TRANSNATIONAL MONITORING AND EVALUATION REPORT ON TESTING THE PILOT ACTIONS

D.T2.2.2

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Content

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1. SUMMARY

This report is gathering the results of the MOVECIT project monitoring, especially concerning the pilot actions, modal split change and CO_2 savings. These results are in detail described in the following chapters.

KPIs which were set at the beginning of the project and results of how they were fulfilled can be found in the 2nd chapter.

The pilot action evaluation (3rd chapter) gathers the information about pilot action monitoring in all countries of the project consortium. Results of these actions are described as well as the CO_2 savings which were achieved during their monitoring periods. Two countries chose pilot actions which couldn't been measured by CO_2 savings. Some of the pilot actions are monitored also in qualitative way to better perceive its effects.

Another source of data about the modal shift (4th chapter) which we were trying to induce during the project was staff travel survey which was conducted three times and this report contains the basic results about the modal split change. This survey also enabled to show CO_2 savings (4th chapter) at workplaces which were part of the project and at which there were workplace mobility plans created. The CO_2 savings were calculated for both commuting and business trips. Total CO2 savings from both pilot action monitoring and staff travel survey results is 562,52 tons of CO_2.

2. KPIs evaluation

There were several Key Performance Indicators (KPIs) set in the Monitoring and Evaluation Plan (D.T2.2.1.). These indicators were set to monitor the success of the project and also the effects of the implemented measures and the change that has occurred. Some of the indicators will be mentioned in the project evaluation report. Here are the results which are bound with the thematic success of the project.

Here are the mobility change indicators how they have been set in the Monitoring and Evaluation Plan:

INDICATOR	MEASUREMENT UNIT	TARGET	EXPLANATION
Number of promotional materials (leaflets, giveaways) disseminated	Promotional materials	7000,00	Project giveaways and leaflets will be disseminated in order to raise the awareness of municipalities' employees of the impact of their mobility behaviour and to motivate and achieve changes in behaviour. Calculation: 1000 promotional materials per country (1000 x 7 = 7000).
Number of implemented measures proposed in mobility planning process	Implemented measures	26,00	The municipality can change the mobility behaviour of its employees by implementing measures promoting sustainable mobility (campaigns, infrastructure changes, new internal rules, seminar etc.). Calculation: 26 implemented measures per 13 pilot institutions.
Number of e-vehicles obtained or owned by the municipality or its employees.	E-vehicles	10,00	Usage of e-vehicles (e-cars, e-bikes) can have a big influence on lowering CO_2 emissions and contributing to the project objective. 10 e-bikes are planned to be purchased in municipality of Litoměřice.
The percentage increase of sustainable mobility modes	%	20,00	Using travel survey three times during life-span of the project modal split for involved institutions will be estimated. The project's goal is up to 20% increase of number of trips made by sustainable mobility modes (cycling, walking, public transport, carpooling etc.).
Number of people answering the questionnaire	Person	1116,00	Number of people filling in the questionnaire can show us the investment of the people in the topic of sustainable mobility. Everyone who pays attention to the questionnaire is induced to think about their mobility and possible change. Calculation 20% of 5581 employees at pilot action institutions is 1116 person.
Number of letter of commitment	Letter of commitment	13,00	Each institution which will develop mobility plan for its employees should sign a letter of commitment which expresses their willingness to adapt this plan as internal document or strategic solution. Calculation: 1 letter of commitment per 1 mobility plan.

Here are the results of the indicators for each country:

INDICATOR	SI	CZ	AT	HU	SK	IT	D
Number of promotional materials (leaflets, giveaways) disseminated	1 000	2 800	1 026	2 900	1 000	2 400	1 026
Number of implemented measures proposed in mobility planning process	12	17	40	4	5	4	3
Number of e-vehicles obtained or owned by the municipality or its employees.	3	10	8	0	0	0	5
The percentage increase of sustainable mobility modes	3%	City Hall: 0% Hospital: 12% Police: 2%	Baden: 17% Bruck: -4% Loeben: 11% Mödling: -5%	BCS: -3% BKK: -9% BME: 12%	0%	8%	1%
Number of people answering the questionnaire*	29	City Hall: 163 Hospital: 385 Police: 19	Baden: 66 Bruck: 38 Leoben: 88 Mödling: 63	BCS: 71 BKK: 265 BME: 56	137	746	142
Number of letter of commitment	1	2	4	3	1	1	1

*Since there were three years in which were the questionnaires collected, the table shows the highest number at each institution. (Since the indicator shows the number of people who answered the questionnaire, we can anticipate that some of the respondents answered also in other years and we want to avoid double counting. This way this number shows the minimum number of people who came in contact with the questionnaire per each institution, and the real number can be only higher.)

The table shows the results of the pilot institutions. In some countries there were more institutions joined in on the process, described in the table. For Slovenia it was the municipality of Ljutomer. In the Czech Republic joined the municipality of Litoměřice, Litoměřice hospital and later on also Municipal Police. In Austria there were for municipalities: Baden, Bruck an der Mur, Loeben and Moedling. In Hungary there were the municipality of Békéscsaba, Centre for Budapest Transport (Budapesti Közlekedési Központ) and Budapest University of Technology and Economics (BME). The municipality of Banská Bystrica was the pilot institution in Slovakia. The municipality of Modena was the partner in Italy and the City of Leipzig joined in as institution in Germany.

Summary indicator result table:

INDICATOR	Target	Total result (abs.)	Total result (rel.; %)
Number of promotional materials (leaflets, giveaways) disseminated	7 000	12 152	174
Number of implemented measures proposed in mobility planning process	26	85	327
Number of e-vehicles obtained or owned by the municipality or its employees.	10	26	260
The percentage increase of sustainable mobility modes	20%	3,22%	16
Number of people answering the questionnaire	1 116	2 268	203
Number of letter of commitment	13	13	100

In this table we can see that all the indicators target values but one was fulfilled. The best results had the indicator about implemented measures proposed in action plans of the Workplace mobility plans. The highest number per country was in Austria, where there were 40 measures implemented (number for four institutions), great results are also in Litoměřice (14 implemented measures at the City Hall) and Ljutomer (12 measures). This indicator is one of the most important ones because the implementation of the measures is crucial for the modal change. The increase of the sustainable mobility modes didn't reach its ambitious target but it can also be given by late implementation of many measures. The effect of the measures can be shown later on after the end of the project.

The second highest relative success had the number of e-vehicles obtained. 260% success was made thanks to 10 e-bikes purchased in Litoměřice during the project, 5 in Leipzig, 3 in Ljutomer, 2 in Mödling and 1 in Leoben. There were also purchased 5 e-cars in Austria (4 e-cars in Baden and 1 in Leoben).

The number of people answering the questionnaire was also fulfilled for more than 200%, which means that the response rate for some of the questionnaire (especially at the beginning of the project) was really high which enabled us to gather important data for WMPs development. However, there was a significant drop in the number answers at some institutions which could also negatively affect the sustainability mode indicator. More about the results of the questionnaires is described in later chapters.

The promotional materials distribution has achieved more than 174% success with total 12 152 distributed materials. These materials were mostly fliers, reflex stripes, pens and other materials made at the beginning of the project. There were 13 letters of commitments signed so this indicator also met its goal.

3. Pilot actions evaluation

In this chapter there are evaluated the pilot actions conducted at each country of the project consortium. All project countries had piloted at least one measure with a goal to support sustainable transport behaviour. As the results show, the countries were successful in this area. Table below shows the CO_2 savings that each country has contributed via their pilot action during their monitoring period. Description of the pilot actions and more details can be found in the following deliverables:

- D.T3.3.15 - D.T3.3.16: Transnational benchmarking and evaluation report on pilot action implementation
- D.T3.3.1-7: Report on Implementation of pilot action *X* in *(country)*

COUNTRY	CO_2 ELIMINATED (KG)
Slovenia	855,6
Czech Republic	1 038,9
Austria	3 985,4
Hungary	2 721,6
Slovakia	-*
Italy	-*
Germany	116,8
TOTAL	**8 718,2**

* This pilot action result cannot be measured in CO_2 savings.

There were some pilot actions which were impossible to translate to exact CO_2 savings. The pilot action in Banská Bystrica, Slovakia, is a bike point located at the train station to be used by both employees of the municipality and public. However, it is impossible to read the distance which will be travelled sustainably from this one point. And therefore, we cannot calculate fuel savings and CO_2 savings. Another pilot action without exact CO_2 savings calculation is a measure from Modena, Italy, which is a traffic sensor which is by itself used for monitoring to gather data for decision making. This data will help to save CO_2 emission by better planning but it is impossible to point out its effect in CO_2 savings right now.

Some countries have adopted their measures later than expected, due various reasons, which influenced the evaluation of the pilot action because the monitoring periods weren't that long. This means there could have been much higher CO_2 savings in some countries if the monitoring periods were longer. However, this doesn't change the fact that all pilot actions are up and running and will continue to serve its purpose and the CO_2 savings will grow and grow. The numbers we are providing in this report are therefore numbers we have acquired until now and we can expect them to be much higher in the lifetime of the pilot actions.

3.1. Slovenia, Municipality of Ljutomer

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).

3.1.1. Bike shed installation and purchase of 3 e-bikes

Monitoring period:

The monitoring phase was conducted in two seasons. First started on April 18 and ended on September 18. The second one was from February 2019 to May 2019.

KPIs used for monitoring:

- Number of parked bikes in storage (per month) or Number of e-bike users (per month) for home trips
- Distance (in km), done by e-bike for business trips

The method of collecting the data was reservation book system (it is existing system for business trips, but only for the cars). The distance per kilometre is an average distance of the employees at the municipality. For the business trip the kilometres were collected by kilometre device meter on the e-bikes.

