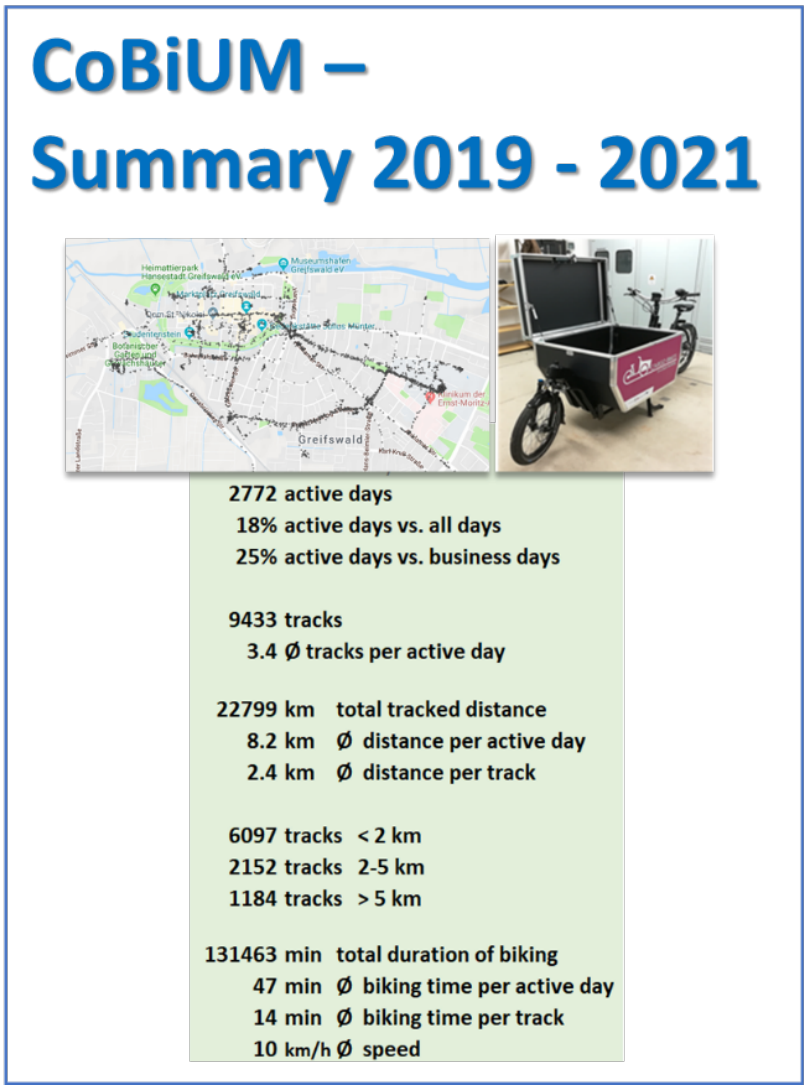
CoBiUM – Summary Report on the Pilots



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European Regional Development Fund

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1 Background

In CoBiUM the partners carried out pilot testings - with small scale investments - in one or more of three thematic areas of cargo bike use.

According to the project application the objectives of pilot phase are

- to test different applications of cargo bikes under specific circumstances to identify drivers and barriers for the implementation of cargo bikes in specific fields and to identify good practices as examples;
- to increase the knowledge of cargo bikes' potential and to improve visibility and acceptance of them in the wider public – leading to increased usage;
- to explore and estimate the potential of cargo bike use for reduction of car traffic and parking pressure as well as reduction of air pollution, meaning reduction of greenhouse gas emissions by substituting fossil driven vehicle trips by cargo bike rides, and in conclusion;
- to deliver the empirical basis and experience to develop guidelines offering advice and checklists to enable a smooth and successful introduction of cargo bikes into different fields of urban mobility – with regard to the different development levels of bicycle mobility in the different countries.

The pilots are the test field to identify good practice for cargo bike usage that can then be disseminated to other cities in the South Baltic region and beyond, encouraging and facilitating the take-up of similar measures. At the same time the pilots are already fulfilling the purpose of raising people's awareness, increasing the knowledge and letting people experience cargo bike use.

In 2019 four partners – Gdynia, Greifswald, Slagelse and Växjö - started to conduct pilots in their cities, later on in 2020 Slupsk and Guldborgsund followed.

This final evaluation report describes the situation on four levels: After the general, framing information on project level the report goes down to the project partner level and then via the pilot agents down to the bicycle drivers (bicyclists).

The information concerning the partners, the local agents and finally the cyclists are based on a semi-structured questionnaire for each level. All questions were open questions, described by several keywords which could be discussed.

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2 Project Level

2.1 Pilot management

The partners started with their pilots at different dates. This was due to the fact that there

- were different dates of project clarification and local implementation;
- were different levels of experience and knowledge concerning cargo bikes;
- was a variety of complex national procedures for the calls for tenders and procurement.

Based on discussions at project meetings every partner had to prepare and manage the cargo bike pilots himself.

The idea was that every partner should cover at least two of the three main thematic fields of application (public body, business, private).

Figure 1 gives an overview of pilot testing in the different partner cities. This includes short running pilots, means not the entire project duration lasting pilots, too. You can see that the thematic fields of application are a bit unbalanced: The pilots running at facilities of public bodies are dominating. This is because it is much easier to manage all necessary formalities between public bodies than in cooperation with external partners.

Figure 1: Number of cargo bike pilots and bikes in thematic fields of application

Project partner	**public body**, number of …		**business**, number of …		**private, public**, number of …	
	pilots	**cargo bikes**	**pilots**	**cargo bikes**	**pilots**	**cargo bikes**
Gdynia	1	6	1	6	-	-
Greifswald	3	4	2	2	1	3
Guldborgsund	1	3	-	-	-	-
Slagelse	1	2(1)	2	3	1	3
Slupsk					1	4
Växjö	1	6			1	7
Project in total	**7**	**21**	**5**	**11**	**4**	**17**

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2.2 Techniques of information gathering for process evaluation

The project partners decided not to run surveys by standardized individual questionnaires for pilots in case only few persons use the cargo bike because their experience will not change from day to day. Thus, the **agents and cyclists** of pilots were **interviewed** in March'21 by project partners **guided** by an **outline of a questionnaire with open questions**. These talks happened in national language and the partners translated the information in English. Afterwards the partners integrated the collected information in the outline of the questionnaire. All in this manner written experiences are documented in the appendix of this report.

Pilots for public use – also called cargo bike library systems – have many different drivers and often people use it only one or two times. For these pilots a standardized **questionnaire** has been developed and can be used **online** as well as in paper version. This was implemented **only** for the "Lara system" in **Greifswald**.

All running cargo bikes of the pilots – without in Växjö - were equipped with a **hardware tracker** to record various quantitative measurable features of use. This recording happened anonymized, excluding the option to link the information with personal data of the drivers.

2.3 Summarised data of all GPS tracked pilot cargo bikes

Hardware tracker recorded in five partner cities all trips of pilot cargo bikes. Unfortunately, caused by human failure – in particular late charging of the GPS tracker batteries - we lost the data of several trips. Nevertheless, the huge number of tracked coordinates of the cargo bikes delivers many valuable information.

Figure 2: Summarised data of all GPS tracked pilot bikes (in monthly split)

2019											2020												2021			Summary
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
1	1	9	10	12	13	15	15	15	18	19	19	20	20	23	31	32	32	32	30	30	30	27	27	27	20 Ø number of bikes per month
31	30	289	300	372	403	438	465	450	558	588	553	621	600	709	922	992	992	960	930	900	930	837	756	837	15463 days
21	22	215	200	276	286	307	345	315	396	436	383	440	440	482	675	736	672	704	660	630	690	567	540	621	11059 business days
2	8	40	57	84	116	91	87	74	46	21	45	73	104	109	211	254	295	249	259	196	77	78	101	95	2.772 active days
6%	27%	14%	19%	23%	29%	21%	19%	16%	8%	4%	8%	12%	17%	15%	23%	26%	30%	26%	28%	22%	8%	9%	13%	11%	18% active days vs. all days
10%	36%	19%	29%	30%	41%	30%	25%	23%	12%	5%	12%	17%	24%	23%	31%	35%	44%	35%	39%	31%	11%	14%	19%	15%	25% active days vs. business days
6	28	129	179	335	510	312	258	250	154	56	120	221	323	321	675	932	1117	893	835	649	232	214	344	340	9.433 tracks
3,0	3,5	3,2	3,1	4,0	4,4	3,4	3,0	3,4	3,3	2,7	2,7	3,0	3,1	2,9	3,2	3,7	3,8	3,6	3,2	3,3	3,0	2,7	3,4	3,6	3,4 Ø tracks per active day
14	41	289	492	715	822	665	589	430	214	171	275	445	768	815	1465	2652	3015	2216	1913	1367	695	628	1075	1029	22.799 km total tracked distance
7,1	5,2	7,2	8,6	8,5	7,1	7,3	6,8	5,8	4,6	8,1	6,1	6,1	7,4	7,5	6,9	10,4	10,2	8,9	7,4	7,0	9,0	8,1	10,6	10,8	8,2 km Ø distance per active day
2,4	1,5	2,2	2,7	2,1	1,6	2,1	2,3	1,7	1,4	3,0	2,3	2,0	2,4	2,5	2,2	2,8	2,7	2,5	2,3	2,1	3,0	2,9	3,1	3,0	2,4 km Ø distance per track
2	21	80	101	222	404	217	181	186	118	25	81	150	198	185	455	548	682	590	553	446	131	121	192	208	6.097 tracks < 2 km
4	6	32	50	86	85	63	48	50	32	21	23	54	76	77	135	233	278	177	206	132	63	62	89	70	2.152 tracks 2-5 km
0	1	17	28	27	21	32	29	14	4	10	16	17	49	59	85	151	157	126	76	71	38	31	63	62	1.184 tracks > 5 km
72	192	1902	3234	3738	4146	4128	3228	2112	1236	876	1428	2076	3966	4026	8406	15639	16770	12798	11550	9516	3834	3570	6960	6060	131.463 min total duration of biking
36	24	48	57	45	36	45	37	29	27	42	32	28	38	37	40	62	57	51	45	49	50	46	69	64	47 min Ø biking time per active day
12	7	15	18	11	8	13	13	8	8	16	12	9	12	13	12	17	15	14	14	15	17	17	20	18	14 min Ø biking time per track
12	13	9	9	11	12	10	11	12	10	12	12	13	12	12	10	10	11	10	10	9	11	11	9	10	10 km/h Ø speed

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Altogether, the summarised distance of all GPS tracked pilot cargo bikes was **22.799 km** until end of March'21.

- Overall, 65 % of all trips were shorter than 2 km. This confirms the presumption that **cargo bikes are predominantly useful for inner-city drives!**
- The overall level of efficiency - 18% resp. 25% - seems to be not very high. Of course, the daily and seasonal weather conditions influenced the use of the cargo bikes, as expected: **more use in summer time** (for instance August compared with December/January).
  But this project and thus also project's values were caused mainly by long periods of local and regional lockdowns due the governmental Corona pandemic restrictions in 2020 and the beginning of 2021.
- There are also differences between partner cities. This variation depends on the one hand on the duration of pilots (Guldborgsund and Slupsk ran one year shorter than the others) and on the other hand on the type of pilot. In Guldborgsund kindergartens used the cargo bikes as optional, additional means of traffic for "additional" outdoor activities; thus, there is a low level of efficiency (just 5% of week days). Whereas is Slupsk all citizens could use the bikes of rental system (28% of week days and even 20% of all days).
- It is the same explanation concerning the average lengths of trips: The **kindergartens** in Guldborgsund show the **highest share (34 %) of long distance** trips (> 5 km).

