly visible. Thus, they may inspire other people to seek a similar option for themselves and contribute to an overreaching shift in perception in the general public.

## 3.10. Innovative character of pilot actions & Potential of overtaking for other municipalities

**Municipality of Ljutomer, SLOVENIA**

In principle, the installation of **bike sheds** is not innovative on a global or European scale, but in this environment, we can say that this is something new, something that the municipality definitely needed. For smaller municipalities with small budgets, such infrastructure is a springboard for further investment in sustainable mobility as well as an incentive for employees.

In establishing **personalized mobility planning**, experience is definitely interesting and we can say that the pilot is innovative. We used a bottom-up approach and taken into account the individual wishes, goals and needs of the employee. Since the approach has been presented so far only theoretically, it has been much more difficult to implement it in the practice. In the meantime, there was a lot of improvisation and preparation of new bases and templates for documents. The basic idea is to carry out consulting with each individual employee, analyse the current situation with him/her, set goals and monitor them. At the same time, we found that working with each one is very demanding, it requires a lot of time from the developer.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

The pilot has attracted attention of local inhabitants, especially the e-bikes used by the municipal police. Not only local people but also regional and national-wide media put attention on our pilot and prepared

news about Litoměřice experience; it is also because e-bikes at municipalities' vehicle fleets are quite a novelty in Czech conditions. The whole pilot is in line with the city long-term strategy to be a local leader regarding energy management and sustainability, Litoměřice is an example of a city which directly supports sustainable transport modes.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

The pilot action Walking Award was not necessarily innovative with its approach of a competition campaign because Austria's Bike to Work is similar organized and already ran over eight years. But the Walking Award definitely is innovative with its focus on transport mode "Walking" and to promote its positive aspects. Walking is the most natural way of mobility. Maybe for this reason it is often forgotten or there is not paid enough attention on it when we talk and think about sustainable mobility. When we had our consultancy meetings and dissemination events and met representatives of other municipalities, they were interested on the campaign because it provides an opportunity to widen the focus of mobility measures from bicycle traffic and e-mobiltiy to pedestrians. Another relevant aspect are low implementation costs which are affordable for many municipalities. In 2019 the European Mobility also focusses on transport mode "Walking" and the Walking Award will be promoted as "Geh-Winn" Walking Competition within more than 950 Climate Alliance Austria's partner municipalities.

**BME, HUNGARY**

Most feedbacks commended the integrative way of the application, how innovatively it compares transport modes. Other users highlighted the visualization, since the user interface of the application is very trendy and eye-catching. The methodology and the tool itself can be easily transferred to any other region in Central Europe, only the data for route planning need to be specified, otherwise it is well applicable and useful in other areas.

**Municipality of Banská Bystrica, SLOVAKIA**

The bike point with such a composition and such equipment does not exist in broader region on Banska Bystrica. Therefore there are good chances that with a growing demand for biking infrastructure and growing interest in sustainable mobility in more and more municipalities, the concept can be implemented further. Also for the Slovak Railways Company this bike shelter can serve as an innovative and model solution, since there is a larger project of modernisation of the railways stations in whole country going on and the point in Banska Bystrica received very good feedback (though by now informal) from the top company management.

**City of Modena, ITALY**

Starting from the assumption that the communication process is essential to increase the awareness and the consciousness of citizen, is relevant to invest on it. Working on own WMP and policies for its own employees, make the municipal the first test-case for its territory: it's very important that the municipality has the role of guidance in mobility issues. The technology innovation helps Modena's pilot action to be a modern tool, on which the municipality can base its mobility policies.

**City of Leipzig, GERMANY**

Administrative institutions with their high number of employees constitute a large potential target group for e-mobility campaigns that has not been tapped so far. It is however important to remember the high

level of administration necessary when working with similar institutions. For this reason the overtaking for other municipalities is definitely possible and very promising, but requires considerable effort.

## 3.11. Lessons learned

**Municipality of Ljutomer, SLOVENIA**

The installation bike sheds itself was fairly smooth, with no major problems, since the municipality quickly found the right place for the placement in the proximity of the municipal building. Currently, the bike shed works well, but if the need for capacity expansion is revealed, the municipality will have to finance it further.

Concerning personalized mobility planning, experience shows that for better results, more individual consultations, more motivational workshops should be carried out, and for the start to find such employees who already show the readiness to change behaviour in traffic.

We also believe that personalized mobility plans would be easier to make in an environment that offers more options and choices of different means of transport, and that at the same time all transport systems work well. In environments where public transport is basically weak or is not presented, it is difficult to promise or realize in practice in spite of the strong desire of the employee. Therefore, we believe that the results of personalized personal plans tests are thus positive and successful.

**Municipality and Hospital of Litoměřice, CZECH REPUBLIC**

The e-bikes have been used since the beginning of the cycling season 2018 and the charging stations since their installation in June 2018. There is a variety of e-bikes on Czech market but it was quite difficult to find out potential suppliers of bike charging stations which would confirm our requirements (regarding size, requirements on the place for stations, installation and maintenance, and other technical parameters).

But to conclude, our experience with application of the pilot is quite positive and it even motivated some employees of the municipality to buy their own private e-bikes. Further the e-bikes even attracted attention of local, regional and national-wide media (because it is quite a unique transport measure in the region and there is no other city in the region which would have e-bikes in its city vehicle fleet). Because of this uniqueness, we faced some legal problems, especially how to deal with security and safety issues of employees and bikes.