Sum. bikes	**Number of parked bikes in storage, per month**							**TOTAL**
2018	April	May	June	July	August	September	Total	**1060**
	45	80	111	101	145	167	649	
2019	February	March	April	May			Total	
	46	108	129	128			411	

Basis for calculation	Average routes in km: 3 km
	CO_2 savings
	8% (2,4 people = 48 people/month)

EXISTING bikes	**Number of EXISTING parked bikes in storage, average per month**							**TOTAL**
2018	April	May	June	July	August	September	Total	**474**
	45	48	48	48	48	48	285	
2019	February	March	April	May			Total	
	45	48	48	48			189	

NEW bikes	**Number of NEW parked bikes in storage, per month**							**TOTAL**
2018	April	May	June	July	August	September	Total	**586**
	0	32	63	53	97	119	364	
2019	February	March	April	May			Total	
	1	60	81	80			222	

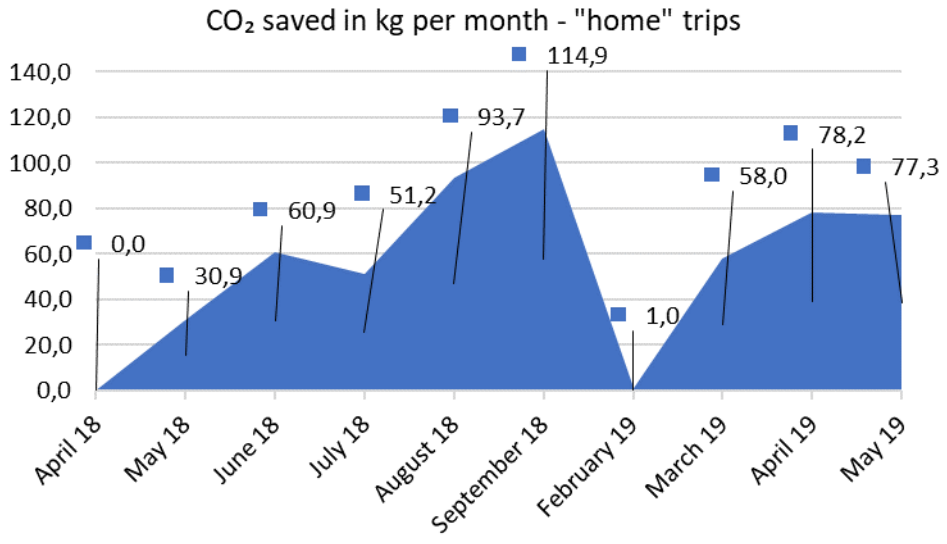
"km" reduction	**Distance saved in km**							**TOTAL**
2018	April	May	June	July	August	September	Total	**3 516**

		0	192	378	318	582	714	2 184
	2019	February	March	April	May			Total
		6	360	486	480			1 332

Fuel reduction				**Fuel saved in liters**				**TOTAL**
	2018	April	May	June	July	August	September	Total	**228,5**
		0,0	12,5	24,6	20,7	37,8	46,4	142,0	
	2019	February	March	April	May			Total	
		0,4	23,4	31,6	31,2			86,6	

CO_2 reduction				**CO_2 saved in kg**				**TOTAL**
	2018	April	May	June	July	August	September	Total	**566,0**
		0,0	30,9	60,9	51,2	93,7	114,9	351,6	
	2019	February	March	April	May			Total	
		1,0	58,0	78,2	77,3			214,4	

€ saved				EUR saved				**TOTAL**
	2018	April	May	June	July	August	September	Total	**300,16**
		0,00	16,39	32,26	27,14	49,67	60,94	186,39	
	2019	February	March	April	May			Total	
		0,51	30,75	41,51	41,00			113,77	



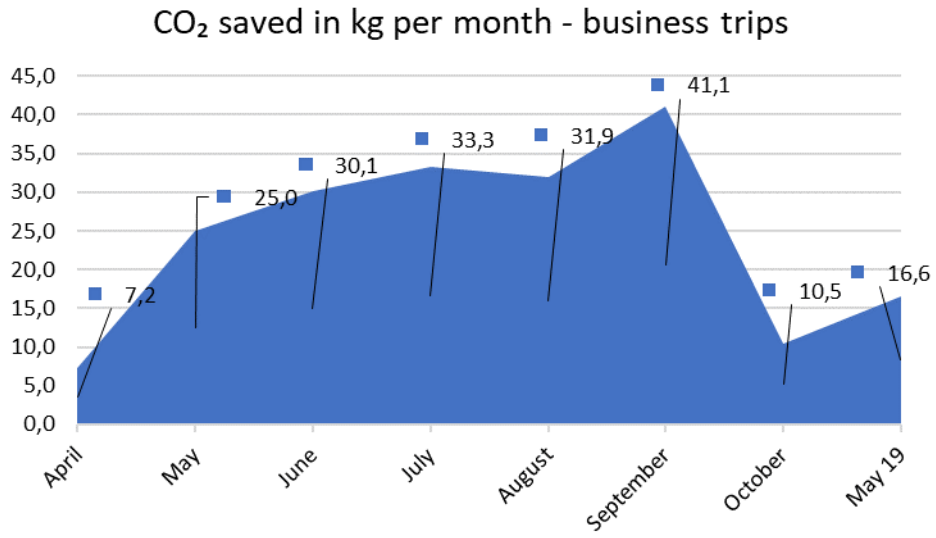
Additional indicator is Distance (in km), done by e-bikes for business trips:

"km" reduction	**Distance (in km), done by e-bikes for business trips**								
	April	May	June	July	August	September	October	May 19	Total
	45	155	187	207	198	255	65	103	1 215

Fuel reduction	Fuel saved in liters								
	April	May	June	July	August	September	October	May 19	Total
	2,9	10,1	12,2	13,5	12,9	16,6	4,2	6,7	79,0

CO_2 reduction	CO_2 saved in kg								
	April	May	June	July	August	September	October	May 19	Total
	7,2	25,0	30,1	33,3	31,9	41,1	10,5	16,6	195,6

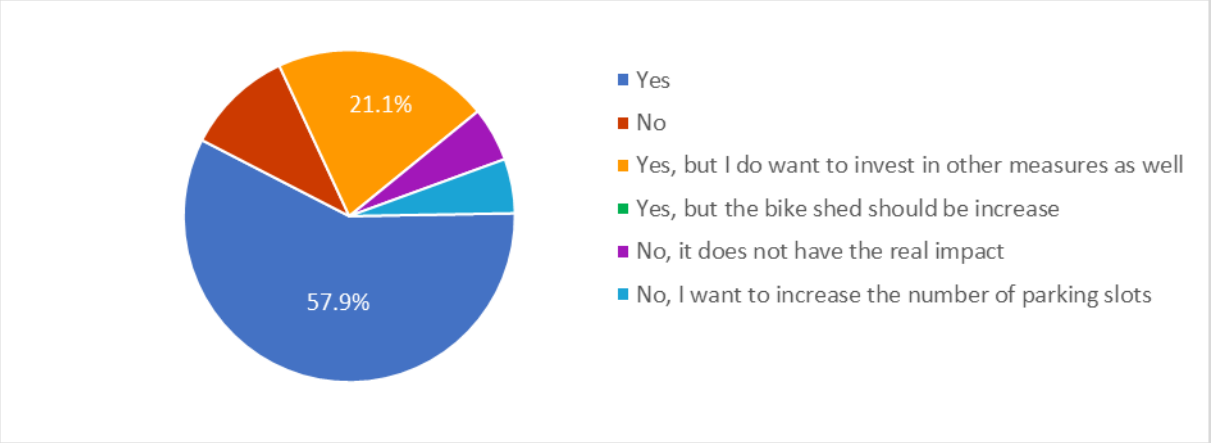
€ saved	EUR saved								
	April	May	June	July	August	September	october	May 19	Total
	3,83	13,20	15,92	17,63	16,86	21,71	5,53	8,77	103,46



	SOURCES for CALCULATION:
FUEL	**Statistical office of the Republic of Slovenia** (https://www.stat.si/statweb/en) - According to statistics from 2014, the average number of kilometres travelled (annually) by motor vehicles with unleaded petrol is 10.235 km, while this figure for diesel-powered vehicles is 16.879 km. The same source also talks about average fuel consumption (l / 100 km), which is 6,7 l / 100km for vehicles with a petrol engine and 6,3 l / 100km with diesel engine.
CO_2	**Covenant of Mayors**: Technical annex to the SEAP template instructions document (THE EMISSION FACTORS) - https://www.eumayors.eu/IMG/pdf/technical_annex_en.pdf
€	**Slovenian Ministry of Economic Development and Tehnology** (http://www.mgrt.gov.si/en/) - FUEL PRICES in 2018 19st of June 2018: Super 95 - 1,342 €; dizel - 1,284 €, the average was taken 24st of May 2019: Super 95 - 1,335 €; dizel - 1,293 €, the average was taken (1,314€)

The pilot action was also monitored in the last staff travel survey (2019). One of the additional answers to the travel survey was whether the employees think the pilot investment of a covered bicycle shed has contributed to the greater use of the bike on the job/workplace. There were 6 answers and multiple choices were allowed. Only 10% of all employees that participated at the survey think that bike shed has no positive impact on the cycling to the workplace. Most of them are

satisfied with it and support the bike shed, they think that the bike shed contribute a lot to the travel habit. 21% of employees think also that the municipality should invest in some other measures as well. Therefore, there are still capacities to invest and employees wish to see other measures as well.



Do you find that a pilot investment in a covered bicycle shed has contributed to the greater use of the bike on the job/workplace?

This pilot action enabled the employees of the Municipality of Ljutomer to cycle 4.731 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 761,6 kg of CO_2.

3.1.2. Personalized Mobility Plans

The implementation of the plans stepped into the force in June 2018. All three plans were monitored by simple questionnaire/form for each employee. They had to mark with X (cross) on which day in the week they commute by sustainable mode and marked also the weather conditions (sunny, rainy, cloudy). The monitoring last 4 weeks per month.

So, the indicator was the switch from car to sustainable mode. The goals were different from employee to employee, depends on the commuting distance and infrastructure possibilities. 1st employee's distance to workplace is around 10 km, 2nd employee's distance is 3 km and of the 3rd employee around 60 km in one way. The 3rd employee carpool its co-worker which has 10,5 km to the workplace in one direction.