Figure 2: Summarised data of all GPS tracked pilot bikes (split by partners)

Tracked Pilot Bikes in ...					All Tracked Pilot Bikes summary	
Greifswald Germany	Slagelse Danmark	Guldborgsund Danmark	Gdynia Poland	Slupsk Poland		
01.03.19	08.05.19	01.06.20	01.05.19	01.06.20		
31.03.21	31.03.21	31.03.21	31.03.21	31.12.20		
4697	4153	912	4845	856	15463	days
3358	2968	654	3463	616	11059	business days
1032	**767**	**30**	**769**	**174**	**2.772**	**active days**
22%	18%	3%	16%	20%	**18%**	**active days vs. all days**
31%	26%	5%	22%	28%	**25%**	**active days vs. business days**
3393	**2437**	**64**	**2957**	**582**	**9.433**	**tracks**
3,3	3,2	2,1	3,8	3,3	**3,4**	**Ø tracks per active day**
9260	**4780**	**267**	**6240**	**2252**	**22.799**	**km total tracked distance**
9,0	6,2	8,9	8,1	12,9	**8,2**	**km Ø distance per active day**
2,7	2,0	4,2	2,1	3,9	**2,4**	**km Ø distance per track**
1996	1757	24	2050	270	**6097**	**tracks < 2 km**
59%	72%	38%	69%	46%	65%	of all tracks
885	491	18	573	185	**2152**	**tracks 2-5 km**
26%	20%	28%	19%	32%	23%	of all tracks
512	189	22	334	127	**1184**	**tracks > 5 km**
15%	8%	34%	11%	22%	13%	of all tracks
50610	**23001**	**882**	**44466**	**12504**	**131.463**	**min total duration of biking**
49	30	29	58	72	**47**	**min Ø biking time per active day**
15	9	14	15	21	**14**	**min Ø biking time per track**
11	12	18	8	11	**10**	**km/h Ø speed**

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3 Partner Level

All following information are gathered by open qualitative interviews based on a written outline. The partners in Växjö, Greifswald, Gdynia, Slupsk, Slagelse and Guldborgsund ran such interviews with the pilot agents and cyclists and reported afterwards the collected information to PP_3 in English language.

3.1 PP_1, Partner in Växjö, Sweden

The project team in Växjö made a pre-study by experts, checked the experience from other cities in Sweden in similar projects to choose thematic areas with the maximum potential transfer their pilots to other cities.

Växjö considered to implement in the first step three pilots. But the idea to run a "transport hub" could not be realized. So, finally

- a pilot "kindergarten" with 6 cargo bikes and
- a pilot "bike library" (offer to lend a cargo bike to citizens) with 7 cargo bikes (two- and three-wheeled ones)

have been implemented.

The pilot "kindergarten" started in January/2019 and is still running; pilot "bike library" started in April/2019 and ended October/2020.

As no GPS tracker could be implemented in Växjö, there is no quantitative data available which can show the driven distances and similar features.

3.1.1 *Criteria for pilot choice*

The kindergarten was chosen for the wrong reasons, as no CO^2 emissions are saved, because no car is replaced, as kindergartens don't have own cars. Still, it is a very good way of transport and the cargo bike bring lots of other social values as they sit together very closely and get in direct contact with each other while driving longer distances than by walking.

The bike library was implemented to enable people to try all kinds of bikes (in total 27 bikes have been bought, e.g. e-bikes, trike, rikshaw, kick-boards). Cargo bikes are a part of this project and they contribute a lot to the visibility of the project in terms of marketing. The cargo bikes have been included to reduce CO^2 and to enable citizens to try new forms of transport.

3.1.2 *Procedure of procurement*

The procedure of procurement for the cargo bikes for the kindergarten really went smoothly. There were no complications due to experience with already existing cargo bikes.

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With the bike library pilot more paper work was needed. We have decided to buy very unusual and different bikes to make people test them. There was never a problem with the bikes, only the human factor was always critical, as you need a lot of management and also the bikes can get damaged sometimes by mistakes people make.

3.1.3 *Implementation*

Due to a close cooperation with a person who had experience from another Interreg-project (ELMOS) and who also knew exact the structure and work in the kindergartens, the implementation went also very smoothly with that pilot.

We have 4 bike shop in the city that rent all the bikes. You need reliable bike dealers to be part of the project. A lot of administration of the municipality is needed and in conclusion the bike library shall stand on its own legs in the future by gaining money out of renting the bikes.

3.1.4 *Management*

In terms of the kindergarten pilot not any problems occurred. Still, after an accident with a kindergarten teacher driving a bike with children where she was unconscious for some time, we made the policy that minimum of 2 staff members are allowed to drive together (no single use of cargo bikes with children).

Regarding the pilot “bike library” you need very experienced and reliable bike shops as pilot agents. Once you found them, all runs very well. You just need to arrange a good lending contract.

Each bike is rented 3 weeks to one person and one week it stays in the shop for maintenance etc.

The quality of the bikes met the expectations and the responsible agents fulfilled the agreement totally.

3.1.5 *Communications with pilots*

For the pilot “**kindergartens**” no communication plan was made since all lenders were arranged by the coordinator on the department for Education and learning before the pilot projects started. Therefore, it was no need for communication or campaigns at that point.

But for the pilot “**bicycle library**” a target group was chosen: people who have an interest in buying a cargo bike and therefore have the opportunity to try it.

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At the beginning of the project this offer was advertised both in local media and social media. Later on, advertisement was only in social media since it was an absolute success. There was seen not any problems at all since the impact on our social media was overwhelming.

3.1.6 *Assessment, options to transfer and conclusion*

Since about two years a very huge increase of cargo bike sales occurred. The same with e-bikes, with increased sales numbers of 5% per year.

Both pilots are transferable to other cities without many adaptations.

The reduction of CO^2 emissions could only be realized in the bike library. Nevertheless, awareness rising and general promotion could be done by both pilots: bike library and kindergarten, e.g. by 40.000 views of posts done in Instagram or Facebook.

Both pilots have been a huge success and all bikes are used very often!

3.2 PP_3, Partner in Greifswald, Germany

The project partners in Greifswald had no own personal experience with the use of cargo bikes.

That is why they took part in the conference “Velo Berlin” in spring 2018 and started in autumn with one cargo bike as pre-pilot and implemented the pilots afterwards step by step.

Although the University of Greifswald (Institute of Geography) is listed as official project partner within the CoBiUM project the city administration, namely the department of environment, is assisting as associated partner especially in terms of finding suitable project agents.

3.2.1 *Criteria for pilot choice*

The idea was to have a broad variety of different types of cargo bikes and to cover as many fields of application as possible, which means public, business and private use.

To avoid possible problems the first pilots focused on **public bodies** because these potential agents do not need to care about insurance aspects – the staff drives the cargo bikes during their working hours and consequently they are insured. The following pilots have been initiated at first:

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- at the university the computer center (URZ) and the student association (ASTA) got a cargo bike and additionally
- in cooperation with the city of Greifswald: two cargo bikes are managed by the department of environment.

In a second phase one pilot should be conducted with **business partners**. Due to the small number of cargo bikes and to avoid problems with the "state aid" rules only branches have been discussed which include in Greifswald a manageable number of potential partners. A crucial criterion for this pilot was the goal to replace a car as means of transport. By these two criteria the focus came very soon to "home care services". By running this pilot one home care company also accepted to run the pilot with the rikshaw in one retirement home for the elderly people living there.

Finally, three bikes have been handed over to **local NGOs**; namely Makerspace, Animal Rescue and STRAZE which used them for their specific purposes.

To offer cargo bikes also **to private drivers** a renting system had to be established. The concept for a system that private people can rent a cargo bike for free could be slightly adapted from other existing projects in Germany.
In this context the search for reliable agents was the biggest problem. The intended three agents should

- be located in different parts of the city to offer a good accessibility for all inhabitants of the city;
- offer long opening hours per day, also on Saturday;
- are reliable and interested in long term cooperation throughout the whole project period
- have a safe storage room – easily accessible at ground level – available for storage at night.

All thematic pilot fields of application have been recruited top-down, meaning the project team asked organizations and companies whether they are interested to use a cargo bike for testing purposes.

The two business pilots have been selected by a two-step procedure: First all health care companies with the same kind of activities (12 companies) were contacted and invited to take part in a common information meeting. 4 companies confirmed their interest and participation in the meeting, but finally only two took part. And these two companies finally agreed to run a pilot.

3.2.2 *Procedure of procurement*

The pre-pilot delivered already valuable information and experience concerning the formalities of the tender and procurement procedure:

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- The administrative procedure, means the documents to hand over the cargo bike from university to pilot agents as well as insurance issues and search for an appropriate location, was more difficult and more time consuming than expected.
- The price level for cargo bikes in Germany is very high – this is due to the low number of experienced cargo bike providers, the high level of security requirements in Germany and also due to the wish of potential target groups to use cargo bikes with electric drive.
- Thus, the calculated budget in the project was too low. All bikes could be equipped only with a minimum of required equipment. In any case additional equipment was needed and could be bought according to requirements mentioned by the project agents.

Concerning the technical aspects of cargo bikes the project team in Greifswald learnt, that a well-equipped cargo bike should have – irrespective of the field of application at least

- an electric engine,
- a second battery,
- a strong lock,
- at least a flexible rain-proof cover (tarpaulin).

With regard to safety aspects mostly two-wheeled cargo bikes were chosen. Only for the open bike renting system one three-wheeled bike was chosen. Three-wheeled cargo bikes can overbalance at high speed in sharp turns. This is contradictory to the expectation by most people, but the clear opinion of experts. Nevertheless, the driving experience is even more strange to a normal bike in comparison to a two-wheeled cargo bike.

Apart from this bike a rikshaw was bought by the project to transport specifically elderly or handicapped people.

3.2.3 *Implementation*

The implementation of the pilots was conducted step by step: first those at public bodies (university and city of Greifswald), then one business branch (health care companies) and finally the access for the public by an open renting system.

Furthermore, **NGOs** located in the city (Makerspace, Animal Rescue Association and Straze) each got a bike from the project, after having confirmed to the duties and requirements to use such a project bike, e.g. GPS tracking.

The pilots managed by **public bodies,** e.g. city, university and NGOs caused no problems.

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Fortunately, the insurance aspect also turned out as irrelevant for the **business** companies because their staff also drives the cargo bikes only during working hours.

The implementation of the **public cargo bike renting system** took a longer time of preparation, because

- reliable agents had to be selected,
- formalities regarding insurance, rules for borrowing a cargo bike, financial responsibilities, etc. had to be clarified,
- an online booking system had to be created and launched
- public promotion for the LARA-system, e.g. banners was necessary.

As a similarity all pilots nominated one person as responsible for the cargo bike during the whole project duration and to care about the further management.

3.2.4 *Management*

Concerning the quality of all bikes we can confirm all bought cargo bikes to have a very good quality. Until now we cannot complain about any big technical weakness. Only normal abrasion, like breaks or tires, occurred. These issues could be solved during **regular planned maintenance** twice a year conducted by the bike shop where we bought all the cargo bikes.

Unfortunately, nobody had practical experience with cargo bikes - neither the project team nor the agents of the pilots. Thus, the chosen bikes were not ordered with specific **equipment**. Still, after realizing the missing items, they have been ordered at the shop where all bikes have been bought.

The availability of a dry and safe **parking lot** with easy access was a bottleneck for the choice of pilots as well as for the daily management during the usage. The project could not cover costs for small garages, which means the agents of the pilots had to offer and care about this necessary feature.