**Municipalities of Baden, Mödling and Leoben, AUSTRIA**

In conclusion, with the development of the walking competition campaign “Walking Award” for municipalities we learned about campaigning, municipalities’ requirements and opportunities related to its implementation, about aspects of gamification like competition elements and that people walk a lot if you encourage them.

- There is quiet high effort on development but it is fairly easy to rerun and to reuse developed procedures, componentes or material.
- At each participating municipality or public institution it needs someone who is committed to the issue and responsible for a walking competition’s implementation and its coordination
- Participation must be transparent to make competition possible – we got the feedback from our mobility teams that they didn’t know from each other how many participants each municipality has and for this reason they couldn’t compete. For instance, an online plattform could provide progress bars for this reason.
- With its low implementation costs the Walking Award campaign is affordable even for municipalities with small budget.

- The campaign with its Award Ceremonies offered several opportunities for media appearences and to promote each municipality's engagement on sustainble mobility.
- We were positively surprised about the pilot action's result, when 154 employees of CAA's partner municipalities walked nearly 21.700km in one month.

**BME, HUNGARY**

The most important lesson was derived during the stakeholder involvement process, when it was decided not to cope with real-time data and short-term decisions, but focus on long-term decisions and generalized results. The best practice of this pilot action is to focus on the effectiveness of a tool: it was on purpose to develop an online tool to support travel behaviour change by showing the transportation options in a very clear and efficient way.

**Municipality of Banská Bystrica, SLOVAKIA**

In summary the pilot action of implementation of a bike point at the train station and bus station Banska Bystrica is an excellent contribution of the project to step by step change of the mobility paterns in the city. The city as such does not have a long term tradition of extensive use of bikes and it is obvious that until the substantial change will take place, it can take many years. At the same time one of the main achievements of the pilot action is that it was a joint initiative of the municipality and the NGO.

At the same time the experience shows the planning and permissions obtaining process was yet more complicated than originally expected. In this way the project also contributes to capacity building at the level of the administration on how to cope with this kind of projects in the future. The lesson learned is that the National Railway Operator, even though the plan is well in line with their intentions has far complicated decision making structures and it would be less complicated to find location which is not in its ownership.

Despite of all process-related and practical obstacles, a unique bike shelter has been constructed and given to use of commuters and city visitors.

**City of Modena, ITALY**

The data provided by sensor are very important and relevant to support mobility policies. It's very important for municipality to invest more economic funds to implement a higher number of devices in order to investigate many crucial points of the city. If specific and relevant sections of the transport network are considered, traffic counting, when repeated for enough years, can provide precious information on the traffic trends of a city, on its modal split, on the seasonal or daily distributions and on the infrastructure usage. Further, if counting is available for enough years and in a sufficient number of sections, they can be used to build the origin-destination demand matrix, which can be used as a tool for any action and investment plan as a support for decisional processes. It is also clear that the communication process is essential to increase the awareness and the consciousness of citizen.

**City of Leipzig, GERMANY**

Through the pilot action it became clear that the concept idea is simple and thus applicable everywhere and to every target group. However, the costs for that purpose are relatively high and can best be funded through targeted partnerships. In addition, the pilot is relatively unimpressive as a project and must be advertised accordingly, so that it is seen and used. In this project, the advantage is that the pilot refers only to one authority - the Office for Traffic Planning and Road Construction - on a larger scale, you would have to advertise correspondingly. The hardest part is the implementation of the booking and fleet

management. It is costly and time consuming and can best be achieved through targeted partnerships that bring knowledge but also financial support into the project.

# 4. Benchmarking & Evaluation Analysis

## 4.1. Pilot Actions

During MOVECIT project eight different pilot actions in context of sustainalbe mobility had been implemented and evaluated in seven Central European countries.

Based on preceding workplace mobility analysis, mobility measures were implemented in eight municipalities, at one hospital and one university campus. Depending on individual requirements or initial situations of each workplace, the mobility measures focussed on transport modes of cycling and walking, on tools which help to analyse individual mobility behaviour and encourage employees to travel in a more sustainable way and further in tools of traffic data collection. Related to that, two soft measures in form of personalized mobiliy plans in Slovenia and a walking competition campaign in Austria were implemented. Hard mobility measures in context of cycle traffic were implemented in Slovenia, Czech Republic, Slovakia and Germany. They consisted on purchase of e-bikes and cargobikes and required infrastructure like charging stations, bike sheds, helmets, reservation systems, bike boxes and a self-service station. The city of Modena (I) focusses on data collection with the installation of an automated traffic counting sensor and the Technical University Budapest (HU) provides an online service for travel route planning, which compares different transport modes, for its employees.

## 4.2. Aim of pilot actions

The aims of the pilot actions vary in dependence on different initial situations of project partner municipalities or public institutions. For instance, the installation of a bike shed in Ljutomer (SI) and the implementation of a bike point at the the train station in Banska Bysrica (SK) as pilot actions have important innovative character on regional level. With very limited infrastructure for bicycle traffic in the cities and their sourrindings, Ljutomer and Banska Bystrica become role modells for neighbouring municipalities on one hand and motivate people to switch from car to other transport modes on the other hand.