The goal of the 1st and 2nd employee was:

- Commuting by bike once per week

The goal of the 3rd employee was:

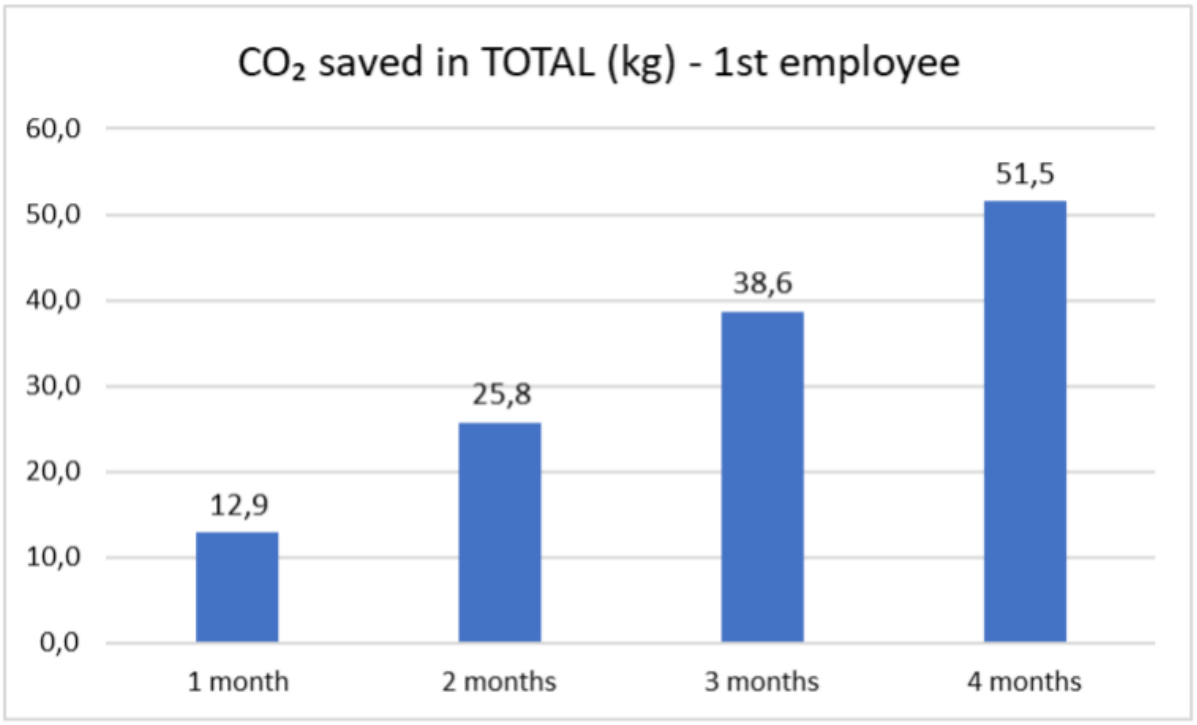
- Carpooling once per week

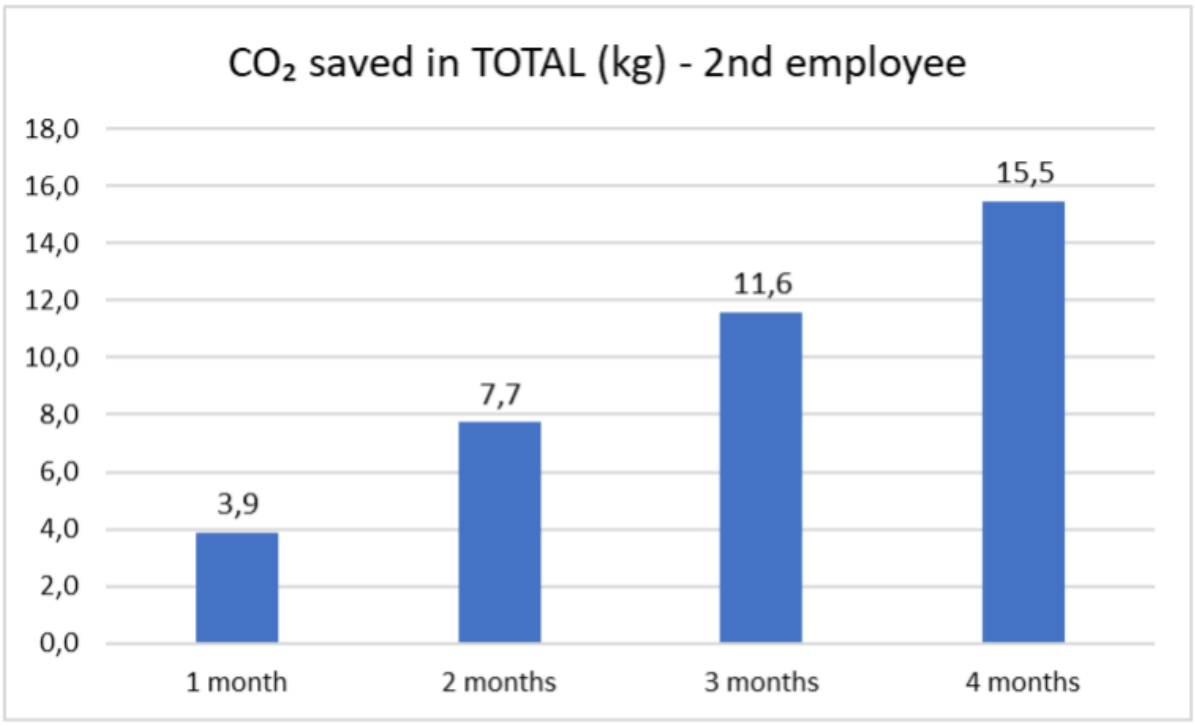
Monitoring period:

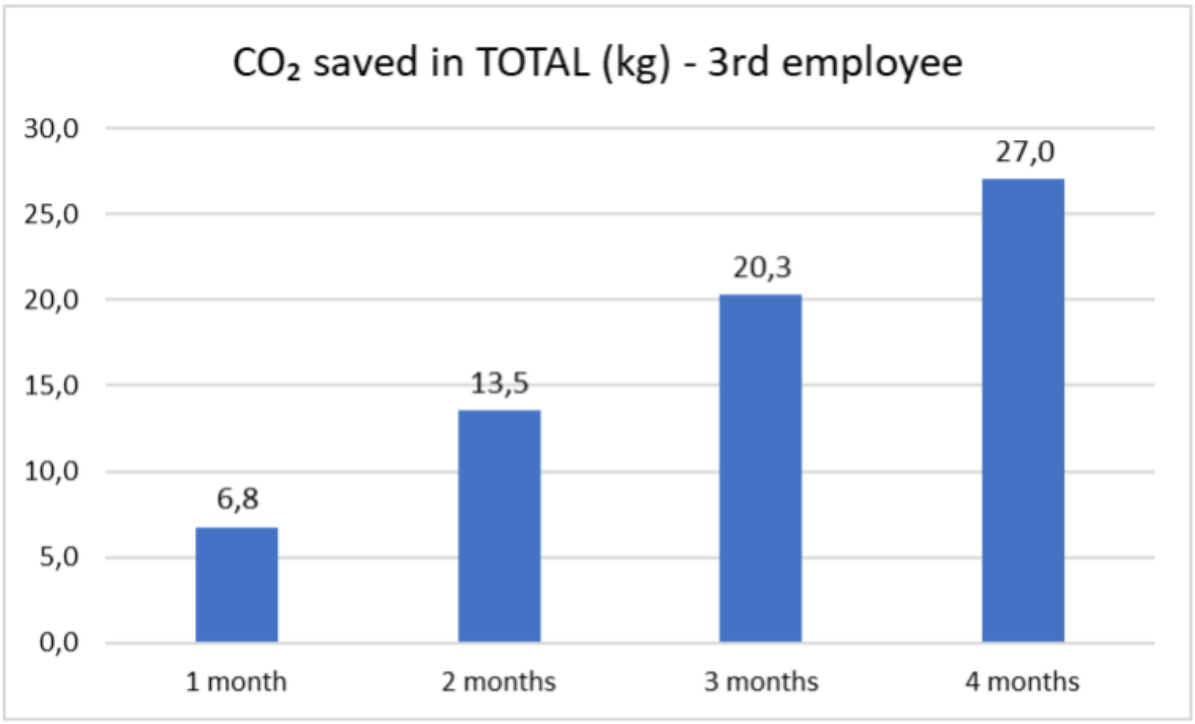
- The monitoring phase started on June 18 and ended on September 18.

KPIs used for monitoring:

- The number of sustainable routes per employee


CO_2 saved in TOTAL (kg) - 1st employee
60,0
50,0
40,0
30,0
20,0
10,0
0,0
12,9
25,8
38,6
51,5
1 month
2 months
3 months
4 months


CO_2 saved in TOTAL (kg) - 2nd employee
18,0
16,0
14,0
12,0
10,0
8,0
6,0
4,0
2,0
0,0
3,9
7,7
11,6
15,5
1 month
2 months
3 months
4 months



This pilot action 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 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 CO_2.

3.2. Czech Republic, Municipality of Litoměřice

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.

Monitoring period:

April 2018 to November 2018

KPIs used for monitoring:

- the number of kilometres for each bike for one cycling season (April-October)
- the number of people using each bike

The name of bike	The number of kilometers for each bike for one season	The number of people using each bike
1 CITANA 19''	40	4
2 CITANA 16,5''	212	3
3 CITANA 16,5''	160	1
4 CITANA 16,5''	28	3
5 CITANA 19''	33	1
6 ALTEZZA 17''	259	5
7 VOYAGER 19''	1 200	4
8 MONTANA 19''	2 173	1
9 MONTANA 17''	801	18 policemen
10 MONTANA 19''	751	
TOTAL	**5 657**	**40**

Biked kms per person (in average): 141.4 km

Biked kms per month (in average): 808.1 km

Maximum kms biked by one person on one bike during the monitored period: 2,173 km

Minimum kms biked by one person on one bike during the monitored period: 10 km

Kg of CO_2 saved/eliminated: 1 038.85205 kg of CO_2.

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.)