On the whole all agents were reliable. Some problems have been encountered by the agents with the cyclists will be mentioned below.

3.2.5 *Communications with pilots*

Concerning the communication with the pilots as resp. target groups different channels were used:

- Pilot “city administration”: emails, information in intranet, press releases, demonstration of the cargo bikes at the “day of mobility”;
- Pilot “university-ASTA”: personal contacts or phone/e-mail, social media
- Pilot “home care”: the cargo bikes have been introduced also directly to the staff members of the companies;

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- Pilot “LARA”: target groups are the local population and visitors; thus, the focus of the communication is public relations, concretely
  - press releases
  - social media (Facebook, Twitter)
  - post cards for LARA promotion at tourist information center
  - a banner at a transport nodal point at the entrance to the old city center
  - stand up displays at each pilot agent
  - a webpage for booking of a LARA bike (https://lara-greifswald.de)
  - link on city webpage concerning climate protection to LARA page (https://klimaschutz-greifswald.de/angebote-infos/lastenraeder/)
- Pilot “Makerspace”, “Animal Rescue” and “Straze”: directly face to face or by phone, messenger or e-mail.

Problems and challenges:

- irritating local rules and regulations concerning stand-up displays
- closing or reduced opening times of offices and shops during COVID-19 made it difficult to use the bikes in an appropriate way. At the same time, it was not always easy to rent the public bikes to the citizen with all the COVID-19 restrictions.
- competition for PR location in public space
  - it was difficult to catch a location for the banner
  - too many flyers promote events and business products and services

Solution:
Permanent and persistent continuation of promotion and communication.

3.2.6 *Assessment, options to transfer and conclusion*

Generally, the pilots are running well, public awareness is big, reactions overall positive, leading to increasing interest and demand.

Concerning the transferability of pilots to other cities we suppose that:

- in many public bodies are several departments which can use a cargo bike; but often it might be an additional or optional means of traffic, only for some specific activities’ cargo bikes will be the first choice;
- (public) kindergartens are always and nearly everywhere potential users of cargo bikes;
- the business branch of home care services which care about old, ill or handicapped people are also a very good target group. Especially the rikshaw is of high interest to be used for elderly or handicapped people;

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- in general, an ecological attitude of pilot agents can lead to continuous support of the project and a focus on sustainable way of living makes all involved people even more engaged to take part in the project and support the use of cargo-bikes.

3.2.7 *Tracking of the trips and car replacement*

The trips of all pilot cargo bikes have been recorded by a GPS tracker.

In the beginning a smartphone has been tested for GPS tracking the trips. This solution worked technically well, but the human factor occurred as a problem: Several cyclists took the tracker but forgot to switch it on and some staff members just refused to carry an additional mobile phone. Thus, we lack of many non-measured trips during several weeks in autumn and winter period in 2019/2020 for the pilot "city administration".

The problems of all tested GPS trackers are the following: these tools are flexible due to the necessity to charge the battery from time to time, the tracker has to be fixed at the bike, maintained by the agent and users need to take the tracker as additional equipment for each trip.

The finally chosen GPS hardware trackers worked very well. Nevertheless, other few problems appeared – again caused by human failure:

- Despite of information via email and telephone regarding "low battery of the GPS tracker" agents sometimes charged the battery not at all.
- It happened that an agent "forgot" the GPS tracker in the office after charging the battery. The online observation of all bikes did not realize this mistake, because it happened in winter period and most bikes have not been used at that time.

By these mistakes and carelessness, we lost the data of several trips – unfortunately often those which replaced the use of a car. Nevertheless, the gathered data deliver many useful information.

- As expected, the cargo bikes were used in summer time more often than in winter period. Unfortunately, the winter time was disturbed strongly by Corona caused restrictions. In average the bikes were used at 22% of all pilot days and 31% of all business days during pilot periods.
- In total, user of all pilot cargo bikes drove more than 843 hours and mastered 9.260 km.
- The average distance per active day (all tracks) was 9 km, driven was an average speed of 11km/h.
- Most trips (58,8 % of all recorded drives) have been very short, means less than 2 km.

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Figure 3: Summarised recorded trips of all pilot cargo bikes in Greifswald (with monthly split)

2019							2020															2021			ALL PILOTS in Greifswald 01.03.19 - 31.03.21 summary
Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
31	30	31	30	93	93	138	155	150	155	155	145	186	180	244	262	310	341	330	279	270	279	279	252	279	4697 days
21	22	23	20	69	66	97	115	105	110	115	100	132	132	166	192	230	231	242	198	189	207	189	180	207	3358 business days
2	**8**	**4**	**8**	**24**	**14**	**19**	**41**	**34**	**22**	**10**	**26**	**15**	**18**	**50**	**67**	**93**	**118**	**119**	**102**	**87**	**42**	**26**	**23**	**60**	**1032 active days**
6%	27%	13%	27%	26%	15%	14%	26%	23%	14%	6%	18%	8%	10%	20%	26%	30%	35%	36%	37%	32%	15%	9%	9%	22%	**22% active days vs. all days**
10%	36%	17%	40%	35%	21%	20%	36%	32%	20%	9%	26%	11%	14%	30%	35%	40%	51%	49%	52%	46%	20%	14%	13%	29%	**31% active days vs. business days**
6	**28**	**11**	**31**	**58**	**35**	**65**	**126**	**121**	**61**	**34**	**80**	**40**	**40**	**111**	**258**	**345**	**471**	**415**	**339**	**280**	**128**	**57**	**47**	**206**	**3393 tracks**
3,0	3,5	2,8	3,9	2,4	2,5	3,4	3,1	3,6	2,8	3,4	3,1	2,7	2,2	2,2	3,9	3,7	4,0	3,5	3,3	3,2	3,0	2,2	2,0	3,4	**3,3 Ø tracks per active day**
14	**41**	**26**	**65**	**97**	**39**	**242**	**391**	**253**	**152**	**93**	**234**	**67**	**147**	**311**	**496**	**933**	**1633**	**1248**	**759**	**552**	**438**	**183**	**233**	**614**	**9260 km total tracked distance**
7,1	5,2	6,6	8,2	4,1	2,8	12,7	9,5	7,4	6,9	9,3	9,0	4,4	8,2	6,2	7,4	10,0	13,8	10,5	7,4	6,3	10,4	7,0	10,1	10,2	**9,0 km Ø distance per active day**
2,4	1,5	2,4	2,1	1,7	1,1	3,7	3,1	2,1	2,5	2,7	2,9	1,7	3,7	2,8	1,9	2,7	3,5	3,0	2,2	2,0	3,4	3,2	4,9	3,0	**2,7 km Ø distance per track**
2	21	4	18	41	28	28	69	71	29	17	43	32	14	55	175	197	247	243	215	132	56	31	18	130	**1996 tracks < 2 km**
4	6	7	9	13	7	20	32	39	28	12	22	5	6	31	63	97	128	101	91	51	41	16	12	44	**885 tracks 2-5 km**
0	1	0	4	4	0	17	25	11	4	5	15	3	20	25	20	51	96	71	33	27	21	10	17	32	**512 tracks > 5 km**
72	**192**	**144**	**432**	**468**	**246**	**1458**	**2100**	**1422**	**804**	**492**	**1176**	**372**	**582**	**1494**	**2988**	**5598**	**8406**	**6630**	**4506**	**3504**	**2082**	**1020**	**1206**	**3216**	**50610 min total duration of biking**
36	24	36	54	20	18	77	51	42	37	49	45	25	32	30	45	60	71	56	44	40	50	39	52	54	**49 min Ø biking time per active day**
12	7	13	14	8	7	22	17	12	13	14	15	9	15	13	12	16	18	16	13	13	16	18	26	16	**15 min Ø biking time per track**
12	13	11	9	12	9	10	11	11	11	11	12	11	15	12	10	10	12	11	10	9	13	11	12	11	**11 km/h Ø speed**

Of course, recorded data show big differences between the pilots. Worth mentioning are following distinctive features:

- The longest pilot periods had “ASTA” (student association) and “home care service”. LARA and city administration (Stadtverwaltung) are shown in the figure with higher number of days, but these pilots run 3 or 2 cargo bikes – means more optional days of use.
- Regarding the usage LARA is the winner: LARA bikes were driven most often (485 times in total). If you consider the duration of pilot period the NGO “Tierrettung” (animal rescue) becomes the best pilot with a rate of 60% of all business days. The NGO “Straze” (comprising several cultural and sustainable initiatives) has also a very good operating grade.
- Due to often usage the longest driven distance in total is also realized by LARA: 4326 km means every cargo was used for 1.442 km.
- By consideration the active days the “Rickshaw” achieves the longest average distance with 12,7 km. “Straze” drove also long distances per day in average (9,6 km).
- Trips can be interrupted by pauses. The so-called “tracks” indicate the distances of driving without long pauses (of more than 10 minutes). By this indicator you can see that the staff of the “city administration” drives the longest tracks (4,6 km in average).
- Whereas for the “home car service” a distance of just 0,9 km has been recorded. This fits well to their inner-city activities. This pilot ran 91% of all tracks as within the short distance of less than 2 km and realized not any long trip (> 5 km).

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Figure 4: Summaries for all pilots in Greifswald

	Public / Administration						Business		Private (citizens)
	Public Organisation			NGO					
Indicator	City Administration	ASTA (student organ.)	URZ (computer center)	Tierrettung (animal rescue)	STRAZE	Makerspace	Pflegedienst (home care service)	Rikscha (at home care service)	LARA
Total numbers of weekdays	731	640	214	294	243	149	640	94	1692
Business days (no Sat & Sun):	522	458	152	210	173	107	458	68	1210
Active days (abs.):	**120**	**80**	**45**	**127**	**72**	**39**	**54**	**10**	**485**
Ratio (%): active days vs. all days:	16%	13%	21%	43%	30%	26%	8%	11%	29%
Ratio (%): active days vs. business days:	23%	17%	30%	60%	42%	36%	12%	15%	40%
Number of tracks:	**365**	**289**	**137**	**494**	**217**	**83**	**119**	**37**	**1652**
Ø tracks per active days:	3	3,6	3,0	3,9	3,0	2,1	2,2	3,7	3,4
Total tracked distance (in km):	**1679**	**673**	**226**	**1.160**	**692**	**272**	**106**	**127**	**4325,7**
Ø distance per active day (in km):	14	8,4	5,0	9,1	9,6	7	2	12,7	8,9
Ø distance per track (in km):	4,6	2,3	1,6	2,3	3,2	3,3	0,9	3,4	2,6
Σ of tracks < 2 km:	145	181	90	316	144	36	108	16	880
... in % of all tracks	40%	63%	66%	64%	66%	43%	91%	43%	53%
Σ of tracks 2-5 km:	106	66	42	136	42	23	11	10	449
... in % of all tracks	29%	23%	31%	28%	19%	28%	9%	27%	27%
Σ of tracks > 5 km:	114	42	5	42	31	24	0	11	243
... in % of all tracks	31%	15%	4%	9%	14%	29%	0%	30%	15%
Total duration of biking (in min):	**7110**	**3840**	**1308**	**7434**	**3198**	**1152**	**606**	**750**	**25212**
Ø duration of biking per active day:	59	48	29	59	44	30	11	75	52
Ø duration per track (in min):	19	13	10	15	15	14	5	20	15
Ø speed (in km/h)	14	11	10	9	13	14	10	10	10

- The fastest pilot was the NGO “Makerspace” with 14km/h as average speed. The staff of the “city administration” realized the same speed, but their cargo bikes are equipped with an electric engine, whereas “Makerspace” drove without technical support, only muscular strength.