In Litomerice, Budapest and Austrian municipalities pilot actions have been implented in addition to previous or parallel set strategies and measures in direction of sustainable mobility and energy efficiency. For instance, Litomerice (CZ) is local leader in energy efficiency and energy management. Here, the pilot action of implementation of e-bikes and charging stations at municipal buildings to promote sustainable travelling and commuting among employees is one measure next to several others, like providing a municipal e-car fleet and photovoltaic systems for charging e-cars and -bikes. Hungarian Technical University BME aims to become leader in the context of sustainable mobility and wanted to develop a powerful and innovative tool which supports BME's employees and citizens of Budapest in conscious travel choices. For this reason the implemented online service collects travel information and makes different aspects of travelling visible. With this approach long-term decisions on travelling shall be influenced and sustainable transport modes be promoted. The German city of Leipzig aims to introduce the pilot action as strategic document in the daily work agenda and to decrease CO2 emissions by 20 percent. In Austrian's MOVECIT partner municipalities well developed infrastructure for cycle traffic and pedestrians have been implemented over several years but still even short travel distances of municipalities' employees are made by car. The pilot action "Walking Award" aims to promote the healthy and environmental friendly transport mode "walking" and to encourage employees to travel in a more sustainable way.

The city Modena with its pilot action of implementation of an automatic traffic counting sensor on a main traffic route focusses on analyzing. The counting sensor allows to measure effects of implemented mobiliy actions, collected data found a basis for further decisions in that direction of sustainable mobility and of dynamic traffic development.

## 4.3. Target groups

The target groups of the pilot actions are mainly concentrated on employees of municipalities or public institutions in Ljutomer (SI), Litomerice (CZ), Austria and Hungary. In Slovenian city Ljutomer for development of personalized mobility plans employees were split into three groups of daily commuters depending on travel distance and one representative of each group became involved in the pilot action. In Litomerice, not only employees of the municipality but also employees of police department and the hospital were target group of using e-bikes for commuting and work trips. The Austrian pilot action „Walking Award“ focussed on municipality's employees who do have short travel routes and who mainly do sedentary work like administration staff at city hall and for that reason promoted the health aspect of walking. In Leipzig employees of the Office of traffic planning and Road Construction of the city of Leipzig were mainly addressed by the pilot action. Broader groups were targeted with pilot actions in Banska Bystrica and Modena, where passengers, daily commuters and visitors of the cities are aimed to use the bike point at the train station or being counted by the automatic counting sensor on Modena's main traffic route. Next to its pilot action involvement of public employees, Litomerice provides public e-bike charging stations for citizens of Litomerice and its FUAs.

## 4.4. Procedure of implementation

The procedure of implementation of pilot actions consisted on different stages. Most of them were linked to a selection phase, planning and an implementation phase. Further aspects of implementation were “stakeholder involvement” and “promotion of pilot action”. These steps and aspects summarized as follows:

**Selection phases**

During selection phase pilot actions were chosen based on different factors. For some project partners the strategical issue was in foreground like in Ljutomer (SI) where the pilot action bike shed for municipal employees was a logical measure following targets of the recently developed municipal strategic document SUMP or in Litomerice (CZ) where the implementation of e-bikes for municipal employees is part of the municipalitie's strategical issue of becoming energy sustainable. For pilot actions like the Walking Award in Austria and traffic counting sensor in Modena (IT) the factor awareness raising related to specific transport modes or on traffic evolution in general were important aspects. The bike point at Banska Bystrica's train station had best potential to extend provided services for bike traffic. Most of the pilot actions are based on previous analysis of developed Workplace Mobility Plans.

**Planning phases**

Main aspects of planning stages during implementation of pilot actions differed a lot between hard and soft mobility measures. For infrastructural measures, as they were implemented in Ljutomer in form of a bike shed, in Litomerice as e-bikes and charging stations, in Banska Bystrica the a bike point at the train station, the traffic counting sensor in Modena and the e-bikes, cargo bikes and bike boxes in Leipzig, following aspects were partly overlapping:

- Chose locations of installation or to reject chosen locations because of technical issues like in Leipzig
- Clear legal issues like conditions of cultural and monumental protection, clear safety issues and check insurance aspects
- Discuss details of the infrastructure
  (what kind of equipment, number of infrastructural components, etc.)
- Reach agreements/ permissions of relevant stakeholders
- Conclude public procuremens with suppliers of requiered infrastructure

For mobility measures, that can be seen as more soft ones and which were implemented in Ljutomer in form of personalized mobility plans, in Austria as a walking competiton campaign and in Budapest in form of an online service tool for travel route planning the planning phases were characterized by developing processes. Here following steps were relevant:

- Collect experiences on similar projects
- Discuss goals and methods/ methodologies
- Plan procedures and designs
- Develop components

**Implementation phase**

Once the planning process was finished the implementation of the pilot action started. The different procedures between implementation of soft and hard measures continued until the installation of the hard measures was done. But also within the implemention of hard measures different issues appeared. For the installation of bike sheds in Ljutomer for example, bidders had to be found and construction works had to be carried out. Wheraes in Litomerice, after purchasing the equipment, safety measures had to be set up, challenges concerning insurance emerged and responsibilities on taking care of the equipment had to be cleared. In Budapest, once the planning and development of the application was done, it was "only" a matter of spreading it amongst the colleagues. Same in Banska Bystrica, after the construction of the shelter, its usage started, while trying to promote the new device via public events. Also in Modena the implementation of the sensor was quite simple.
Whilst the installation of the mobility devices was connected with technical and constructional issues, purchasing the equipment and finding the right spot, in municipalities implementing soft measures this step could be omitted.
After the development and installation the next stage was trying to motivate as many people as possible to take part at the competition (awareness raising mobility measure) or to use the new mobility devices. Monitoring and evaluation was part of all the pilot actions in the implementation phase. This was carried out with various tools, like questionnaires, personal interviews or counting devices.