3.3. Austria, Mödling and Leoben

The Pilot Action, which was implemented by CAA was a soft measure in form of a Walking Competition. With the, so called **Walking Award** they 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, they 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, they 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.

Monitoring period:

- The quantitative evaluation: October – November 2018

- The qualitative evaluation: January – February 2019

KPIs used for monitoring:

- The quantitative evaluation
  - Number of participants (registration form)
  - Number of counted steps/kilometres (pedometer/ App)
  - Amount of CO_2 reduction by done walking distances during the Walking Award Period
- The qualitative evaluation
  - Transferability of the campaign
  - Qualitative Evaluation of campaign procedure
  - Qualitative Evaluation of campaign components

The quantitative evaluation

Municipality	Participants	Steps	km	CO_2 saved (kg)*
Mödling	20	3 754 303	2 628	482,6
Baden	107	19 940 659	13 958	2 563,2
Leoben	27	7 308 058	5 116	939,5
TOTAL	154	31 003 020	21 702	3 985,4

*This calculation was made by using the average production of CO_2 by car per km: 183.6401 g/km.

The qualitative evaluation

1. **Does the Walking Award Campaign offer an attractive offer for municipalities / public institutions and their employees?**

- Yes, if there is someone who takes care on it. It needs a kind of moderator who is promoting the campaign and motivating participants.
- It is easy to implement.
- Good tool for awareness raising on sustainable transport modes.
- When pedometers where given as a present for employees it was quiet cost intensive for more than 100 participants.
- In Mödling pedometers where distributed only for the period of competition and collected again to use them for another Walking Award.
- Different counting results of mobile-App and pedometer.

2. **Are financial costs which were done for the Walking Award affordable for the municipality?**

- Costs depend on municipality's size and number of employees.

- Costs were quite low and can be covered by the municipality.
- Financial costs can be balanced by positive long-term impact related to health of employees and less time of absence from work due to sickness.
- Next to pedometers prizes in form of vouchers for local companies were sponsored by the city of Leoben.

3. **Was the procedure of the Walking Award by given information clear for you?**

- Everything was clear.
- The flyer was good.
- It should become clear that not only steps during working time but during the whole day can be counted.

4. **Was the period of time of the Walking Competition (Middle of September - Middle of October) a good time from your point of view?**

- One month is good but during this period regular motivation (emails) is necessary to keep participants walking.
- Autumn and period from March to June are good times for implementation.
- Walking Award should not take place during holiday time (summer & winter).
- It can become more difficult to promote the Walking Award and for public relations when the Walking competition is one of many other activities of the European Mobility Week.

5. **Were produced materials and components of the Walking Award (poster, flyer, stickers, booklet) enough for promotion and implementation?**

- Flyer and booklets (registration card & step table) were mostly used.
- Flyers were distributed via email to contact employees directly.
- Posters and stickers were less used. (Stickers are more attractive for younger target groups.).
- Suggestion for improvement: Online tool for registration and step counting instead of analogue registration card.
- Suggestion for improvement: Combination of online tool and analogue registration card (especially employees, who work most of the time outside, prefer analogue tools).
- Suggestion for improvement: Online tool to make comparison between municipalities possible and to improve competition.
- Suggestion for improvement: If steps can be counted via App, information about the App-download should be included in promotion material like booklets and flyers.

6. **Were Materials and different components well designed?**

- Editable templates should be provided for municipalities to allow easy insertion of the own logo.

- Wooden medals for winners were perceived as very attractive.

7. Were Walking Award Materials well prepared concerning its content and aspects of clear understanding?

- See question No. 6
- Questions came up related to the usage of pedometers.

8. Were your tasks related to the implementation of the Walking Award manageable?

- Promotion of the Walking Award and to convince department heads to participate with their employees was time intensive.
- Some kind of pedometers, were not that easy to use or regularly failed, for that reason do not choose the cheapest one.

9. Was the procedure of the prize draw and chosen prizes appropriate for the issue?

- Prizes should be drawn and not given to participants with most steps because real number of walked steps cannot be proved.
- Increase minimum number of steps like up to 100.000 as requirement for prize draw participation. – 60.000 steps require very little activity from participants and do not necessarily justify to win high quality prizes.
- Prizes should be highlighted in information material.
- If the Walking Award is only organized within municipalities separately from each other a general prize draw is not necessary.

10. Was the official prize ceremony appropriate organized?

- The official press event with climate alliance's managing director was a great appreciation
- It was nice to get Walking Award certificates for each participant.

11. Would you/ your municipality participate at the Walking Award again?

- If it is always the same procedure, it is not clear to encourage employees for regular participation (maybe with a time lag between its implementations).
- It is good to be limited to municipal employees otherwise it would require more intense support.
- Compared to the Walking Award, "Bike2Work" ("Österreich radelt") is self-organized and not only addressing municipal employees, provides online tools with progress bars and participants are selected by random generator for daily lottery.

12. How do you rate the potential of the Walking Award as an Austrian wide campaign?

- The Walking Award has potential for an Austrian wide campaign and is very encouraging

- It's a question how to organize the competition aspect – do all participating municipalities compete with each other or only employees of one municipality?

13. Which incentives might induce employees to participate regularly?

- Varying Prizes.
- Prizes for those who participate regularly.
- To provide pedometers as a gift for employees which can be used even after the Walking competition.

14. How important is it to provide a combination of Walking Award Campaign and an expert's lecture on health aspects of walking?

- The expert's lecture was good to provide information on these aspects to motivate employees.
- We had very little number of participants at the expert's lecture (6 persons) compared to Walking Award participants (111 persons).
- An information sheet could provide relevant information about these aspects.

15. Would you like to add something concerning the Walking Award?

- In case of implementation at larger scale an App or Online Platform would be useful.
- The Walking Award is a good event, which should be implemented in regular intervals to encourage employees to walk.

3.4. Hungary, BME and BKK

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) was responsible for the implementation and dissemination of the online tool, which is a soft measure.

Monitoring period:

- November 2018 – February 2019

KPIs used for monitoring:

- Number of users
- Number of trip searches

- Total distance planned
- Number of sustainable travel mode choice
- Travel time reduction (per user)
- CO_2 reduction per workday

Here are the results that describe the performance of the online tool:

- Number of users: 56
- Number of trip searches: 147
- Total distance planned: 4800 km/workday
- Number of sustainable travel mode choice: 41 (27,8%)
- Travel time reduction (per user): -4.5 min/workday
- CO_2 reduction per workday: 32,4 kg/workday
- CO_2 reduction total: 2721,6 kg (84 working days during the monitoring period)

In total 56 users have tried the online tool, who searched for 147 routes, so almost 3 trips were planned in average by the users. Out of these trips 41 stated feedback was saved, 48% chose public transport, 37% choose bicycle and 15% chose walking. It was assumed, that a stated feedback expresses a trip in one direction during one workday. Based on the stated feedback of mode choice the travel time and CO_2 reduction were calculated. The original transportation mode was assumed to be car, if the user has one, and it was public transport, if the user does not own a car. The chosen transportation mode for the calculation was the stated one. Travel time reduction was calculated per user for a trip during one workday can be a negative number (which means more travel time than the original mode), since sometimes sustainable modes take longer. However, mode choice is a complex process and several parameters (not only travel time) have to be taken into account, which affects the decision of the user.

Furthermore, sustainable mode choice means using more active modes (cycling or walking), which is one of the main aims of the project. CO_2 reduction was calculated as an aggregated number for all users for a trip during one workday.

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 CO_2 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 CO_2 usages, the application promotes sustainable commuting modes, and therefore helps decreasing CO_2 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.

3.5. Slovakia, Municipality of Banská Bystrica

Pilot Action is the **bike point at the train and bus station in Banská Bystrica**. The final technical solution of the bike point is supposed 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.

Monitoring period:

- April – May 2019

KPIs used for monitoring:

- Potential use of the bike point
- Potential purpose of usage of the bike point

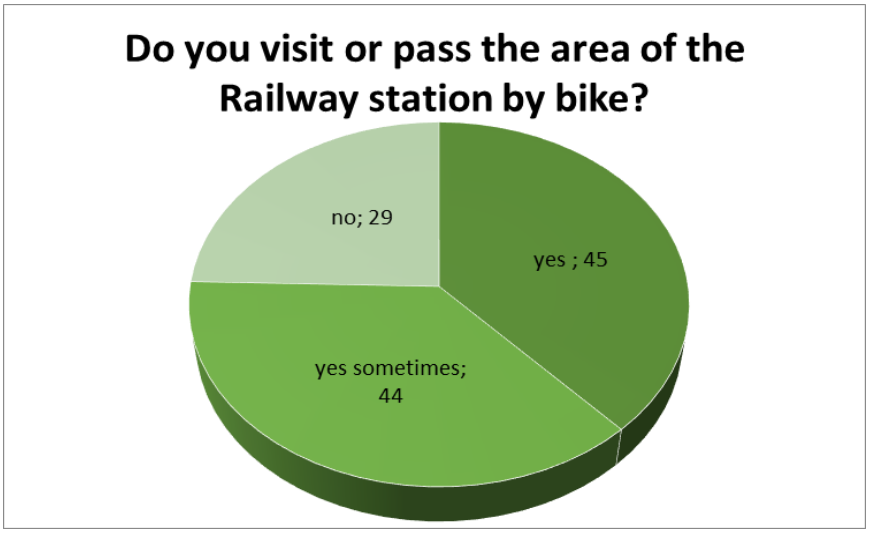
Given the fact that the implementation of the Pilot action was for objective reasons delayed, a long-term monitoring of the use of the physically built bike point was not feasible. The project partners however organised the survey among the target groups to find out their reaction on the project and potential interest in use of the bike point once it is built.

The questionnaire has been delivered to the respondents during the months April and May 2019, on several public events, where the "soon to be completed" bike point was promoted. Project partners produced the infographic banner presenting the functions of the bike point and presented it at the critical mass ride at the occasion of the opening the cycling season, and other public events related to Bike to work campaign in May. The banner was also exposed and respondents approached directly the construction site near the Railway station.