More measured information of the pilots with monthly split are shown in the description of every pilot – see documentation in the appendix.

The calculation of avoided greenhouse gas emission bases on the driven distances of each cargo bike and the information concerning the share of car replacements for the use. Figure 5 shows the effects.

Fig. 5: Avoided greenhouse gas emission by pilot cargo bikes in Greifswald

	Pilots in Greifswald									
	city administration	ASTA (student association)	URZ (computer center)	Tierrettung (animal rescue)	STRAZE	Makerspace	Home Care Service	Rikscha	LARA	All Pilots
pilot duration, number of c.bikes	13 months - 1 cb	21 months, 1 cb	7 months - 1 cb	9.5 months, 1 cb	8 months, 1 cb	5 months, 1 cb	21 months, 1 cb	10 months, 1 cb	18.5 months, 1 cb	
total tracked distance in km	**1.679**	**673**	**226**	**1.160**	**692**	**272**	**106**	**127**	**4.326**	**9.261**
calculation basis for car replacement	agent interview: all trips	agent interview: first all trips, then only long	agent interview: 95% of all trips	agent interview: all trips	agent interview: 20% of all trips	agent interview: all trips	agent interview: all trips	agent interview: not any trip	calculated by answers in survey	
share of total distance	85%	83,60%	95%	100%	20%	100%	100%	0%	45,90%	
car replacement in km	1.427	563	214	1.160	138	272	106	0	1.985	5.866
*avoided greenhouse gas emission (gram per kilometer) **	**204.082**	**80.456**	**30.661**	**165.880**	**19.803**	**38.896**	**15.158**	**0**	**283.926**	**838.862**

* emission of cars calculated by UBA 2021 (https://www.umweltbundesamt.de/themen/verkehr-laerm/emissionsdaten#verkehrsmittelvergleich_personenverkehr)

The variation of replaced car drives by the cargo bikes of the pilots was very broad in Greifswald: Depending on the type of pilot a cargo bike substituted not any car kilometer (that is the “Rickshaw”) or every driven trip would have been done by a car – 100% replacement had the NGO-pilots “Tierrettung” and “Makerspace” and the

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business-pilot “home care service”, which unfortunately did not use the cargo bike as much as intended and promised by the company.

The disappointing result in this regard by the pilot “Rickshaw” happened due to the field of application we have chosen for this short period: The main objective was a social one – to help elderly people and enjoy them by daily leisure trips which are an additional offer and activity of an old people’s home. Of course, there are other fields of application which can replace car trips, for elderly people as target groups too. We discussed for instance the offer to drive elderly and handicapped people from home for visiting graves of their relatives at cemetery. Unfortunately, we could not realise this idea within the project’s frame.

Based on the driven distances of the cargo bikes and the shares of car replacement of every pilot we can calculate the avoided emissions: The pilots in Greifswald avoided at least **838 kg greenhouse gas**.

3.3 PP_4, Partner in Slupsk, Poland

The project partner in Slupsk covers two thematic fields of application: municipal service and private use.

3.3.1 *Procedure of procurement and implementation*

The main **criteria** concerning the concrete decision on the pilots were possibilities and rationality making the pilot successful. Thus, the project team ran on the one hand meetings with different municipality units and they made on the other hand a questionnaire for citizens how they would like to see cargo bikes in their city.

As the **procurement** law in Poland is very strict and the procedure needs a lot of documents preparing everything this preparing period was very time consuming. For instance, it is not possible to buy bikes in less than 3 months. The support the project team hired an expert to prepare detailed description of the bikes.

The **procedure of implementation** was heavily disturbed by the restrictions due to Corona pandemic. Most relevant and chosen pilot units were closed, i.e. theatres, the stadium of SOSiR, kindergartens.

3.3.2 *Management*

Another (expected) barrier was the anxiousness of agents concerning the costs and responsibility of accidental damages. So, the project the **project covered the costs for service and insurance**.

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The pilot for private users worked better than those at municipal units. The reservations and rents – during short periods when the lending system was allowed to work – was very well.

3.3.3 *Outlook and lessons leant*

The **opinion** of the project team concerning the **general use of cargo bikes in Slupsk** is very positive:

- "Cargo bikes were seen before CoBiUM project as something funny and unnecessary, mostly used as something to use occasionally for trips and recreational reasons. During the project we show cargo bikes to citizens as something useful and that it could be used in many different ways in city's mobility.**"**
- "*All of the pilots could be easily transferred to another cities – whatever it is rental for citizens or municipality services.*"
- "*For a City of 46 square kilometers a* ***few cargo bikes wouldn't significantly reduce the amount of CO2 emission*** *but it is a good instrument to share new mobility routine and share an example of idea to make our environment cleaner and greener.*"

Lessons learnt:

"*The project was a good experiment for the City because it shows how small things can make an impact on whole city – the bike not many citizens know about and the possibilities of riding it comfortably was shared and we plan to expand the rental system so everyone can access cargo bikes and make their own experiences*."

3.3.4 *Tracking of the trips of the pilot "SOSiR Rental"*

The four cargo bikes of the public rental pilot drove at least (some trips were lost due to forgotten or low battery of GPS trackers) **2.252 kilometers in total**, which is a very good level of efficiency as the duration was only 4 months.

Figure 6: Summarised tracked data of the pilot "SOSiR Rental"

Pilot "SOSiR Rental" Jun-Dec'2020 summary				
Slu_08	Slu_09	Slu_10	Slu_11	4 cargo bikes
214	214	214	214	856 days
154	154	154	154	616 business days
55	**57**	**42**	**20**	**174 active days**
26%	27%	20%	9%	**20% active days vs. all days**
36%	37%	27%	13%	**28% active days vs. business days**
188	**183**	**142**	**69**	**582 tracks**
3,4	3,2	3,4	3,5	**3,3 Ø tracks per active day**
759	**637**	**663**	**194**	**2252 km total tracked distance**
13,8	11,2	15,8	9,7	**12,9 km Ø distance per active day**
4,0	3,5	4,7	2,8	**3,9 km Ø distance per track**
84	91	58	37	**270 tracks < 2 km**
62	57	42	24	**185 tracks 2-5 km**
42	35	42	8	**127 tracks > 5 km**
3900	**3960**	**3594**	**1050**	**12504 min total duration of biking**
71	69	86	53	**72 min Ø biking time per active day**
21	22	25	15	**21 min Ø biking time per track**
12	10	11	11	**11 km/h Ø speed**

- All bikes show a similar good level of use.
- The average activity time per day (72 min.) is by far the longest in this project.
- Also, the share of long tracks (> 5km) without breaks of max. 10 minutes is very high: 22%; the second rank behind Guldborgsund.

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3.4 PP_5, Partner in Gdynia, Poland

3.4.1 *Criteria for pilot choice*

The first step was of course to run a pilot within the own city administration and afterwards to open the renting concept also for business. Thus, there were two pilots covering the application fields “administration” and “business”.

- Pilot “Municipal Service” (including local administration, schools, kindergartens)
- Pilot “Business” (entrepreneurs and NGOs)

3.4.2 *Procedure of procurement*

Due to a lack of companies selling cargo bikes in Poland, it was hard to purchase bikes that are not home-made. Furthermore, Gdynia wanted to purchase cargo bikes that are factory-made as tested and reliable, so the procurement had to include specific requirements such as “at least 10 bikes made and sold in prior year”. As there came few offers, the best price won.

All cargo bikes were equipped with electric drive - because the city has big hills between living areas and the city centre near the seaside.

“*All the bikes were available to rent since November 2018, but Pilots started to grow in April 2019 due to fact that in winter season people are less interested in riding bikes. In 2020 we decided to purchase two more cargo bikes.”*

In total, in last phase of the project 12 cargo bikes were is use in Gdynia:

- 1 Babboe City-E
- 3 Babboe Transporter-E
- 2 Babboe City-E
- 3 Babboe Dog-E
- 1 Babboe Big-E
- 2 Stork

3.4.3 *Implementation*

There were several general challenges to face among the general public from Gdynia: lack of interest, fear of riding the cargo bike and a lower number of employees than expected wanting to ride a cargo bike than expected.

The solution was to offer test rides on events, trainings before lending the bike, and to identify just the one employee who is keen on riding a cargo bike and can introduce it to other co-workers. This approach turned out to be very effective, as even the city presidents decided to take part in cargo bike tests.

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3.4.4 *Management*

All bikes are of good quality, there are no technical problems other than usual maintenance.

It was very hard to find a service for cargo bikes. Finally, a 1-man business was found. Before he was focusing on mobile bike service – now he is dedicated only to the project cargo bikes.

All bikes were used interchangeably for renting in both pilots, because "*there is only a little interest from municipal units so there is no point in splitting the cargo bike fleet the hard way*".

3.4.5 *Communication with pilots*

The agent for both pilots was a staff member of the Mobility Management Unit of Gdynia City Hall and involved in this project, too. So, there was no friction loss in communication between the project management and the pilot level.

3.4.6 *Assessment, options to transfer and conclusion*

"*In general, we can see a lot more cargo bikes on Gdynia streets. Some of them are very visible (DPD couriers ride a lot on small area), some occasional (family trip on a rented cargo bike) but they still draw attention of public. Bike shop on main street has a cargo bike in their offer and on a display.*"

3.4.7 *Tracking of the trips and car replacement*

In the beginning – starting in April'19 for test purposes – the trips of just 2 cargo bikes have been recorded by similar GPS trackers as other partners used. One month later 4 more trackers have been added and in May/June'20 again two more trackers came in use. So, **trips of 8 cargo bikes have been recorded** during pilot lifetimes.

Figure 7: Recorded trips of 8 pilot cargo bikes in Gdynia (with monthly split)

2019									2020													2021		GDYNIA - all pilots May'19 - March'21 summary
May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar		8 cargo bikes
186	180	186	186	180	186	180	186	186	174	186	180	217	240	248	248	240	248	240	248	248	224	248	4845	total number of week days
138	120	138	132	126	138	126	132	138	120	132	132	147	176	184	168	176	176	168	184	168	160	184	3463	business days (no Saturday/Sunday)
36	**42**	**49**	**39**	**32**	**7**	**6**	**10**	**3**	**2**	**1**	0	**24**	**108**	**69**	**62**	**51**	**68**	**57**	**25**	**5**	**42**	**31**	**769**	**active days**
19%	23%	26%	21%	18%	4%	3%	5%	2%	1%	1%		11%	45%	28%	25%	21%	27%	24%	10%	2%	19%	13%	**16%**	**active days vs. all days**
26%	35%	36%	30%	25%	5%	5%	8%	2%	2%	1%		16%	61%	38%	37%	29%	39%	34%	14%	3%	26%	17%	**22%**	**active days vs. business days**
118	**141**	**224**	**187**	**122**	**14**	**36**	**51**	**6**	**2**	**1**	0	**80**	**306**	**217**	**294**	**249**	**251**	**218**	**86**	**26**	**204**	**124**	**2957**	**tracks**
3,3	3,4	4,6	4,8	3,8	2,0	6,0	5,1	2,0	1,0	1,0		3,3	2,8	3,1	4,7	4,9	3,7	3,8	3,4	5,2	4,9	4,0	**3,8**	**Ø tracks per active day**
263	**423**	**498**	**379**	**277**	**48**	**13**	**12**	**20**	**4**	**1**	0	**216**	**495**	**555**	**476**	**341**	**441**	**461**	**196**	**113**	**607**	**402**	**6240**	**km total tracked distance**
7,3	10,1	10,2	9,7	8,7	6,8	2,2	1,2	6,5	1,8	1,1		9,0	4,6	8,0	7,7	6,7	6,5	8,1	7,8	22,6	14,5	13,0	**8,1**	**km Ø distance per active day**
2,2	3,0	2,2	2,0	2,3	3,4	0,4	0,2	3,3	1,8	1,1		2,7	1,6	2,6	1,6	1,4	1,8	2,1	2,3	4,3	3,0	3,2	**2,1**	**km Ø distance per track**
76	76	137	129	75	7	36	51	3	1	1		52	205	141	220	202	193	150	58	9	125	69	**2016**	**tracks < 2 km**
25	41	66	41	33	4	0	0	1	1	0		12	46	40	55	37	41	38	15	9	43	25	**573**	**tracks 2-5 km**
17	24	21	17	14	3	0	0	0	0	0		9	33	30	10	15	10	10	0	0	0	0	**213**	**tracks > 5 km**
1758	**2748**	**2868**	**2046**	**1902**	**288**	**180**	**180**	**72**	**24**	**6**	0	**1206**	**3552**	**3618**	**3888**	**2874**	**3552**	**4140**	**1452**	**810**	**4578**	**2724**	**44466**	**min total duration of biking**
49	65	59	52	59	41	30	18	24	12	6		50	33	52	63	56	52	73	58	162	109	88	**58**	**min Ø biking time per active day**
15	19	13	11	16	21	5	4	12	12	6		15	12	17	13	12	14	19	17	31	22	22	**15**	**min Ø biking time per track**
9	9	10	11	9	10	4	4	16	9	11		11	8	9	7	7	7	7	8	8	8	9	**8**	**km/h Ø speed**