**Promotion**

For promoting the pilot actions various techniques were deployed.
Awareness raising and information campaigns, expert lectures and discussions were organised targeting employees and the public. For those purposes different information materials like thematic posters, leaflets and booklets were developed, produced and distributed. Ljutomer additionally had promotional shirts, in Austrian municipalities stickers promoting the Walking Award were spread.
The internal communication of the pilot action amongst employees of the municipality or the organisation also included several newsletters, emails, use of intranet, social media channels and journals for municipalities. Modena put the information about the counting sensor in the SUMP.

**Stakeholder Involvement**

The stakeholder involvement played a big role in all of the pilot actions. They fulfilled important tasks in the course of the implementation – mainly due to the connections and close relation to employees, other stakeholders, to the citizens or due to professional qualification, experience and know how. Stakeholders gave important inputs in every phase of the implementation process and thereby helped to develop the original ideas and methodologies, improve them and make the implementation of the different pilot actions viable. Most of the project partners selected a working group, a mobility team, which was especially dedicated to the implementation of the pilot actions and accompanied the whole process from the beginning.
Implementing hard measures as pilot actions required additional stakeholders in terms of permission isssues, public procurement and also expert opinions concerning the development and installation of mobility devices like tha traffic counting sensor in Modena, the bike boxes in Leipzig or the bike point in Banska Bystrica.

## 4.5. Duration of Implementation

Concerning the duration of pilot action implementation two main aspects became visible:
Firstly there is a difference between implementation of soft and hard sustainable mobility measures and secondly there is difference on implementation of "more public" measures with involvement of many different stakeholders and parties and "less public" mobility measures what means the involvement less different stakeholders on implementation of pilot action.
To bring some examples: Hard mobility measures like the installation of a bike shed and purchase of e-bikes or cargo-bikes for municipal employees or for employees of public institutions like Police were implemented in quiet short period of time. From start of discussion of different aspects until installation or purchase it took approxiamety four months.
Compared to that the implementation of soft mobility measures or such pilot actions which were linked to a development process like the Walking Award or Hungarian online service took longer. In both cases preparation and development needed five to six month and in case of Walking Award its further implementation took another six month.
In Slovakia and Italy public infrastructural mobility measures were implemented as pilot actions. In both cities Banska Bystrica and Modena the installation of infrastructure affected main traffic routes or transport hube. In this case many different stakeholders, decision makers, municipal departments, land owners and parties needed to be involved and asked for permission. Although the installation of the infrastructure like the bike point in Banska Bystrica and the traffic counting sensor in Modena needed maximum a few weeks/ days, the previous bureaucratic process took up to two years. Also for the installation of an e-bike charging station at the hospital of Litomerice legal issues needed to be cleared. Here the implementation took seven months.

## 4.6. Level of acceptance among target groups

In general the implementation of pilot actions in project partner municipalities and institutions were linked to positive but different reactions among target groups.

For instance, the online service tool for travel route planning at BME (HU) and the traffic counting sensor in Modena (IT) brought positive feedback of employees or citizens. The feedback was linked to extension requests of the online service in Hungary and asks for devices on traffic counting sensor on other traffic routes, in Italy. In Slovakia, the bike point installation of the bike point at the train station was finished at the very end of the project. For that reason no experience on acceptance is available but the bike point was promoted in advance at several public events and questionnaires were distributed among target groups. 99 of 118 asked persons responded that they regularly or sometimes pass the area of the railway sation by bike and 65% of them responded that they will use the bike parking point once available.

Another effect became visible in Ljutomer (SI), Litomerice (CZ), Leipzig (DE) where newly provided infrastructure like e-bikes and bike sheds are in very regular and intense use. In Ljutomer the intense usage already caused lack of space at the installed bike shed and in Litomerice three e-bikes are permanently used by members of municipal police.

Further, pilot actions influenced private mobility behaviour when inSlovenia frequency of cycling on the workplace has in increased, in Czech Repbulic some employees were encouraged by the pilot action to buy their own e-bike and in Austria some of the employees who already used sustainable transport modes like cycling started to walk because they wanted to participate on the "Walking" Award.

Also a very high number of participants at the Austrian Walking Award was another indicator of acceptance. Especially in Austrian municipality Baden approximately 20 percent of nearly 600 employees participated on the walking competition.

## 4.7. Level of implementation effort

The level of implementation effort varied a lot between project partner municipalities and institutions what was already indicated in chapter “duration of implementation” and what was linked to different challenges:

For example, due the purchase of public infrastructure by the cities of Litomerice (CZ) and Modena (IT) it needed public procurements, to choose adequate suppliers of e-bikes, charging stations and traffic counting systems and went ahead with long processes. Also in Czech Republic and in Slovakian City Banska Bystrica the implementation of pilot actions were more extensive, when it became necessary to deal with legal issues for installation of e-bike-charging station at the hospital and the bike point at main train station. Especially, in Banska Bystrica the actual implementation required much higher involvement of stakeholders than expected due to complex organisational structure of Slovak State Railways, which cost a few months delay. Also in Germany the implementation pilot action went ahead with a prolonged approval process and a rental contract for provided bicycles between official project partner Aufbauwerk and city of Leipzig was necessary.

In Litomerice (CZ) where e-bikes for employees of the municipality, the hospital and the police were purchased “safety of using e-bikes” come up as another topic. That aspect could be problematic to the employer in case of accident or injury” and needed to be cleared. In Leipzig bike boxes had to be replaced because of heat problems at the origin place of installation.

In Austria and Hungary the development of the campaign and the online service tool was quiet intense. In Austria it needed quiet high effort on development of the Walking Award procedure, its design and of different campaing components and material. For Hungarian partners during the development process of the online service for travel route planning the original goal was preserved but methodologies and solutions changed a lot. The application needed good balance, as if the application is too simplistic, the results are not reliable. Also, if the application is too complex, users will turn away.