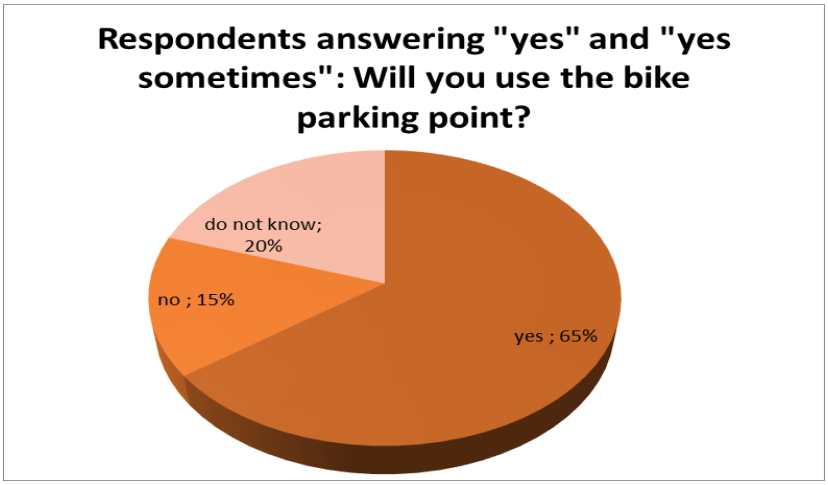
The questionnaire included the following questions:

- Do you visit or pass the area of the Railway station by bike?
  - If YES, will you use the bike parking point once available?
  - If NO, would you consider to use the bike parking point if available
  - If YES, for what purpose would you use the bike parking point?

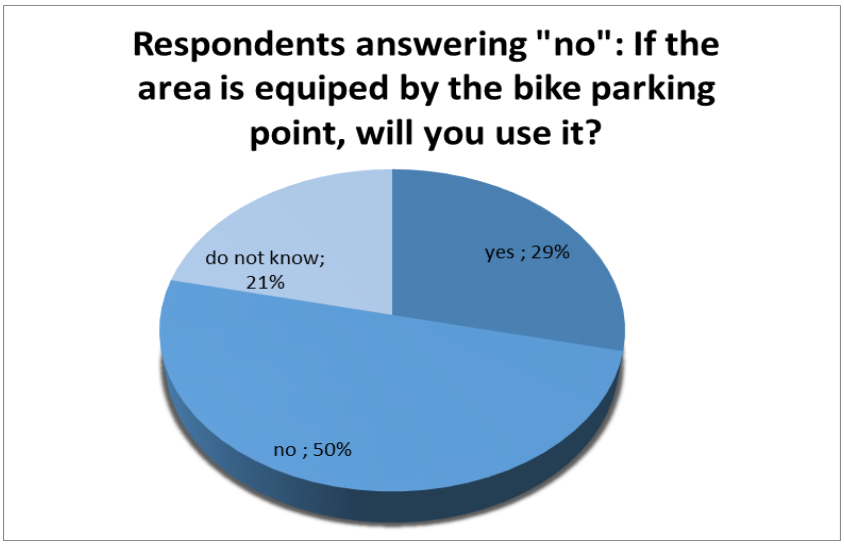
On the all actions, total of **118 respondents**, typically bike users, of all age categories provided their answers to the interviewers. The answers "YES" and "YES Sometimes" reached 99, and there were 29 answers NO.



Out of those who responded YES to the first question, 65% responded positively, 15% responded NO, and 20% Do not know.



Even some respondents who usually do not go to the area, would consider to use the bike parking point, if available: 29% positive responses were registered in this category. 50% stayed with NO, and 21% Do not know.



Regarding the purposes, in which cases the users would park their bike in the bike point (or use its other services, the main reasons are presented as follows:

3.6. Italy, City of Modena

The pilot action for 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 analysed.

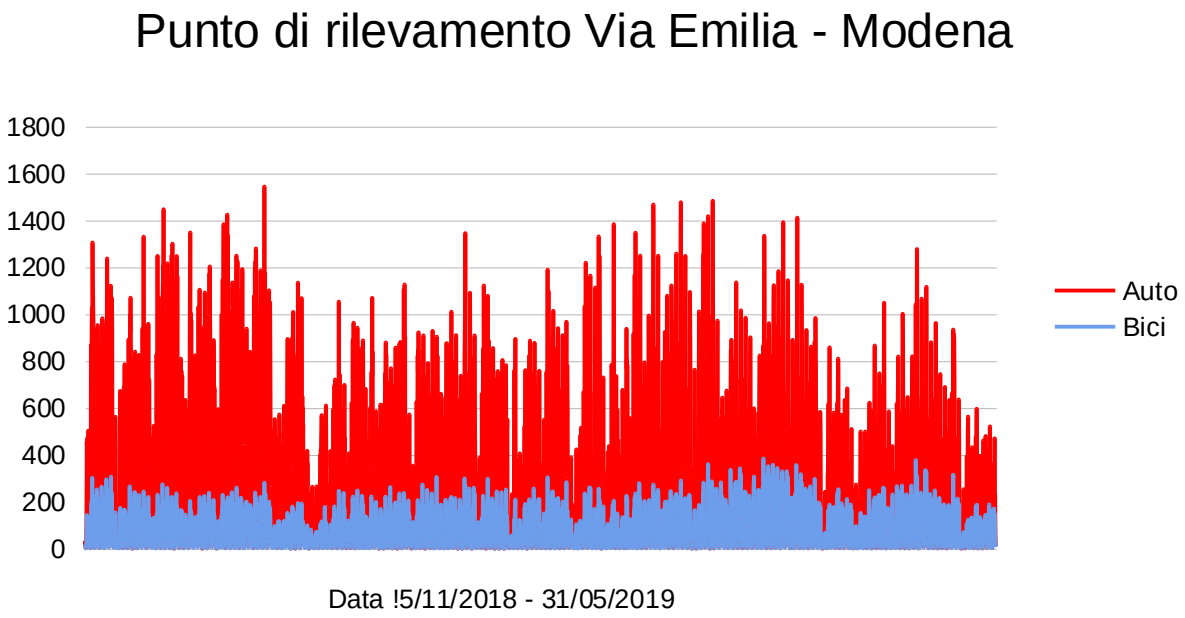
Monitoring period:

- December 2018 to May 2019

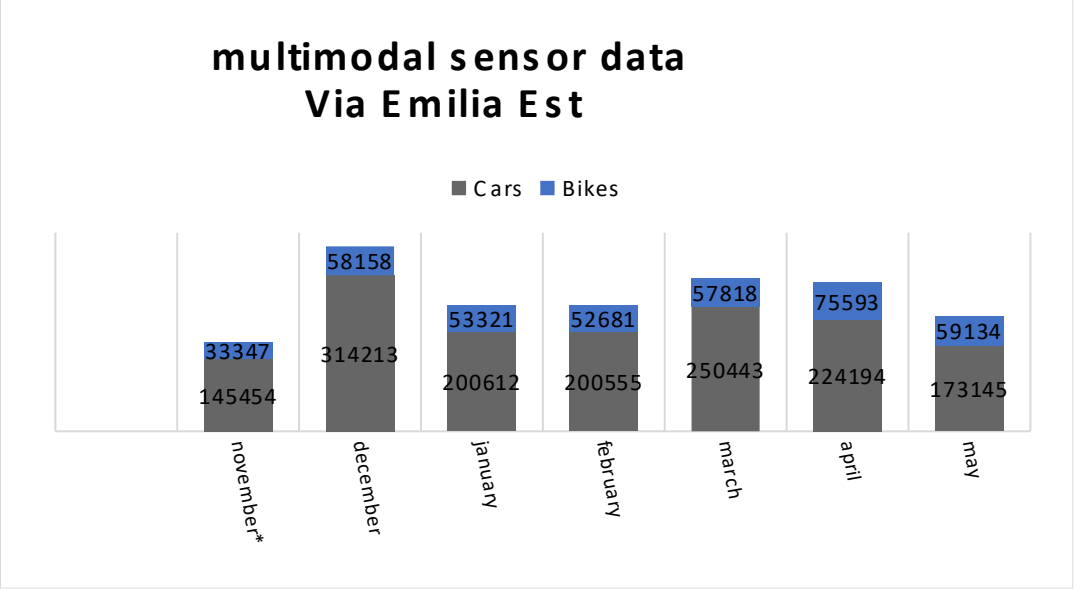
KPIs used for monitoring:

- Average number of bicycle passages per day, calculated for every month.
- Average number of car passages per day.
- Number of visits to the web platform.