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But as finally 12 cargo bikes were driven, **not all realized trips in the two pilots are recorded**. Furthermore, the bikes were used interchangeable between the pilots; means, the tracked data cannot link with a specific pilot but shown only in summarizing manner.

Nevertheless, the recorded data deliver several interesting results – besides the function of the trackers as anti-theft system.

- The eight pilot bikes have been 6.240 km driven in total, on average 8,1 km per active day and 58 minutes duration.
- On average the bikes were driven at 16% of all possible days and 22% of business days. But there are big differences: In April'2020 not any pilot bike was used not any day, whereas in June'2021 the bikes were busy on 61% of all business days. Such variations are caused on the one hand on the weather conditions (in winter time less than in summer period) and on the other caused by external restrictions due to Corona pandemic.
- Most trips (68 %) – without an interruption of more than 10 min. – have been for short distances; just 7% were long trips of more than 5 km.
- As most trips are for short distances which indicates that people drove mostly inside the city the average speed is only 8 km/h.

Of course, there are big variations between the cargo bikes (see fig. 7). This you can see very clear by the total tracked distance: from only 321 up to 1.689 km.

- There are also big differences in the number of active days: from just 45 days up to 165 active days. One bike was used at 47% of all available business days whereas another bike was driven only at 9%.
  This is not only due to the different recording periods (two bikes started in 2020), but documents primarily the varying demand of the users caused by models and equipment of the cargo bikes.
- The "average distance per track" indicates also different purposes for driving a cargo bike: For instance, bike no.7 was used mostly for very short trips (just 1.2 km in average), whereas bike no.8 seems to be the cargo bike for long trips (3.6 km in average).
- Several months many cargo bikes have been out of use (see figure 8). The common months with zero tracks document on the one hand bad weather seasons (i.e. January'20) and on the other hand the consequences of the Corona caused restrictions (i.e. April'20). Summer time 2020 was the best period, means good weather and no Corona restrictions.

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Figure 8: Summarised data of all 8 GPS trackers in Gdynia

Bike no.	Gdy_1	Gdy_2	Gdy_3	Gdy_4	Gdy_5	Gdy_6	Gdy_7	Gdy_8	GDYNIA - all pilots summary	
start	01.05.19	01.05.19	01.05.19	01.05.19	01.05.19	01.05.19	01.06.20	01.05.20		
end	31.03.11	31.03.11	31.03.11	31.03.11	31.03.11	31.03.11	31.03.11	31.03.11		
	701	701	701	701	701	701	304	335	4845	days
	501	501	501	501	501	501	218	239	3463	business days
	160	**52**	**45**	**165**	**90**	**99**	**103**	**55**	**769**	**active days**
	23%	7%	6%	24%	13%	14%	34%	16%	**16%**	**active days vs. all days**
	32%	10%	9%	33%	18%	20%	47%	23%	**22%**	**active days vs. business days**
	522	**132**	**140**	**714**	**331**	**386**	**601**	**131**	**2957**	**tracks**
	3,3	2,5	3,1	4,3	3,7	3,9	5,8	2,4	**3,8**	**Ø tracks per active day**
	1313	**408**	**321**	**1689**	**754**	**593**	**692**	**470**	**6239,9**	**km total tracked distance**
	8,2	7,9	7,1	10,2	8,4	6,0	6,7	8,5	**8,1**	**km Ø distance per active day**
	2,5	3,1	2,3	2,4	2,3	1,5	1,2	3,6	**2,1**	**km Ø distance per track**
	307	83	86	474	221	291	520	68	**2050**	**tracks < 2 km**
	144	20	35	137	75	67	70	25	**573**	**tracks 2-5 km**
	71	29	19	103	35	28	11	38	**334**	**tracks > 5 km**
	133	**39**	**39**	**198**	**70**	**73**	**143**	**47**	**741**	**hrs total duration of biking**
	50	44	52	72	46	44	83	51	**58**	**min Ø biking time per active day**
	15	18	17	17	13	11	14	21	**15**	**min Ø biking time per track**
	10	11	8	9	11	8	5	10	**8**	**km/h Ø speed**

Figure 9: Active days per months of 8 cargo bikes in Gdynia

Gdynia

2019
2020
2021

active days per month (in active days)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PL_Gdy_01					7	10	28	9	1	0	0	0
	0	2	0	0	3	13	12	15	13	12	18	7
	0	6	4	0	0	0	0	0	0			
PL_Gdy_02					6	0	0	0	0	0	0	0
	0	0	0	0	3	16	7	1	0	10	4	3
	0	0	2	0	0	0	0	0	0			
PL_Gdy_03					1	4	0	0	0	0	0	0
	0	0	0	0	7	11	10	6	0	3	3	0
	0	0	0	0	0	0	0	0	0			
PL_Gdy_04				2	4	5	15	4	8	2	0	0
	0	0	1	0	1	20	20	17	13	0	4	10
	5	20	13	0	0	0	0	0	0			
PL_Gdy_05					7	11	6	14	16	0	0	0
	3	0	0	0	9	10	7	0	5	2	0	0
	0	0	0	0	0	0	0	0	0			
PL_Gdy_06				2	11	12	0	9	9	5	6	10
	0	0	0	0	0	16	1	7	4	9	0	0
	0	0	2	0	0	0	0	0	0			
PL_Gdy_07						17	4	8	6	21	20	5
	0	15	7	0	0	0	0	0	0			
PL_Gdy_08	0	0	0	0	1	5	8	8	10	11	8	0
	0	1	3	0	0	0	0	0	0			

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Concerning the **car replacement** by cargo bike trips the estimated share is **19,3% within all rents**. Using the tracked data of 8 pilot bikes there were at least **1,204 car kilometers replaced**.
Bikes that replaced cars more than other are Babboe Transporter-E (~42%, ~23% and ~38%).

Just one detailed view in this regard:
"In the case of the Floral Designa Gdynia flower shop, we know for sure that one car has been completely eliminated in the supply of goods and in transporting children to school / kindergarten before work."

3.5 PP_7, Partner in Slagelse, Denmark

The project partner in Slagelse was not on board from the very beginning, this city started with pilots later and could benefit from the experience of the other project partners and avoid some beginner's mistakes.
Following information are written in the personal point of view of the responsible colleague at PP_7. Authentic sentences are written in *italic letters.*

3.5.1 *Considered fields of pilots*

"We haven't had a lot of ideas before, they have come up as the project went on depending on possibilities and the demand."
Unfortunately, not realised could following ideas:

- A pilot in cooperation with an institution for disabled people: "These people are normally transported in mini busses from Slagelse to the institution outside the city. Here, it could have been possible to create a pilot where you would use cargo bikes to transport the disabled people around, similar to the Cycling Without Age projects. The idea was also inspired from a different project in the municipality, which is also funded by EU or public funds."
- Cargo bikes were placed at the town hall and the employees could use the cargo bikes instead of a car for meeting in Slagelse City, but no one used the bike.

Finally, these pilots worked - varying successful:

- "Bisserup Harbor" with two Winthers cargo bikes both tree wheelers
- "Klunsbar" with one Winther E-Cargoo only for goods
- "Housing Association" with two Nihola Family and one Nihola Low cargo bike
- "Slagelse Municipality" with one Bella bike, later on (after pilot "Klunsbar" stopped) supplemented by one Winther E-Cargoo only for goods.

Figures showing the tracked data for every pilot are documented in the appendix.

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3.5.2 *Criteria for pilot choice*

Primarily to sense and hear that they would be motivated to use the cargo bikes.

3.5.3 *Procedure of procurement*

As the project partner had no own experience or knowledge concerning cargo bikes and as the market for cargo bikes is fairly big in Denmark, PP_7 faced several problems:

- *"It is difficult to figure out price/quality of the different brands.*
- *It was not possible to test them beforehand in the area. It would have been necessary to travel to Copenhagen to do that.*"

One criteria for the cargo bikes was the feature that "it had to be easy to adjust the saddle for the different users."

3.5.4 *Implementation*

"*It is great to have "ambassadors" in the area as with the pilot at Engdraget – Housing association" and "good relations help a lot.*"

3.5.5 *Management*

"*It was a challenge to keep the trackers charged."*
"*The cargo bikes (some) are bought locally and are then also serviced locally. Quick and easy. Good trustworthy contacts/relations are important. "*

3.5.6 *Assessment, options to transfer and conclusion*

"I think it is super important that we move personal transportation from cars to bikes. Which could be cargo bikes. It's a great idea! I cannot stop looking for cargo bikes in other (geographical) areas.

I also work with better bicycle conditions in the municipality, because the bike lanes are not the widest. It is important that you create better conditions for bicycles, and less favor some for cars.

The success of the project is very important.

All the pilots which we are running should easily be transferred to other cities. And it should also be possible to transfer them to other similar conditions, e.g., associations, city-janitors or park-recreation employees in the municipality. They are all certainly transferable.

The targets are ***reached in relation to press and awareness****. Partly because one partner had the cargo parked on the sidewalk, next to busy intersection.*

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Reduction of CO2 – Considered in insolation, ***overall users have seen a reduction in their CO2 emissions****. Engdraget (pilot) has maybe reduced CO2, but not all the users have cars in the first place, but went around by food instead, before the cargo bike pilot. It is* ***not always a 100% substitution for a car****."*

3.5.7 *lessons learnt*

"When I (Finn) got involved with the project, I initially went to speak with our communication department, which basically laughed when I told them about the project. I then went on to set up the relevant communication channels and create content for them. Later, another communication employee came on to help me with press releases and basic communication tasks. Not everybody thinks the project is a great idea".

"*The health factor in the project is a bit overlooked: The children are thrilled about sitting in the bucket of the cargo bike, and that makes the parents happy = mutual happiness."*
"I was surprised that a country like Poland had so many great pilots, and that you can be inspired by the other partners in the project.
The evaluation part has been a bit difficult as it involves administrative work. Structure and navigation in the project could have been better.
Great colleagues which are part of the project in the municipality, and a couple of great sparring partners.
Motivation and initiative are very important for the success of the project."