In summary, the Slovenian pilot activity installation of bike shed, purchase of e-bikes and personalized mobility plans for employees in Ljutomer are, in principle, easily feasible. They are also relatively affordable, with considerable impact and quick performance. Concerning partners in Czech Republic, although the purchase of e-bikes and installation of charging stations went along with some administrative burden, the pilot action was effective so it was worth the effort. After its development phase the Austrian pilot action Walking Award was fairly easy to implement for municipalities and provided an affordable measure on sustainable mobility. Next to that procedures and components can be overtaken for further walking competitions. Concerning the Slovakian pilot action which was the installation of a bike point at the main train station of Banska Bystrica, compared to the investment the implementation effort was relatively high. In the opposite the Italian city of Modena was faced with relatively high costs for installation of a traffic counting sensor. However, these are justified by high efficiency and satisfactory counting results which show constant increase on of cyclists. At the same time, first collected data found a basis for refining Modena’s Workplace Mobility Plan which had been definitively approved by town council on 7$^{th}$ May 2019.

## 4.8. Total finance

Sums in an area between 7.000 EUR and 52.500 EUR reflect the wide range of implementation costs for mobility measures, which were implemented as pilot actions during MOVECIT project. Soft measures like the Walking Award Campaign in Austria and personalized mobility plans in Ljitumer represent the most inexpensive measures. The Austrian pilot action cost about 7000 EUR which implements staff costs, print costs and costs for other external services like presentation in Baden of the so called “World Wanderer” Gregor Sieböck. Costs for pedometers and experts lectures on health aspects of cycling and walking were partly overtaken by municipalities. In Slovenia, incurred costs of 10.000 EUR covered personalized

mobility plan's preparation, interviews with employees, mid term monitoring and the evaluation of monitoring.

The installation of a bike shed and purchase of three e-bikes for employees at the municipality of Ljutomer with 15.000 EUR cost nearly the same as the purchase of ten e-bikes and four bike charging stations in Litomerice (CZ) which cost 14.423 EUR. The financial afford for installation of traffic counting sensor in Modena was also very close to that and cost approximately 15.000 EUR.

The cost afford for the development of an online service tool for travel route planning in Budapest, which was overtaken by a software developer, was in the middle between first counted soft mobility measures and second counted infrastructural measures. The service tool was implemented for an amount of approximately 12.500 EUR.

Highest costs appeared in German city of Leipzig (32.000 EUR) and Slovakian city Banska Bystrica. In Leipzig implementation costs consist of purchase of 4 pedelecs and 1 cargobike, the purchase of 5 bike boxes and the implementation of a booking and fleet manangement system. In Banska Bystrica eligible costs for pilot action bike shelter was 46.000 EUR. Eligible costs covered construction work, bike boxes, bicycle stands, public pump, e-bike charger and bike shelter. Other costs of approximately 6.490 EUR spent from financial resources of Municipality Banská Bystrica covered extra construction work costs and also 10 lockers for bike helmets and small personal luggage. Overall budget for Slovakian pilot action was 52.490 EUR.

## 4.9. Cost-benefit ratio

| PROJECT PARTNER | PILOT ACTION | COSTS | COST PERCENTAGE OF TOT. AMOUNT | MONITORING PERIOD | CO2-SAVINGS (IN TONS) | CO2-SAVINGS PERCENTAGE OF TOT. AMOUNT |
|---|---|---|---|---|---|---|
| **Ljutomer (SI)** | Personalized Mobility Plans for employees of municipality | 10.000 EUR | 21 % | June – Sept 2018 (4 month) | 0,09 | 2 % |
| **Ljutomer (SI)** | Purchase of 3 e-bikes Installation of bike shed for employees of municipality | 15.427,51 EUR | 33 % | April – Sept 2018 (6 month) | 0,56 | 11 % |
| **Litomerice (CZ)** | Purchase of 10 e-bikes 4 bike charging stations for employees of municipality and municipal police | 14.423 EUR | 31 % | April – Nov 2018 (8 month) | 1,04 | 21 % |
| **Baden (AT) Mödling (AT) Leoben (AT)** | „Walking Award" walking competition for employees of municipality and different municipal institutions like police and garden service | 7.000 EUR | 15 % | Sept – Oct 2018 (1 month) | 3,25 | 66 % |
| **IN TOTAL** | | 46.850,51 | 100 % | | 4,94 | 100 % |

Concerning cost-benefit ratio not all effects of MOVECIT pilot actions could have been measured on quantitative data. So, some pilot actions must be evaluated in broader contexts. However, pilot actions of Slovenian, Czech and Austrian project partners were monitored regarding to quantitative factor of kilometres made by sustainable transport mode like walking, cycling or public transport. These counted kilometers were transferred into CO2-emissions produced by car usage on same travel distances. The table above shows CO2 savings reached by each pilot action and gives an overview on implementation costs. Based on quantitative data it becomes visible that the Walking Award campaign so far had the best cost-benefit ratio with lowest costs, and caused in shortest time (1 month) 3,25 tons CO2 savings. The second best relation between implementation costs and effects on CO2 emissions appeared in Litomerice (CZ). Here the implementation of 10 e-bikes and four charging stations cost 14.423 EUR, which was second highest amount of costs but at the same time investigations lead to 1,04 tons of CO2 savings within eight

months and achieved second best result. Lowest savings were achieved by one pilot action in Ljutomer (SI) where personalized mobility plans were implemented as soft mobility measure. Here the pilot action monitoring ran over four months. Although implementation costs were higher than for the walking competition the pilot action achieved 0,09 tons of CO2 savings, which is 3 % of CO2 savings achieved by the Walking Award. On the other hand it must be considered that the Walking Award campaign was a punctual measure, while other pilot actions like the purchase of e-bikes is long-term measure and will might show better long-term results. On the other hand, the Walking Award will be implemented another time and is going to be promoted in Austria as sustainable mobility activity for municipalities during European Mobility Week. Here, the second run will bring new data on cost-benefit-ratio.