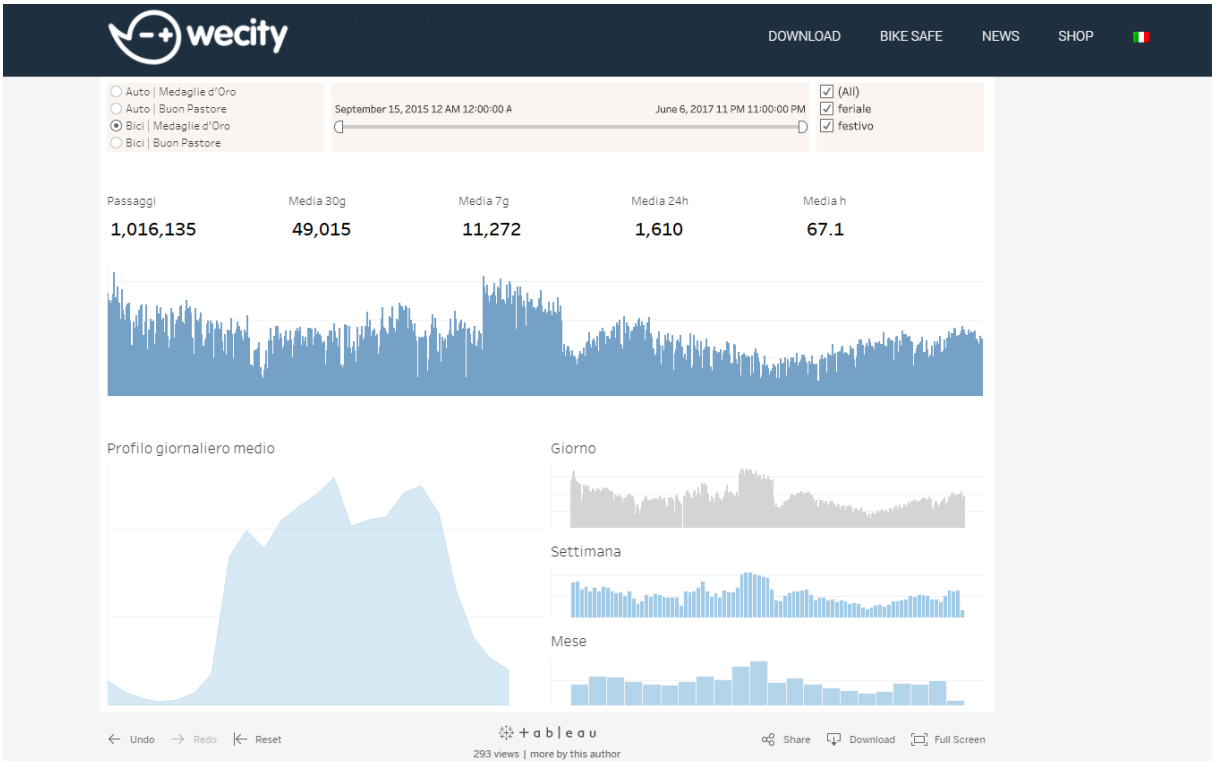
Such data and indicators are provided by the company that has been selected for the supply of the traffic sensor. The sensor will be recording for one year, so the pilot action will last also after the MOVECIT project end. These indicators will not measure an actual effect of the pilot action per se (as no clear direct relation can be assumed between the installation of traffic counting sensors and modal split change towards cycling), but will constitute an interesting output of the more extensive combination of measures included in the WMP, promoting sustainable mobility.



With the first data recorded we started to analyze the punctual modal split trend. In the previous image is shown that the bike has been quite used also during winter season (except from December, around 20 %). A very positive data has been registered in April: the total number of passages is very similar to the previous March, but we can see an important bike number increase. Unfortunately, May was continuous rainy and colder than average, so conditions were quite hard to travel by bike.



* November started recording 15th, so the bar is referred on half period.



The web platform for data consultation has been visited by **105 people** since November 2018 (Til 31/05/2019).

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.

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 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.

To conclude, experience the Municipality of Modena had with application of the pilot is quite positive and it even motivated some employees of the municipality to use the bike to commute. The pilot is even in line with the city long-term strategy to be a local leader regarding sustainable mobility and increase of consciousness, we can say that Modena is an example of a city which directly supports sustainable policies for its territory, starting from its own employees.

3.7. Germany, Aufbauwerk Region Leipzig GmbH

The pilot action consisted of the **purchase of 4 company pedelecs, 1 cargobike and the construction of 5 bike boxes**. The bikes were ordered in November 2018 and handed over to the City of Leipzig in March 2019. 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.

Monitoring period:

- June - July 2019

KPIs used for monitoring:

- Number of bookings
- Distance per booked journey
- Number of routes
- Reduction of CO2 in total

Bicycle	Distance (km)	CO_2 eliminated (kg)*
E-Bike 1	215	39,5
E-Bike 2	121	22,2
E-Bike 3	160	29,4
E-Bike 4	80	14,7
Cargobike	60	11,0
Total	**636**	**116,8**

*This calculation was made by using the average production of CO_2 by car per km: 183.6401 g/km.

During one month the bikes were used 46 times with an average distance of 13.8 km per trip. The total distance of 636 km equals approx. 117 kg CO_2 in comparison to business trips by car. If this positive trend continues, then the city administration will save 1,4 tonnes CO_2 a year. The data were obtained through the book and fleet management system.

In general, it's to say that the concept has arrived well with the employees and the bicycles will be used a lot. But there were certain difficulties in the implementation. The following SWOT-Matrix shows the basic results:

Strengths	Weaknesses
▪ idea of the pilot is easy to use and accessible to everyone	▪ high costs ▪ implementation of a booking and fleet management is difficult
Opportunities	**Threats**
▪ easily transferable to other regions	▪ invisible without campaign

It becomes clear that the concept idea is simple and thus applicable everywhere and to every target group. But 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 larger. 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. Mobility behaviour change

4.1. Survey methodology

The survey of mobility behaviour in the form of a questionnaire survey was chosen as a tool for evaluating the impact of the project. One of the aims of the project was to change the mobility behaviour of the employees of the sites involved in the project, and one way of monitoring this change is to investigate mobility behaviour. During this survey, employees are asked about various questions about their values, preferences, mode of transport and other factual questions.

The basic indicator of mobility behaviour is the so-called modal split, the division of transport work. Modal split shows what proportion of trips are being held by which means of transport. Modal split statistics can be used for both **commuting** and **business trips**. In the case of commuting, respondents were asked how they had been commuting to work over the past seven days, and they could have chosen one mode of transport for each day. In the case of intermodality, where one combines multiple means of transport during one trip, the respondent chose the means by which he travelled the longest. From the summary of responses of all employees of the given workplace, the division of the transport work was calculated.

The division of transport work for business trips was estimated in a more complex way. While commuting to work from home is relatively stable over time in terms of distance and regularity, we find far more variability in both periodicity and travel distances. This diversity also occurs across two basic types of business trips - trips inside the city and trips beyond the city limits. Therefore, we asked about the last two business trips within the city and the last two business trips outside the city. From these data it was subsequently possible to calculate the modal split of business trips.

Mobility behaviour research was conducted in three waves. The first wave at the start of the project in 2017 was used to determine the baseline, the following two waves in 2018 and 2019 are data collections to evaluate the change in mobility behaviour. Data was collected in April and May according to the site, and data collection was typically within two weeks. The data were mostly collected through an online (Google) questionnaire form, in the case of the Litoměřice Hospital, the data were collected through paper questionnaires.

4.2. Mobility surveys evaluation (2017, 2018 and 2019)

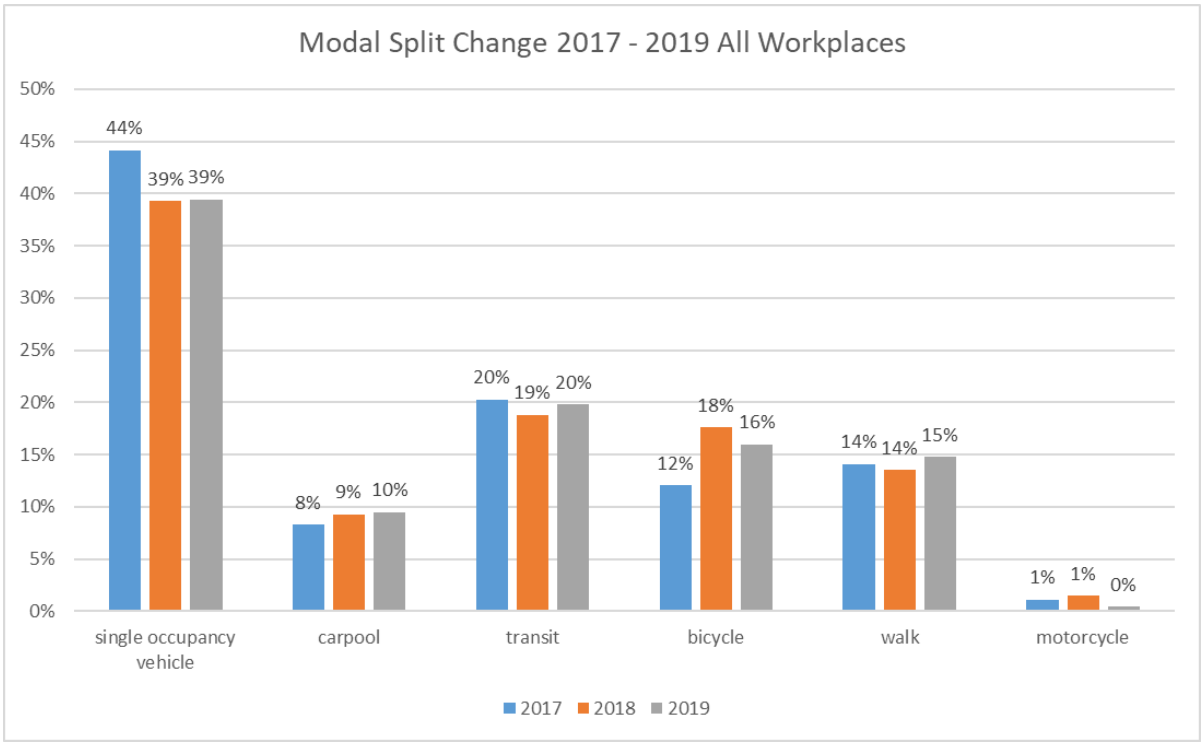
The data were collected in 2017 at 13 workplaces involved in the project; in 2018 and 2019, the workplace of the Municipal Police of Litoměřice took part in the project and the survey was conducted in 14 workplaces. For each repeated research, when respondents are questioned again at intervals, there is a "mortality" of respondents indicating a diminishing return on questionnaires. During the first year, more than a third of all employees participated in the survey (36%), while in the last year it was only one fifth (20%) of the employees.