3.5.8 *Tracking of the trips*

Fig. 10 shows the summarised recorded data of all pilot bikes in Slagelse. Unfortunately, the bikes were not equipped with a GPS tracker from the beginning and one tracker never delivered reliable data. Nevertheless, these data deliver valuable information.

- All bikes were driven at least 3.965 km in total.
- The level of efficiency was good: 18% of all possible days and even 25% of available business days. The best level of efficiency was done by the two drivers at pilot "Bisserup harbour" (see tables shown in appendix).
- Pilot bikes were driven just for 31 minutes for 6,4 km per day on average.
- Most trips (67%) have been for short distances (> 2 km) and most of the few long trips (> 5 km) were realized by the pilot "Housing Association.
- One bike of the pilot "Slagelse Municipality" was used on average a little bit longer per day, faster driven than the other cargo bikes and covered a distance of 10.5 km (see tables shown in appendix). On the other hand this cargo bike drove not any long trip (> 5km without interruption).

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Figure 10: Summarised data of all tracked pilot bikes in Slagelse/DK

2019					2020								2021							SLAGELSE - all pilots summary
Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
31	30	31	48	186	186	174	200	210	217	210	217	217	210	217	210	217	217	196	217	3441 days
22	21	23	33	132	138	120	142	154	147	154	161	147	154	154	147	161	147	140	161	2458 business days
11	**4**	**4**	**27**	**14**	**4**	**16**	**56**	**77**	**30**	**17**	**40**	**84**	**45**	**61**	**41**	**2**	**47**	**35**	**4**	**619 active days**
18%	7%	6%	35%	8%	2%	9%	28%	37%	14%	8%	18%	39%	21%	28%	20%	1%	22%	18%	2%	**18% active days vs. all days**
25%	10%	9%	50%	11%	3%	13%	39%	50%	20%	11%	25%	57%	29%	40%	28%	1%	32%	25%	2%	**25% active days vs. business days**
19	**5**	**7**	**73**	**42**	**6**	**36**	**179**	**245**	**112**	**52**	**179**	**262**	**122**	**165**	**116**	**4**	**131**	**92**	**10**	**1857 tracks**
1,7	1,3	1,8	2,7	3,0	1,5	2,3	3,2	3,2	3,7	3,1	4,5	3,1	2,7	2,7	2,8	2,0	2,8	2,6	2,5	**3,0 Ø tracks per active day**
25	**3**	**11**	**134**	**49**	**17**	**38**	**376**	**513**	**244**	**130**	**340**	**624**	**240**	**354**	**271**	**18**	**333**	**233**	**13**	**3965 km total tracked distance**
2,3	0,8	2,8	5,0	3,5	4,2	2,4	6,7	6,7	8,1	7,6	8,5	7,4	5,3	5,8	6,6	9,2	7,1	6,6	3,2	**6,4 km Ø distance per active day**
1,3	0,6	1,6	1,8	1,2	2,8	1,0	2,1	2,1	2,2	2,5	1,9	2,4	2,0	2,1	2,3	4,6	2,5	2,5	1,3	**2,1 km Ø distance per track**
16	5	5	62	38	2	35	116	163	68	31	137	167	88	102	74	1	81	49	9	**1249 tracks < 2 km**
3	0	2	9	4	4	0	49	57	27	10	29	66	15	51	30	1	37	33	1	**428 tracks 2-5 km**
0	0	0	2	0	0	1	9	10	2	2	6	16	4	11	12	2	0	0	0	**77 tracks > 5 km**
132	**24**	**48**	**384**	**252**	**120**	**222**	**1686**	**2844**	**1026**	**540**	**1659**	**2718**	**1056**	**1902**	**1470**	**72**	**1740**	**1146**	**120**	**19161 min total duration of biking**
12	6	12	14	18	30	14	30	37	34	32	41	32	23	31	36	36	37	33	30	**31 min Ø biking time per active day**
7	5	7	5	6	20	6	9	12	9	10	9	10	9	12	13	18	13	12	12	**10 min Ø biking time per track**
11	8	14	21	12	8	10	13	11	14	14	12	14	14	11	11	15	11	12	6	**12 km/h Ø speed**

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3.6 PP-8, Partner in Guldborgsund, Denmark

The project partner in Guldborgsund was not on board from the very beginning. Thus, this partner started with pilots later and could benefit from the experience of the other project partners and avoid some beginner's mistakes.

Following information are written in the personal point of view of the responsible colleague at PP_8. Authentic sentences are written in *italic letters.*

3.6.1 *Considered fields of pilots*

PP-8 considered and checked five possible pilots. The following three ideas have been rejected:

- *"City-janitors from the municipality were thought of but was not interested."*
- *"Bicycle library – not initiated as there is already similar project running"*
- *"Delivery of groceries or bread from the bakery, in the holiday homes area of Marielyst."*

Two pilots have been implemented:

- "Kindergartens", because it fits (Guldborgsund municipality) "*long term bicycle-strategy about increasing the number of bicyclists. And there are a lot of kindergartens in the municipality, which means a lot of potential pilots.*"
- "Marielyst tourist association" – this is just initiated, but cannot contribute to experiences.

3.6.2 *Criteria for the choice of pilots*

The pilot partner had to be interested and motivated in the project and so PP_8 focused on pilots which could be linked to the bicycle strategy of the municipality.

- In the strategy, children are one of the target groups. How to encourage them from an early age to use a bike instead of a bus, car or other? Thus, the kindergarten of the municipality became the main pilot.
- Tourism is also a focus point for the municipality, hence the pilot at Marielyst tourist association.

3.6.3 *Procedure of procurement and implementation*

After guidance and recommendations from Danish Cycling Tourism (project partner), we ordered cargo bikes that were best suited for the pilots."

"*It is a challenge, when initiate the contact with a possible pilot that they would rarely answer "no" if asked whether they would like to borrow a free cargo bike. But a "yes" does not guarantee frequent use of the cargo bikes by the pilots.*

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The pilots did not place adequate frequency demands on bike usage, and several pilots have a large turnaround of employees. And Covid-19 closure has also been a factor for less usage in general."

The challenge has been the many administrative related tasks, simultaneously with setting up and developing the pilots. It takes a lot of time, compared to what are expected to be developed in the project. It can overshadow the essential parts of the project.

The pilot-partners need a lot of support and care, in particular in the initial phase. It is about having the partners take ownership in the pilot. A challenge was to allocate time for all the tasks and figure out how to spend it best.

"*It is important to educate the pilot-drivers, and make sure they are enthusiastic about the project and are not only a part of it, because they are free to use.*
It is also important to match expectations before accepting a pilot-partner."

3.6.4 *Assessment, options to transfer*

It looks like more and more cargo bikes are being used in Guldborgsund. But perhaps this is a fallacy based on a higher aware of them. "*Bicycle dealers also has an increased focus on cargo bikes. More and more children are driven back/forth between kindergartens in cargo bikes."*

Such pilots are "*great if they fit the needs, but it must make sense. It would be great if you get more to exchange more motorized vehicle transportation to bikes."*
A transfer of this "kindergarten pilot" is quite easy. "*But you also should think about the density of e.g. kindergartens to share them between each other.*
It requires passionate and dedicated people; it is about finding that/those kindergarten teachers. It takes time and a bit of luck finding that person."
"*There are small effects in the right direction, but the project targets will not be met. But there will still be reduced CO_2 and a larger "brand" awareness.*"

3.6.5 *Trips driven by all pilot bikes*

All three cargo bikes of the pilot "kindergarten" have been equipped with a flexible hardware GPS tracker. Fig. 11 shows the recoded data summarised for all bikes.

- Measured by the percentage of active days over the entire pilot period the cargo bikes seemed to be used not very often: 3% of all active days and just 5% of all business days. But this is due to four months without any trip. These months have been the period of summer holiday and Corona-pandemic caused lockdown restrictions. If those months are excluded from the calculations the rate increase a little bit: 5,6% of all days and 7,7% of all business days.

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The explanation for such low levels relies on the purpose of cargo trips: Cargo bikes were not used for regular activities but mostly for additional outdoor trips with children or linked to specific events - for instance in June'20 the rate came up to 14% of business days.

- The length of driven trips shows a big variation: In June'20 for long trips (18,9 km in average per active day), whereas in November'20 only 0,8 km.
- The average speed driven with the cargo bikes was in average 18km/h. There is no variation between the three bikes.
- Concerning the measurable data there is no big difference in use between the three bikes (see appendix). Only one bike was used more often for short trips.
- Even the average speed of 18 km/h driven with the cargo bikes was nearly the same.

Figure 11: Summarised tracked data of all pilot bikes in Guldborsund

DK_Gbs_01_02_03, all Gbs *Period: 01.06.20 - 31.03.21*	2020								2021				Summary
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
Total numbers of weekdays		90	93	93	90	93	90	93	93	84	93		912 days
Business days *(no Sat & Sun)* :		66	69	63	66	66	63	69	63	60	69		654 business days
Active days (abs.):		**9**	0	0	**6**	**2**	**4**	**8**	0	**1**	0		**30 active days**
Ratio (%): active days vs. all days:		10%			7%	2%	4%	9%		1%			**3% active days vs. all days**
Ratio (%): active days vs. business days:		14%			9%	3%	6%	12%		2%			**5% active days vs. business days**
Number of tracks:		**27**	0	0	**11**	**3**	**8**	**14**	0	**1**	0		**64 tracks**
Ø tracks per active days:		3,0			1,8	1,5	2,0	1,8		1,0			**2,1 Ø tracks per active day**
Total tracked distance (in km):		**170**	0	0	**31**	**18**	**3**	**43**	0	**2**	0		**267 km total tracked distance**
Ø distance per active day (in km):		18,9			5,2	9,1	0,8	5,3		2,2			**8,9 km Ø distance per active day**
Ø distance per track (in km):		6,3			2,8	6,0	0,4	3,0		2,2			**4,2 km Ø distance per track**
Σ of tracks < 2 km:		1			8	1	8	6		0			**24 tracks < 2 km**
Σ of tracks 2-5 km:		10			1	0	0	6		1			**18 tracks 2-5 km**
Σ of tracks > 5 km:		16			2	2	0	2		0			**22 tracks > 5 km**
Total duration of biking (in min):		**360**	0	0	**150**	**90**	**24**	**228**	0	**30**	0		**882 min total duration of biking**
Ø duration of biking per active day:		40			25	45	6	29		30			**29 min Ø biking time per active day**
Ø duration per track (in min):		13			14	30	3	16		30			**14 min Ø biking time per track**
Ø speed (in km/h)		28			12	12	8	11		4			**18 km/h Ø speed**

3.6.6 *Lessons learnt*

"*It is about spotting true enthusiasm and match expectations with each other. You don't just want one (pilot-agent) that lends a bike, but somebody who takes ownership of the idea and project.*"

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4 Agent level

The following information are based on the condensed written responses to a questionnaire sent to the partners. These contain the summarised answers to several interviews the different project partners conducted with their respective pilot agents. In case of Greifswald face-to-face interviews have been conducted. Authentic sentences are shown by *italic lettering*.

4.1 PP_1, Agents in Växjo / Sweden

Two pilots have been implemented in Växjö:

- a pilot “kindergarten” and
- a pilot “bike library” (offer to lend a cargo bike to citizens).

In the following **only** the experiences of the pilot **“kindergarten**” are **described**.

The “kindergarten” pilot used 6 cargo bikes in total. As 4 kindergartens took part every facility received just one or two bikes. This pilot ran throughout the whole project time.

Following information base on 4 interviews with one agent in every participating kindergarten. PP_1 ran the talks and sent in English translated summarizing answers of every interview to PP_3 (documented in the appendix).