For pilot actions implemented in Banska Bystrica (SK), Modena (IT), Budapest (HU) and Leipzig (DE) the cost-benefit-ratio related to implementation costs and reduction of CO2 emissions cannot be calculated directly because pilot actions, have more infrastructural value like the bike point in Banska Bystrica or informative value like the online service tool in Budapest and traffic counting sensor in Modena. All of them are expected to have long-term impact on CO2 emissions since they serve information on most CO2-effective travel routes and support travel decisions of commutters, provide data on traffic evolution and serve a decision making tool for policies concerning further measures on sustainable mobility or provide important infrastructure to build up a closed system of sustainable transport modes.

While the bike point in in Banska Bystrica and the traffic sensor in Modena are fix installed infrastructure, the online service tool in Budapest is expected to be further developed and maintained at least until the end of the project. It is not clear how long the service can be provided. In this case, the cost-benefit-ratio will be higher at fix installed infrastructure because expected long term effects can become visible.

## 4.10. Innovative character of pilot and potential of overtaking for other municipalities

In general it can be said, that each pilot action has its innovative character but on different levels and in different contexts.

At some of the pilot actions it was the role model function on regional level which was in the very foreground. For instance, the installation of a bike shed for municipal employees in Ljutomer as model for small Slovenian municipalities with small budget, e-bikes used by municipal police in Litomerice as novelty in Czech Republic or the bike point in well developed composition and with very modern equipment at a railway station Slovakia. Positive effects appeared in form of inhabitants and national medias attention and very positive feedback from relevant stakeholders.

In other contexts the approach or target group served the very innovative character: For instance the approach of personalized mobility plans, implemented in Ljutomer, had been presented so far only theoretically and was tested and evaluated in practise for the first time. Worthful experiences were made with this method which was finally difficult to implement because it needed a lot of improvisation and was very demanding for developers. In Austria, it was quiet new focus on tansport mode of walking, since many municipal measures on sustainable mobility focus on bicycle traffic or e-mobility. Here, representatives of other Austrian municipalities already showed interest on implementing walking competition campaign to widen their focus of mobility measures in favour of pedestrians. For this reason it is already overtaken and going to be implemented during European Mobility Week 2019 and promoted within 950 Austrian municipalities. The city of Leipzig with its pilot action focussed on e-mobility and on target group of admininstrative institutions with high number of employees.

Pilot actions of municipality of Modena and Technical University Budapest had more technical innovation character. Aspects such as the integrative way of application and the trendy, eye-catching interface were highlighted by users of the online service developed in Hungary. In Italy the technical tool of traffic

counting sensor serves a modern tool of communication to increase the awareness and consciousness of citzens and founds a basis for mobility policies.

# 5. Lessons learned

Project partners lessons learned were very closely linked to the uniqueness of their pilot actions in combination with individual initial situations at cooperating municipalities or institutions.

In Slovenian municipality Ljutomer with little infrastructure on sustainable mobility, it was fairly easy to install a bike shed for municipality's employees in the proximity of the municipal building. But it was difficult to succeed with personalized mobility plans targeting changes on employees mobility behaviour. Here the lack of well developed transport systems and as such a lack of environmental friendly transport means became a problem.

The pilot action of purchase of e-bikes and charging stations for employees of the municipality and the police was implemented in Czech municipality Litomerice. This pilot action brought great success because of its uniqueness but on the other hand its novelty in Czech Republic went ahead with some challenges since it was not easy to find an adequate charging station supplier and some legal problems like questions about safety of using e-bikes appeared.

In Austria it became visible that a walking competition campaign needs high effort on development but can be easily transferred to other municipalities. Further, such a campaign is even affordable for municipalities with small budget and can show high impact within a municipality, if there is someone committed on encouraging and implemting the campaign out on the spot.

During the development process of the online service tool for travel route planning in Hungary, it became a challenge to sharpen and to fix the profile of the application. The process led to the final decision, that the application will not cope with real time data and short time decisions but on long term decisions of travel behaviour and generalized results.

During implementation of pilot action in Slovakian city Banska Bystrica, with similar initial situation as Ljutomer and not having long term tradition of extensive use of bike, important and new experiences on decision and planning processes were made. Cooperation between municipality and an NGO was one of the main achievements during the implementation of a very modern bike point at the train station. The process went also ahead with capacity building on administrative level when the planning and permission process became quiet complicated, especially related to complex decision making structures of the National Railway operator, which is landowner of the bike point's location.

In Leipzig two main aspects became visible through implementation of pilot action: Firstly, high implementation costs can be funded through targeted partnerships and secondly, if the pilot action itself is relatively unimpressive, it must be advertised accordingly to receive employees attention.