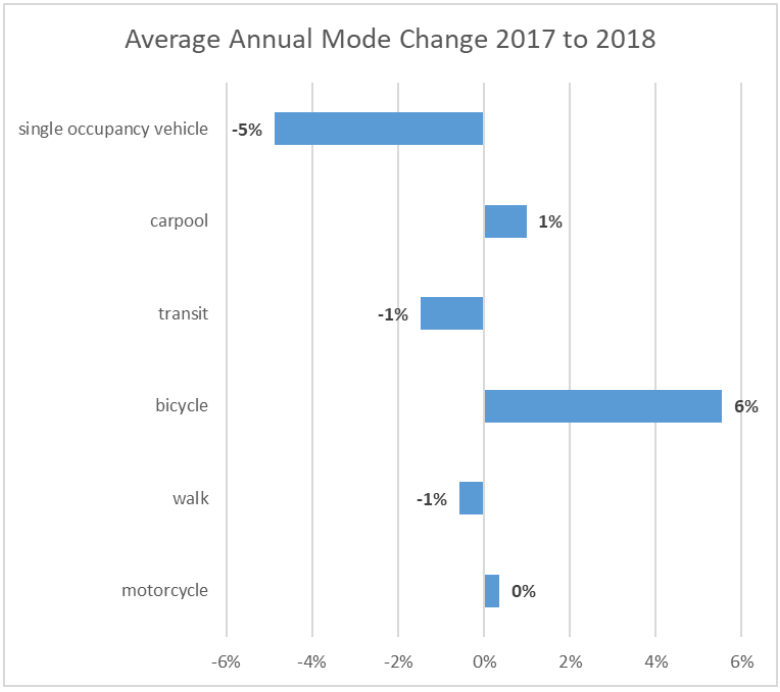
				Response Rate		
City	Workplace	Country	Staff	2017	2018	2019
Baden	Municipality	Austria	300	22%	15%	8%
Banska Bystrica	Municipality	Slovakia	261	52%	38%	35%
BCS	Békéscsaba Municipality	Hungary	210	27%	33%	34%
BKK	Centre of Budapest Transport (BKK)	Hungary	1200	22%	7%	1%
BME	University (BME)	Hungary	163	31%	26%	34%
Bruck and der Mur	Municipality	Austria	226	17%	10%	10%
Leipzig	Municipality	Germany	350	41%	32%	29%
Leoben	Municipality	Austria	380	23%	21%	19%
Litomerice	Hospital	Czechia	878	41%	42%	12%
Litomerice	Municipality	Czechia	218	74%	55%	75%
Litomerice	Police (since 2018)	Czechia	33	0%	45%	58%
Ljutomer	Municipality	Slovenia	29	89%	100%	66%
Modena	Municipality	Italy	1608	46%	43%	26%
Moedling	Municipality	Austria	300	21%	18%	13%
Total			**6156**	**36%**	**30%**	**20%**

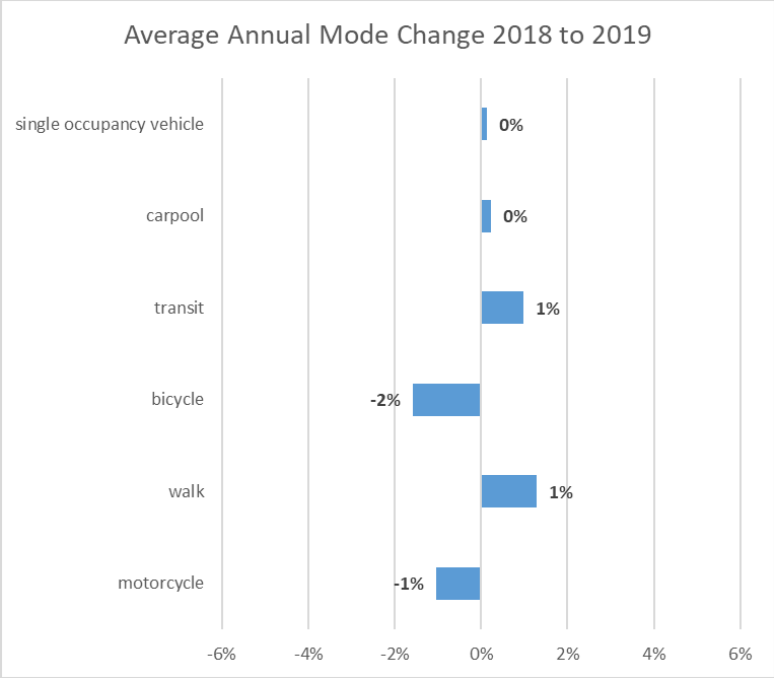
4.3. Modal split change

4.3.1. Commuting

The most significant change in the division of transport labour was between 2017 and 2018, when the share of single occupancy vehicles decreased by 5%. During the project, the share of carpooling travelled up to 10%, the share of public transport was around 20%, the share of cycling travelled from 12 to 16% and the share of walking was around 15%.

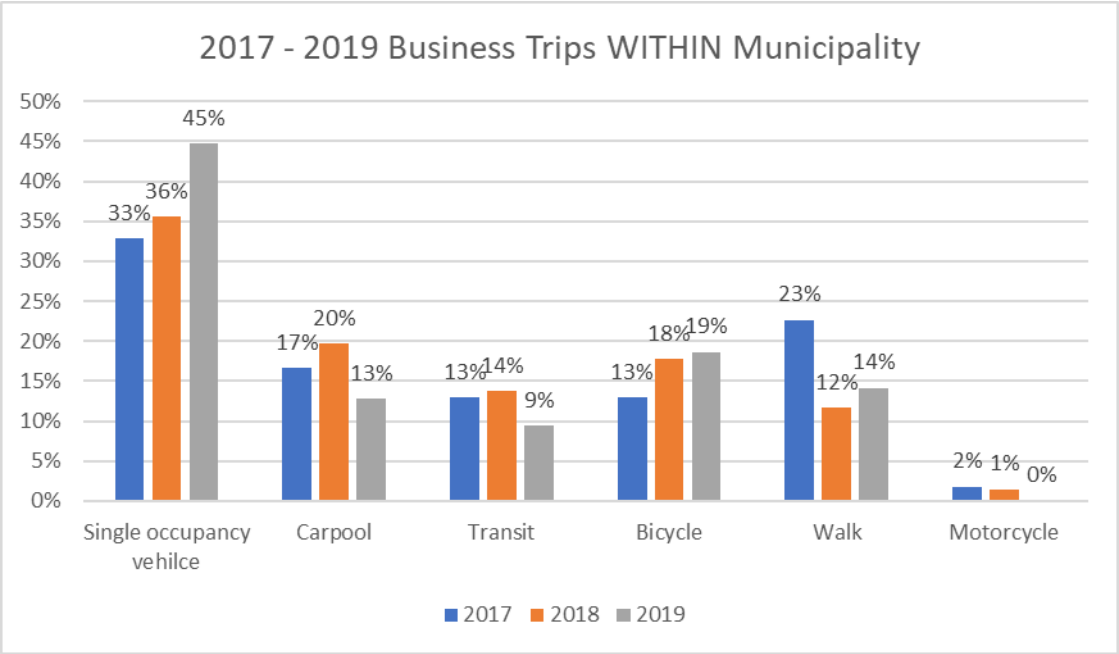

Modal Split Change 2017 - 2019 All Workplaces
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
44%
39%
39%
8%
9%
10%
20%
19%
20%
12%
18%
16%
14%
14%
15%
1%
1%
0%
single occupancy vehicle
carpool
transit
bicycle
walk
motorcycle
2017
2018
2019


Average Annual Mode Change 2017 to 2018
single occupancy vehicle
-5%
carpool
1%
transit
-1%
bicycle
6%
walk
-1%
motorcycle
0%
-6%
-4%
-2%
0%
2%
4%
6%

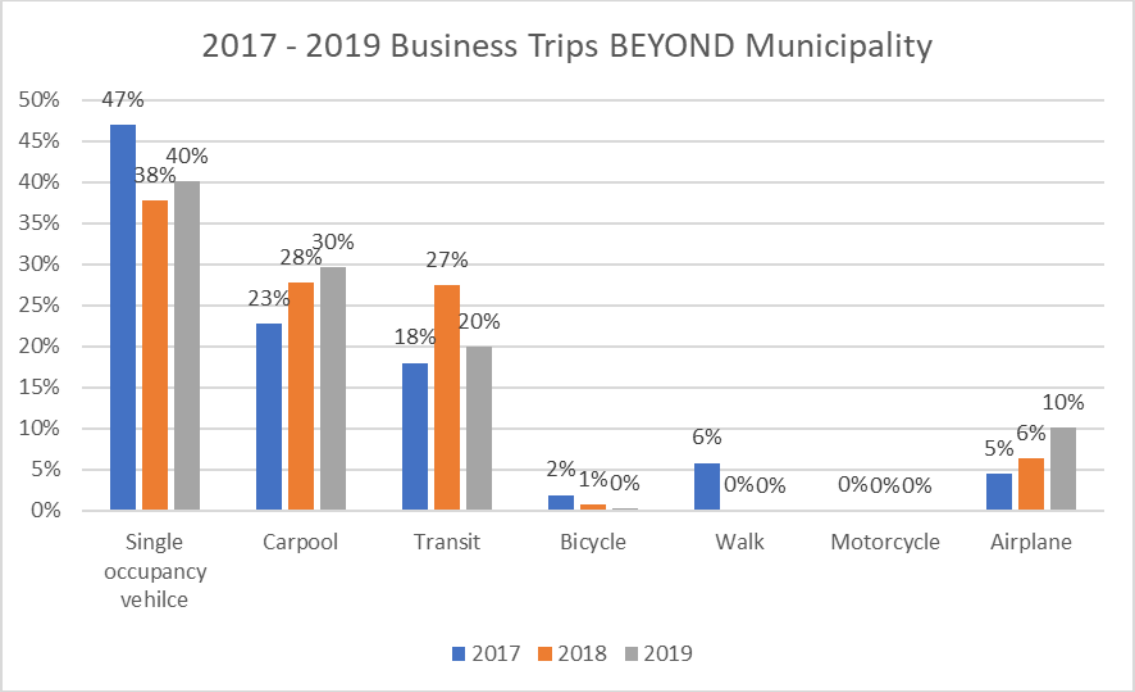


4.3.2. Business trips

If traffic behaviour has changed favourably in normal commuting, the situation is somewhat more complicated in business trips. As far as business trips within the municipality are concerned, between 2017 and 2019, we can follow the increase in the proportion of cycling trips from 13% to 19%, but at the same time the number of car journeys occupied by only one person has increased to 45% and the share of walking has decreased from 23% to 14%.



For business trips outside the city or town, we see a fall in car-only journeys from 47% to 40%, an increase in carpooling from 23% to 30%, and a share of public transport around 20%. Unfortunately, the share of air travel has increased from 5% to 10%.