Project leader within the traffic unit in Municipality of Växjö **initiated the idea** of electric cargo bikes on kindergartens with the management of the department of education. Education department delegated down in their organization to the head principals within a geographic area and designated a coordinator to organize the whole pilot from their side. Within a couple of weeks, they had spread the word to the kindergartens and numerous of them were interested in having the cargo bikes. The traffic unit and the coordinator have selected 4 kindergartens.

After this the procurement process the bikes were purchased and delivered.

The common **expectations** of kindergarten agents were to “*get other opportunities to explore the local environment, traffic environment and different nature sites*.”

There was just one of the educators who had **prior experience** with cargo bikes.

The educators **confirmed in general the appropriateness** of cargo bikes for transporting children, at least for younger children 2-3 years old. They could carry up to 6 young children or 4 older children (5 years) in the cargo box.

Only the mounted belts could have been more adaptable, since there is a big difference in size between a 2,5 years old child and a 5-year-old one.

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On agent complained about a **high rate of maintenance** since the bikes have been used almost every day. The chain jumped off too easily and there were often problems with the air pressure in the tires.

The cargo bikes have been **placed** inside a garbage disposal room, in the cloakroom or outside in a shed without isolation.

A general accident **insurance** was taken out by the department of education which covered the bikes itself, the children and also the cyclists.

There were **no additional equipment** or other costs required except the regular maintenance and shifting of tires from winter to summer. One kindergarten had to repair a seatbelt, since it broke during a slighter accident with one of the bikes.

Three kindergartens used paper **calendars** as booking system. One made a fixed schedule: Each department had access to the bikes one week at a time and had to wait 4 weeks until next time.

The pilots **transported only children** with the cargo bikes to explore the local environment, traffic environment and different nature sites. Also trips to a nature reserve (Bokhultet), new playgrounds around Växjö and to the library have been done.

Only trips and excursions by foot were replaced. No car or bus transports! No emissions were thereby saved!

The general **assessment** was **positive**: "*The kindergarten was with this able to take longer (distance) excursions and trips away from the kindergarten, which itself had been very positive for both children and staff. The children have been given the opportunity within the excursions to show where they live within the village which have been very appreciated*."

"Happier children and even more positive: that the staff had been satisfied and thought it was very fun to use the bikes together with the children."

But: One bike isn´t enough for a whole department on a kindergarten. Due to this experience this facility bought an additional bike.

Conclusions:

Cargo bikes support the life in kindergartens in a very positive manner:

- "*Many good conversations between the children and the educators during the trips."*

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- *"Exercise and practice in their usage of language."*
- *"Creates a big sense of security where the children been given the opportunity to show where they live."*
- *"Highlights the kindergarten in the village: both the children and the bikes have been very appreciated by the local inhabitants*."

And concerning the promotion of the use of cargo bikes:
"*A fairly high need for maintenance on the bikes which led to the assessment that they probably had chosen a different model, if they had known what they know today about the bikes*."

Finally, the use of the bikes had the following consequences:

- One kindergarten has bought one cargo bike of the same brand as the one they got via the project;
- more than one of the educators bought an own e-bikes after they had seen and used the bikes;
- several families have thought about the possibility to purchase their own and at least 3 families have realized that thought and bought an own cargo bike.

4.2 PP_3, Agents in Greifswald, Germany

In Greifswald all three fields of application have been covered. Most pilots were managed in the field of **public bodies** at:

- the city administration (two cargo bikes)
- ASTA (student organization) within the university (one cargo bike)
- STRAZE which is a roof organization comprising several NGOs with focus on ecological and social aspects (one cargo bike)
- "Tierrettung", which is an NGO caring about the rescue of animals (one cargo bike)
- "Makerspace", which is an NGO (one cargo bike)
- at URZ (computer center of the university) as pre-pilot (one cargo bike).

Concerning the field of **business** only one pilot could be realized. One company dealing with health care (Heinrich&Heinrich) got a cargo-bike and a rikshaw by the project. These bikes were used frequently in the beginning. But since COVID-19 pandemic it became very difficult to make contacts to sick and/or old people in terms of frequent access.

One pilot is running for **private people under the** marketing label LARA. Three organisations (City Information Greifswald, REWE Supermarket, STRAZE NGO) acted as agents - each with one cargo bike to rent to private users.

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The overall **experiences** of all agents can be **summarised** as follows:

All cargo bike **pilots have been recruited top-down** by the project team. Consequently, the project team asked possible project agents to be part of the project, after deciding which pilots would be of interest and useful to test during the project. The later on **information flow** between local project team and agents was always done by direct connection via email, telephone or even face-to-face meetings.

Concerning the **motivation** of the participating departments and companies all the same was

- the idea to test additional, innovative possibilities for transport
- as well as the promotion for the own organization by using a cargo bike.

Additional motivation features were broad:

- Some wanted to receive an additional offer for their staff (health care) or clients (LaRa private users),
- others wanted to be part of a sustainable transport idea (NGOs).

So, a mixture between ecological, social and economic intentions was always existing, but present to a different degree, depending on the specific agent.

Apart from that the agents did not have many **personal expectations concerning the use of a cargo bike,** because nearly all of the pilot partners had not used a cargo bike before, respectively this kind of transport was new for them. Just one person had tried a cargo bike without electric drive before.

The agents confirmed that nearly all **drivers** using the bikes **are experienced cyclists** and need just a few minutes to become familiar with the cargo bike.

The experience with the **management** of the pilot bikes is diverse, depending on the size of pilot organization and its number of cargo bike drivers: the higher the number of drivers and bikes the more complex the administration and running.

- The quality of all tested cargo bikes was assessed as good and no big technical problem has been reported.
- **Additional equipment** had to be bought by the project partner as different agents missed e.g. rain covers for the bikes.
- The provisioning of an appropriate **parking** position is organized in different ways. Nearly all pilots can offer an indoor parking space. The home care company bought a specific bicycle container as garage, the ASTA constructed a new small outdoor carport.
- No agent needed an additional **insurance** as normal liability insurances work in terms of accidents for private drivers and public liability insurance works for employees.

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- The **booking** of the bikes is mostly done by phone or mail for all bikes. Only the open bike system got an own booking website (www.lara-greifswald.de).

All pilot agents had a clear idea concerning the **transported goods.** Most of the time groceries, hardware store purchases, workshop equipment or children have been transported by using the cargo-bikes.

Concerning the **substitution of car trips** the pilots show divers possibilities in terms of replaced means of transport:

- The trips of the two cargo bikes of the city administration replace about 85%;
- the cargo-trailer run by ASTA replaced a car till 11/19 during all trips (130km) and since 12/19 only all longer trips (432,4 km), whereas the short trips would have been realized by feet;
- pilot “URZ” (computer center) nearly all trips, means 95%;
- the trips of the NGO pilot “Tierrettung” (animal rescue) substituted completely a car (100%);
- at the NGO “Straze” were just 20% replaced;
- the NGO “Makerspace” would have driven always a car (100%);
- the business pilot “home care service” replaced also completely a car (100%);
- but the pilot “Rickshaw” was just an additional offer for old people, so not any replacement;
- the share of replaced car trips by private people using the cargo bikes of LaRa is 45,9%.

PR was done mainly by the project via press releases in local newspapers and by using a big banner at the main crossroad. All bikes are sticked with labels. The agents also received a stand-up display for promotion. STRAZE promoted their bike additionally by a regular email newsletter and by giving information in social media.

The **general assessment** of all pilot agents is positive. In detail the pilot agents delivered several valuable recommendations – mostly technical hints and wishes regarding the specific cargo bike. Mainly a more flexible cargo box (in terms of size) would be helpful.

The **general outlook** of the project is optimistic. The system for private users shall be continued after the project. Also, all public agents, like the city administration and the different NGOs are interested in using cargo-bikes in the future. The business agent, working in health care, stated to buy an own cargo-bike after the end of the project. This confirms the information given by our cargo-bike seller of a general increased cargo-bike demand.

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4.3 PP_4, Agents in Slupsk / Poland

In Slupsk one pilot was focusing to the use of private people. This pilot was managed by an organization called "**SOSiR Center"** which is a municipal unit.

SOSiR cared about four cargo bikes:

- 1 babboe city cargo with a box

Citizens could borrow a bike up to one week. The bikes have been rented 64 times.

There was **not any experience** at SOSiR in using and managing cargo bikes.

All **cost of service and insurances** have been covered by the city.

As there was no place for parking the cargo bikes **two bike shelters** for storage have been bought.

Booking system was made by google sheet (for free) – anyone can make reservation and come take the bike at fixed time.

Bikes were used mostly for **transporting children** for trips and occasionally to transport some goods or do shopping.

The agent appraised cargo bikes very positive as mean of transport concerning the option to go with family for an active trip.

Lessons learnt:

- Four bikes were not much for the attraction. So, two bikes were moved from a closed pilot to this one.
- Due to the success the cargo bike rental will stay in the city.
- Probably no one using rented cargo bike from rental will buy their own because they are at the price of old car and there is a problem of storage such big bike.

4.4 PP_5, Agents in Gdynia, Poland

In total, 12 cargo bikes have been used interchangeably within two pilots which offered to public departments and NGOs as well as entrepreneurs to hire a cargo bike for a longer period.

Both pilots were managed by one agent who was working in the unit that manages the CoBiUM project, two. Everything happened within the Mobility Management Unit of Gdynia City Hall.

Reservations for rents were made via **online form**. Next step was a contact via phone or e-mail to arrange a meeting for handing over the bike.

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"*Pilot Agent is **passionate about bikes in general**, knows the City well and has experience in coaching people on how to ride bike in the city the safe way. Great skill of communication helped her to run the rental without issues and help lenders with their first ride on cargo bike."* But the agent had no own experience in driving a cargo bike.

Concerning the quality of the bikes:
"*The bikes are highly praised."* But *"I'm not sure, but when it comes to parts, some parts of cargo bikes are extremely "fragile", such as the Urban Arrow O-lock retainers and the protective spokes break very often. The spokes on a Stork cargo bike cannot withstand the force generated by the motor and break.*
Fragile lock keys also happen."

Management of cargo bikes:
Cargo bikes were stored in garages provided by the Municipality of Gdynia, provided for free.

All cargo bikes were insured in the same way as all property of Municipality of Gdynia. It's one big insurance policy to which cargo bikes were added through negotiations.

Most people have **tested** cargo bikes before within our cargo bike rent, some of them multiple times to see the difference between particular models.

Maintenance of the bikes was a challenge at first, because it took 7 months of searching and procedures to find a service willing to do the work. Finally, a 1-man company with mobile bike service background could be found. Now he is the only bike service in Gdynia dedicated to cargo bikes.

Children and goods from shopping were **transported** most. Following list illustrates the broad variation as well as some funny transports:
"*- delivery of documents to offices (Babboe City),*
- a sentimental journey following the old traces of my uncle to Gdańsk (Babboe Dog),
- transport of a dog (Stork, Babboe Dog),
- delivering food purchased through the applications
- delivering prizes in "I cycle to work" campaign
- flower delivery (Floral Design Gdynia and Jewasińska)
- trying on a stroller for a disabled person with a person - on the occasion of the event "Come to the Kashubian Square", the Babboe E Dog model is perfect for this."

General Assessment:
3-wheeled cargo bikes are considered "dangerous" on the curve of the road and overturning when exceeding the designated speeds. But safer for the transport of large and heavy loads. 2-wheelers are considered more agile and faster.

Cargo bikes are heavy and people need to plat their trips more carefully to avoid stairs or steep climbs (to counteract part of this all our cargo bikes have electric drive).