# 6. Conclusions

In a final conclusion most important outcomes related to implementation of eight pilot actions in context of sustainable mobility in seven central European countries are summarized. Mobility measures were developed to mainly address employees of different sized municipalities and institutions with the aim to stimulate more sustainable mobility behaviour and so cause a decrease of CO2 emissions because of less car use. By the analyzing process very relevant aspects appeared concerning implementation costs, acceptance of pilot actions among target groups, savings of CO2-emissions and lessons learned (see table below):

| Project Partner | Pilot Action | Costs | Acceptance among target groups | CO2-savings in kg* | Lessons Learned |
|---|---|---|---|---|---|
| LP (SI) | 3 Personalized Mobility Plans | EUR 10.000 | High interest until Mobility Plan turned into practise | 94 kg in 4 month<br>(3 employees) | Better results in case of better developed network of sustainable transport means |
| | Bike Shed<br>3 e-bikes | EUR 15.427 | High increase on bicycle usage became visible | 563 kg in 6 month<br>(3 e-bikes) | Easy to implement, high effects |
| PP2 (CZ) | 10 E-Bikes<br>4 charging stations<br>helmets & maintenance package | EUR 9.618<br>EUR 4.805<br><br>Tot: EUR 14.423 | Positive reactions of employees:<br>some even bought private e-bikes<br>Permanent use of e-bikes by police | 1038 kg in 8 month<br>(10 e-bikes) | Difficulties in finding suppliers of charging stations in CZ<br>Novelty of pilot action attracted national- wide media's attention |
| PP3 (AT) | Walking competition campaign<br>"Walking Award" | EUR 7.000 | Partly very high number of participants<br>(111 employees in Baden) | 3250 kg in 1 month<br>(158 employees) | High effort on development, less on implementation<br>Implementation needs encouraged support out on the spot<br>Low implementation costs for municipalities, high impact<br>Good transferability |
| PP4 (HU) | Online tool for sustainable travel route planning | EUR 12.580 | Positive feedback<br>Extension requests from employees | No direct calculation; since the tool cannot measure if mobility behaviour changes related to travel suggestions | High effort on development and to clear the goal for such kind of tool (influence long-term decisions not short-time decisions on mobility behaviour) |
| PP5 (SK) | Bike Point:<br>- 18 lockable spaces for bikes (bike boxes & stands)<br>- 10 boxes for small luggage<br>- self service stand<br>- walking map | Tot: EUR 52.490 | Implementation finished at the very end of project.<br>Previous survey at train station (n = 118): 65% "will use bike parking point once available" | No direct calculation;<br>Evaluation in broader context:<br>Enhance of biking conditions exclusive location at transport hub 1st bike point in region | Strong innovative character (no long term tradition of extensive use of bike in Banska Bystrica)<br>Experiences on very complex decision making and permission processes on administrative level and with the National railway operator |
| PP7 (IT) | Traffic counting sensor | EUR 15.000 | Increase on consciousness:<br>Employees asked for devices on their own itinerary to number of transits | No direct calculation;<br>The sensor counts number of transport means no distances | Counting sensor allows analysis on traffic trends, its modal split and on daily and seasonal distributions to support decision processes.<br>Provides a communication tool to increase awareness of citizens. |
| PP11 (DE) | 4 pedelecs, 1 cargo bike<br>5 bike boxes<br>Fleet management system | EUR 12.000<br>EUR 9.800<br>EUR 10.200<br>Tot: EUR 32.000 | Implementation finished at the very end of project. Well adopted by employees during development process. High use is expected. | No direct calculation;<br>20 % of surveyed employees rely less on car for commuting<br>Increase on usage of sustainable transport means was observed. | Good transferability<br>High costs can be funded by partnerships<br>Unimpressive project needs according advertisement<br>High effort on development of fleet management system |

* converted from 'sustainable' made kilometres

### Implementation costs

Amounts of implementation costs range from EUR 7.000 to EUR 52.000. Here it became visible that pilot actions in form of soft mobility measures like walking competition campaign (EUR 7.000,-) or personal mobility plan (EUR 10.000,-) were less expensive than measures on infrastructure like the bike point at Banska Bystrica's (EUR 52.000,-) train station. Financial differences appeared between hard and soft mobility measures but also between countries. For instance in Czech Republic purchase of 10 e-bikes cost EUR 9.618 and the purchase of 4 e-bikes in Germany EUR 12.000. Such kind of differences may be considered in relation to transferability of mobility measures.

### Acceptance of mobility measures among target groups

In general most of the pilot actions were linked to very positive reactions of target groups and further by media and stakeholders. Personal mobility plans had less positive reactions, as soon as they had to be turned into practise by employees. High individual consultation effort and a lack of alternative transport means in Ljutomer became obstacles of high acceptance. On the other hand the Ljutomer's infrastructural pilot action, implementation of a bike shed and purchase of e-bikes showed directly positive effects and went ahead with increase on bicycle usage by employees. Also purchase of e-bikes in Litomerice (CZ), the Walking Award Campaign in Austria, the online tool for sustainable travel route planning of Technical University Budapest and the traffic counting sensor in Modena caused positive reactions. In Litomerice the pilot action, because of its novelty awoke national-wide media's attention and motivated employees even to buy their private e-bikes. Since their implementation e-bikes are in regular use by police. In Austria, partly a very high number of employees participated on the Walking Award. With a very motivating mobility team out on the spot in Baden nearly a fifth of all employees (111 employees) participated on the one month lasting walking competition. Extension requests came from employees after implementation of travel route planning tool in Budapest and the traffic counting sensor in Modena.

Two pilot actions in Banska Bystrica (SK) and Leipzig (DE) were implemented at the very end of the project, so it was difficult to evaluate the acceptance among target groups. However, a previous opinion survey at Banska Bystrica's train station showed, that 65 % of 118 interviewees "will use bike parking point once available". In Leipzig employees were involved in the implementation process so that well-adopted infrastructure is expected to cause high use of the e-mobility fleet.