4.4. Workplace by workplace comparison

Detailed information about commuting and business trip modal split for every workplace is included in D.T3.1.2 3RD TRANSNATIONAL REPORT ON 13 TWO PILLARS MODAL SPLIT ON BEFORE MEASUREMENT.

5. CO_2 savings

5.1. CO_2 emissions avoided

How do we arrive at as precise estimate of CO_2 saving as possible? Every mode of transportation has a statistic of CO_2 emissions per kilometre per passenger. For walking and cycling those emissions are zero, the most CO_2 intensive mode of transportation is a car equipped with internal combustion engine which is occupied just by a driver. Such a mode of transportation may produce something between 100 to 200 grams and more of CO_2 emissions each kilometre. Following table contains some of the basic data input for CO_2 savings calculation.

Commuting	Single Occupancy Vehicle	Average Trip Distance (km)	12,3
		CO2 emissions (grams) per passenger per 1 km	150
	Carpooling	Average Trip Distance (km)	8,7
		CO2 emissions (grams) per passenger per 1 km	80
	Transit	Average Trip Distance (km)	16,5
		CO2 emissions (grams) per passenger per 1 km	52
	Bicycle	Average Trip Distance (km)	4,1
		CO2 emissions (grams) per passenger per 1 km	0
	Walk	Average Trip Distance (km)	2,1
		CO2 emissions (grams) per passenger per 1 km	0
	Motorcycle	Average Trip Distance (km)	8
		CO2 emissions (grams) per passenger per 1 km	80
	Average number of trips per year		230
Business Trips Within Municipality	Single Occupancy Vehicle	Average Trip Distance (km)	9,2
		CO2 emissions (grams) per passenger per 1 km	150
	Carpooling	Average Trip Distance (km)	11,1
		CO2 emissions (grams) per passenger per 1 km	80
	Transit	Average Trip Distance (km)	9,4
		CO2 emissions (grams) per passenger per 1 km	52
	Bicycle	Average Trip Distance (km)	5,3
		CO2 emissions (grams) per passenger per 1 km	0
	Walk	Average Trip Distance (km)	2,3
		CO2 emissions (grams) per passenger per 1 km	0
	Motorcycle	Average Trip Distance (km)	11,4
		CO2 emissions (grams) per passenger per 1 km	80
	Average number of trips per year		39,5
	Share of employees who do this business trips 2017		48%
	Share of employees who do this business trips 2018		37%
	Share of employees who do this business trips 2019		41%
Business	Single Occupancy Vehicle	Average Trip Distance (km)	91,1

Trips BEYOND Municipality	Carpooling	CO2 emissions (grams) per passenger per 1 km	150
		Average Trip Distance (km)	114,4
	Transit	CO2 emissions (grams) per passenger per 1 km	80
		Average Trip Distance (km)	182,4
	Airplane	CO2 emissions (grams) per passenger per 1 km	52
		Average Trip Distance (km)	860,7
		CO2 emissions (grams) per passenger per 1 km	100
	Average number of trips per year		9,2
	Share of employees who do this business trips 2017		48%
	Share of employees who do this business trips 2018		37%
	Share of employees who do this business trips 2019		41%

The CO_2 emissions for every transportation mode were estimated using this formula:

((total number of employees)(specific modal share of a mode)*(average trip distance for given mode two way)*(average number of trips per year))*

*

(CO_2 emissions per passenger per kilometre for given mode)

CO_2 produced in 2017 according to mobility survey was used as a baseline. CO_2 calculations for following years (2018 and 2019) were substracted from the baseline according to this example:

Example: Commuting SOV CO_2 savings calculation

CO_2 produced in 2017: 2307,8 tons **(baseline)**

CO_2 in 2018: 2046,8 tons

CO_2 in 2019: 2054,5 tons

CO_2 savings in 2018 = 2307,8 - 2046,8 = 260,9 tons

CO_2 savings in 2019 = 2307,8 - 2054,3 = 253,5 tons

CO_2 savings total = 260,9 + 253,5 = 528,7 tons

Total results of avoided CO_2 during MOVECIT project lifetime (from data gathered via questionnaires):

Commuting	CO_2 **avoided 2018**	CO_2 **avoided 2019**	CO_2 **avoided total**
Single occupancy vehicle	260,9	253,5	514,4
Carpool	-19,0	-23,5	-42,5
Transit	37,2	13,5	50,7

Bicycle	0,0	0,0	0,0
Walk	0,0	0,0	0,0
Motorcycle	-6,3	12,4	6,0
total	**272,8**	**255,8**	**528,7**

Business Trips WITHIN municipality	CO_2 **avoided 2018**	CO_2 **avoided 2019**	CO_2 **avoided total**
Single occupancy vehicle	17,7	-18,1	-0,4
Carpool	3,1	11,5	14,6
Transit	2,8	5,5	8,3
Bicycle	0,0	0,0	0,0
Walk	0,0	0,0	0,0
Motorcycle	1,5	3,5	5,0
total	**25,1**	**2,4**	**27,5**

Business Trips BEYOND municipality	CO_2 **avoided 2018**	CO_2 **avoided 2019**	CO_2 **avoided total**
Single occupancy vehicle	133,2	91,1	224,3
Carpool	7,2	-13,8	-6,6
Transit	-15,7	4,1	-11,6
Airplane	-14,2	-194,2	-208,4
total	**110,5**	**-112,9**	**-2,4**

Total CO_2 tons avoided during project lifetime	**553,8**

We arrived at estimate of 553,8 tons of CO_2 emissions avoided during MOVECIT project lifetime at 14 workplaces across 7 European countries. This is the result gathered via staff travel surveys and it doesn't contain additional data gathered via pilot action monitoring. Overall results can be found in conclusions chapter bellow.

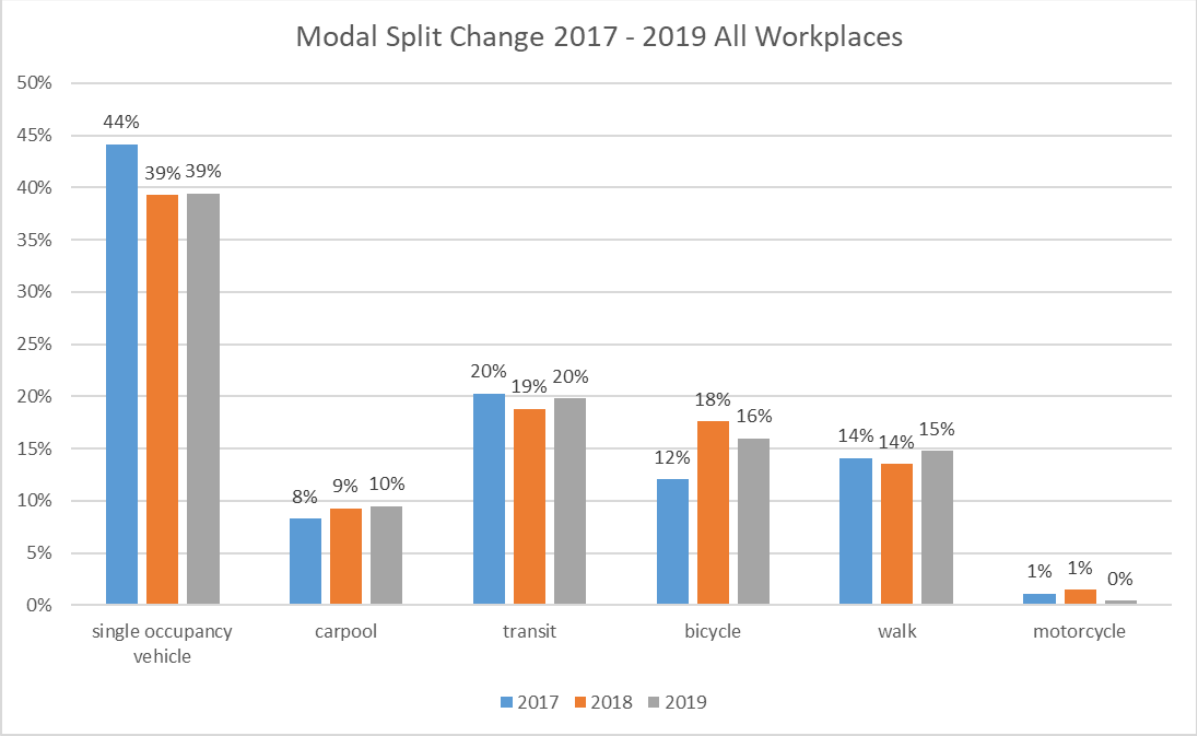
6. CONCLUSIONS

This report gathered the mobility change results of the MOVECIT project monitoring, especially concerning the pilot actions, modal split change and CO_2 savings. These results are in detail described in previous chapters.

In following table, you can see that all thematic KPIs (but one) has fulfilled its target values:

INDICATOR	Target	Total result (abs.)	Total result (rel.;%)
Number of promotional materials (leaflets, giveaways) disseminated	7 000	12 152	174
Number of implemented measures proposed in mobility planning process	26	85	327
Number of e-vehicles obtained or owned by the municipality or its employees.	10	26	260
The percentage increase of sustainable mobility modes	20%	3,22%	16
Number of people answering the questionnaire	1 116	2 268	203
Number of letter of commitment	13	13	100

The CO2 savings were targeted both in percentage (20% change) and both in absolute numbers. The project goal was to save 800 tons of CO_2.



Via the source of travel staff survey we have reached the results of **553,8 tons** of CO_2 emissions avoided during MOVECIT project lifetime at 14 workplaces across 7 European countries. We can also add the results of pilot action monitoring to this savings and add **8 718,2 kg** of eliminated CO_2.

COUNTRY	CO_2 ELIMINATED (KG)
Slovenia	855,6
Czech Republic	1 038,9
Austria	3 985,4
Hungary	2 721,6
Slovakia	-*
Italy	-*
Germany	116,8
TOTAL	**8 718,2**

All pilot actions were successfully implemented and total CO_2 savings from both pilot action monitoring and staff travel survey results is 562,52 tons of CO_2.