### Savings of CO2 emissions

Four of the eight pilot actions in context of sustainable mobility were monitored on their CO2 savings which were converted from kilometres done by sustainable transport mode instead by car. Here, the highest amount was reached by the walking competition campaign "Walking Award" when 3.250 kg of CO2 were saved during a period of one month. The purchase of e-bikes in Litomerice and in Ljutomer as well as the implementation of personalized mobility plans were monitored over longer time periods (4 to 8 months) which saved between 1038 kg and 94 kg of CO2. At this point two aspects must be considered: On one hand the Walking Award was a punctual campaign, while e-bikes and mobility plans are in regular use/ practise. On the other hand much more people could be addressed by the campaign, than by infrastructural measures where number of users is limited. For that reason a comparison of both pilot actions will not be representative and requires research on long-term effects. Other pilot actions were not directly linked to CO2 calculations but must be evaluated in broader contexts. For instance, travel route planning in Budapest cannot measure changes on mobility behaviour, which are might caused by transport suggestions. However, different aspects like CO2 emissions of each transport mode can be provided by the application and raise awareness to commuters. Also at the bike point at Banska Bystrica's train station CO2 savings cannot be calculated directly but the pilot action must be seen as enhance on biking conditions for the municipality and

even for the region, where no long term tradition on extensive bike use was given so far. The traffic counting sensor in Modena provides information on modal split but not on travel distances. However, a constant increase on bike numbers can be observed. In Leipzig, where a fleet of e-bikes and cargo-bike with a fleet management system were implemented a survey on mobility behaviour brought the result, that 20 % of interviewed employees rely less on car commuting since pilot action's implementation.

**Lessons learned on implementation of sustainable mobility measures**

Learned lessons can be divided into more challenging ones and very positive ones and are relevant for transfer of pilot actions into similar regions.

APPEARED CHALLENGES DURING IMPLEMENTATION PILOT ACTIONS

- High effort on development

Pilot actions which required implementation of systems or procedures like the online tool on travel route planning, the Walking Award Campaign and the fleet management system in Leipzig needed higher effort on development, while implementation itself was less intense. It is one of the main aspects to define what the final version of a tool or campaign shall provide or communicate.

- Lack of developed network on sustainable transport means

In case of pilot action personal mobility plans for municipal employees in Ljutomer it became a challenge that previous infrastructural measures on sustainable mobility would have been needed to succeed with mobility plans. Because of a lack of established network on alternative transport modes it became very complex for employees not to use the car, especially on travel distances of more than 60 kilometres.

- Difficulties on finding adequate suppliers of technical infrastructure

Because of its novelty in Czech Republic the installation of e-bike charging stations in Litomerice became challenging when it was difficult to find adequate suppliers of charging stations which fulfil requirements in the given context.

- Time-intense decision making and permission processes

Concerning pilot actions in Modena and Banska Bystrica the implementation of pilot action went ahead with very time-intense decision making and permission processes. These processes needed two years while construction was finished within a few weeks or days.

- Funding of expensive projects and long term financing challenges

Financial aspects are relevant in different contexts. In Leipzig, especially the implementation of a - fleet management system was time- and cost-intense. Here it was useful to build up partnerships which can support in knowledge and financing. Also in Budapest and Austria long term implementation of pilot actions depend on finding regular funding sources.

- Adequate advertisement to promote less impressive mobility measures

For promoting less impressive mobility measures to target groups, adequate advertisement will be required as it was experienced during implementation process of e-bike-fleet at city administration Leipzig.

VERY POSITIVE EFFECTS DURING IMPLEMENTATION AND EVALUATION OF PILOT ACTIONS

- Support out on the spot

For the implementation of the Walking Award campaign it became visible that personal support on the spot had high impact on results. Especially in Baden (AT) a very committed person promoted the campaign within different departments, gave direct advice to employees and was regularly motivating them.

- Immediate visible effects

In Ljutomer (SI), the implementation of a bike shed for municipal employees was a very innovative measure on regional level since the region has few experiences on projects on sustainable mobility. The more important was the immediate visible effect of regular and intense use of the bike shed.

- Low implementation costs – high impact

In regions with well-developed infrastructure on sustainable transport modes, the Walking Award campaign showed very high impact in short time, when 3.250 kg of CO2 were saved within one month by employees of three municipalities. Because of few implementation costs, the pilot action with focus on awareness rising is fairly easy to transfer to other municipalities with small budget.

- Strong innovative character & media attention

The very innovative character of pilot actions like the purchase of e-bikes for municipal police at Litomerice (CZ) or the implementation of a bike point at Banska Bystrica's (SK) train station was responded by media's attention even on national level in Czech Republic and by very positive feedback of Slovakian Railway provider.

- Information & communication tool

Italian's pilot action, installation of a traffic counting sensor, appeared as a very effective communication and awareness rising tool to citizens and as important information tool for policies and traffic planners.

In conclusion the transferability of pilot actions on sustainable mobility measures to reduce CO2 emissions depend on different aspects. Low-threshold and less expensive measures like campaigns are very easy to transfer as the example of Walking Award in Austria shows, where a similar walking competition is promoted during European Mobility Week 2019 in more than 950 Austrian municipalities. On the other hand the implementation of personal mobility plans in Ljutomer (SI) showed, that it needs an infrastructural basis to succeed with soft measures of sustainable mobility and in this context pilot actions like a bike point at train station, bike sheds at municipal buildings or e-bikes for municipal employees provide important role models, to raise awareness on the topic on regional and national level and to share first made experiences. Complexity of development and decision making procedures or the involvement of stakeholders are often linked to long lasting processes and must also be considered at further implementations.