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General outlook:

Cargo bikes got more visible in the city, they became recognizable.
"Within our sister project City Changer Cargo Bike we started funding scheme. People can purchase a cargo bike, show us documents that prove it and receive a donation of up to 50% value of the bike or up to 5000 PLN from the city. There is a limit of 10 donations and it's already used, we also know about 2 more people interested in purchasing cargo bike in near future.
Most of those people (7/10) have tested cargo bikes before within our cargo bike rent, some of them multiple times to see the difference between particular models."

4.5 PP_7, Slagelse/DK

There were four pilots:

- "**Bisserup Harbor**" with two Winthers cargo bikes both tree wheelers, started 08.05.2019 and is still running (tracked data till end of 03/21)
- "**Klunsbar**" with one Winther E-Cargoo only for goods, running from 08.05.2019 – 18.03.2020
  (This pilot "*never get the webstore running very well, and therefore they only have very few deliveries*" – so, there are nearly no information input besides the general positive opinion)
- "**Housing Association**" with two Nihola Family and one Nihola Low cargo bike, started 12/2019 and is still running (tracked data till end of 03/21)
- "**Slagelse Municipality**" with one Bella bike, later on (after pilot "Klunsbar" stopped) supplemented by one Winther E-Cargoo only for goods, started in 08/2019 and is still running (tracked data till end of 03/21).

The pilot "Bisserup harbor" was managed by two people and both were also driving these bikes, whereas the pilot "Housing Association" was focusing on 126 families as potential users. One local person cared about the tree cargo bikes as agent.

The idea in "Bisserup harbor" came bottom-up from a citizen in the village who cooperates with Slagelse Municipality. He heard about the project and the possibility to use a cargo bike instead of a car. Whereas the "Housing" pilot was initiated top-down: Slagelse Municipality contacted Slagelse Housing Association to hear if an association of theirs might be interested. This agent saw the potential in sharing the cargo bikes and using them instead of cars, because the "*people who live in Engdraget are used to helping each other out and sharing things e.g. a trailer, some tools, a little workshop and a room for social activities."*

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Some families in Engdraget had **experience** with using a cargo bike, but to most of them cargo bikes are new.

The two pilot bikes in Slagelse were driven by three employees of Slagelse Municipality. The first worker who agreed to use one bike for driving between the two buildings he supported, did not use the cargo bike at all. Thus, another worker has been asked and he used it luckily. As the second cargo bike was offered a third worker took it because he had to care about four buildings. May be, he was convinced by the permission to use the bike for driving home, too.

The **quality** of all cargo bikes is generally good. Only the bikes of "Bisserup harbor" had problems with the electric controller, and both controllers had to be replaced.

In "Bisserup harbor" the two bikes were **parked** privately at home of the cyclists indoors and the three pilot bikes in "Bisserup harbor" stood in a garage, which was locked and all families had a key.

Families had to register in an app which has been arranged by the agent: After 10 months, 52 families are registered in the **booking app**.

Unexperienced people received a **little instruction** in how to use the cargo bikes.

In the beginning only one of the two cargo bikes could carry children, but after 2 months a bench also was installed in the other one.

The two cargo bikes of "Bisserup harbor" were used to **transport** tools and goods to the harbor. Sometimes visitors of the harbor use the cargo bikes to go shopping in the little supermarket in the village (about 1 km from the harbor). Furthermore, the cyclists themselves travel every day from their home to the harbor (about 1,5 km).

The two cargo bikes of the pilot "Housing Association", which can carry children, were used almost every day; all three cargo bikes were used for shopping.

The two cargo bikes in "Bisserup harbor" **replaced a car**. Nevertheless, the two cargo bikes cannot replace totally cars, e.g. in bad weather or for transportation a lot of goods. But 90 % of all trips can be done by the cargo bikes.

At the pilot "Housing Association" "*approximately **60 percent of the trips** with the cargo bikes have replaced a trip with a car. The pilot bikes have replaced small trips using the car while traveling with children, but the bikes have not been able to replace a car for transporting large things.*"

"*The **general assessment** of cargo bikes as a means of transportation is very good, especially for small trips. It is easy to park in the center of the city."*

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Although the business pilot "Klunsbar" could realise only very few deliveries, they "*still find it a very good way of distribution to use a cargo bike*".

"The people who live in Engdraget are not looking forward to the pilot coming to an end, because they do not have money to buy their own cargo bikes. Only a few families have their own cargo bike."

4.6 PP_8, Agents in Guldborgsund, Denmark

PP_8 implemented two pilots:

- at the Kindergarten "Skovtrolden", managed by Guldborgsund municipality;
- Marielyst tourist association – initiated.

As the tourist association started very early and could use the bikes in winter period and due to Corona restriction for nearly no trips, the following information base on an interview with the kindergarten agent and describes the specific situation of that kindergarten pilot.

This kindergarten used 3 cargo bikes, model Babboe e-max.

The mobility manger of the municipality talked with the project partner and recommended kindergartens as a good field of application. Thus, the contact went top-down to the chosen kindergarten.

The motivation of the kindergarten was their feature as an "outdoor kindergarten" which often takes kids on trips. **"***Smaller kids can't walk very long distances making it hard to get far. The bikes helped us to move further with the kids and also give us flexibility to move whenever it suites us without being forces to follow timetables of public transportation etc.***".**

The **number of drivers** was about 8 to 10 staff members. Some of them used cargo bikes before.

They transported mostly kids with the pilot cargo bikes. But some staff members used also the bikes to get goods from the construction market when they had to work at the playground and used the bikes also to move goods as when a summer party for the kids and parents was conducted.

The **quality** of tested model cargo bikes was assessed as good. The bikes seemed to be very stabile, which is mostly important driving other people's children around.

In summertime cargo bikes are very useful for trips. But not at winter time, then "*it is too cold for kids to sit in the bike even in their blankets etc. We get them to walk instead because we need them to be warm for a whole day outside.*"

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There is no **substitution of car trips** because the alternative option is walking or using a public bus.

The **general assessment** of cargo bikes as means of transport is positive: "*We have been very happy to use the bikes. Some staff members were more happy than others, and some of them really got into using the bikes as a valuable tool in their planning of the week.*"

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5 Cyclist level

The following information are based on the summarised written responses to a comprehensive questionnaire. These contain the contents of interviews the project partners conducted with cyclists who used a cargo bike. Authentic sentences are shown by *italic lettering*.

5.1 PP_1, Opinion of Cyclists in Växjö / Sweden

The “pilot cyclists” **found out about the project** on Municipality of Växjö’s Instagram or Facebook and also by mouth-to-mouth information.

Instruction and guidance had been conducted at the shop of the bike dealer that handled this particular bike. Opportunities to test the bikes was given, but was often not necessary since the cyclists had prior experience of cargo bikes. At the beginning of the lending period one cyclist was actually unsure if he would use the bike the whole period since he had a feeling of being not secure with the bike. Though the whole lending period the bike was used since the confidence rose for each day of use.

Some of them had prior experience since she had borrowed a friend’s cargo bike before - though a different model. Persons with no prior experience with cargo bikes jumped on the opportunity to lend one in a longer period of time with bicycle library.

The **transported goods** have been the following ones: on working days the bike was used to go to work but also to go to kindergarten with the youngest child before work. Mostly children have been transported, but occasionally also goods to the recycling station. On weekends grocery shopping and nature trips with the child could be realized.

In terms of **replaced means of transport** the cyclists would have used either a regular bicycle with child seat or mostly even a car depending on working times of the other parent. Most cyclists used the cargo bike to go to work by using the available fast bike lane. E.g. one specific cyclist had 20 kilometers from home to work, round trip, along with the stop on kindergarten. 20x15 working days= 300 kilometers. Estimated additional 100 kilometers on evenings and weekends.

Personal experiences and assessment of the cargo bike were rated as very easy to handle and very sturdy with a secure feeling, since the bike was quite heavy and sturdy. This positive feeling happened especially while driving the bike on both roads and bike paths since the way to work contained both. The bike was parked at work within an area with fence under a canopy and the battery was stored inside the office during working hours to charge the battery. A bit “unsafe” feeling arose to park such

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an expensive bike on public bike parking slots, but this changed with the opportunity to park inside a car garage in the basement of work. Drivers claimed it a little bit tricky to learn the technique to drive the cargo bike since the electric drive were enabled through a slider on the handle and it is tilted in the curves. Very heavy to ride it without electric support.

In general, the cargo bike was valued good replacement (in terms of **means of transport**) to car since it took shorter time to get from home to work with a stop on the way on the kindergarten.

In terms of **general outlook,** the cyclists are hoping for development in infrastructure in form of wider bike lanes within Växjö. In 2020 some drivers announced that they actually bought an own cargo bike of the same model as they rented within the project. The opinion is very positive. It was a greater experience than expected. Still, until separated bike lanes have been built, no cargo bike or regular bike would be bought. Apart from that public transport is a huge competitor to go to work, especially during winter months. Most users had the following opinion: *Just wanted to try out the cargo bike! And it was fund to test it!*

5.2 PP_3, Opinion of Cyclists in Greifswald, Germany

The pilot cyclists have been informed to use the cargo bikes mainly by the following two options: the public and business pilot drive users have been informed by using regular circular mails of the organization, by intranet or social media information and also by clear top-down information by managers.

Most cyclists used a cargo bike for the first time without any experience. Thus, all drivers got an **instruction from the pilot agent** about the specific bike characteristics. Nearly all started by driving just a few minutes under observation of an experienced colleague in an area with low volume of traffic.

Most of the drivers have been very satisfied with the handling of the cargo-bike and the transportation of goods. Their **personal expectations** fit to the real experience. Most of the drivers are experienced cyclists anyway. Still, they are aware about the differences in driving a cargo bike. Only very few cyclists refused to really use the bike after having experienced some difficulties during the test drives. Although big cargo boxes are really helpful for carrying the goods and equipment, especially these boxes were responsible of an insecure feeling of the cyclists. But after first exercises with these big cargo bikes the cyclists realized that it is much easier to drive than expected and prejudices could not be confirmed.

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The **transported goods** are very diverse between the pilots. Those cyclists who use the cargo bike during their jobs transport – of course – always the same goods and equipment; namely:

- the computer center always very expensive and large network interface cards;
- the city administration typical office equipment as folders, books, material for public relation, equipment for events, technical equipment for traffic counting and noise measurement;
- the home care service always medicaments and linked tools, bedlinens.
- The cyclists of the pilot "ASTA" are students and LARA cargo bikes are used by private people. Thus, their transported goods show a big variety, for instance construction materials, furniture, beer crates, etc.
- Makerspace used the cargo-bike to transport 3-D printed visors across the city.
- Animal rescue carried food, medical equipment for first aid and rescue materials.

In terms of **replaced means of transport** the use of cargo bikes is somehow diverse. Most drivers stated they would have used a car or a normal bike (sometimes with trailer) to transport the above-mentioned goods. Some stated that they would not have conducted the trip at all, e.g. driving with children.

The personal experiences and assessment considering the quality of all project bikes is always assessed as good or often very good.

Personal experience and observations are often positive, as…

- cargo bikes generate awareness, people are interested;
- comfortable to use an electric support;
- trips are really faster than with a car because cargo bike can stay/park direct in front of a building;
- other cars show more respect to cargo bike – may be due to the size and consequently a better feeling of safety while driving on main roads.

Some users also mentioned negative aspects, like:

- turning circle is big;
- the handling of the bike needs some training;
- due to too small cycle tracks you often need to drive on the streets and car drivers do not accept bikes there;
- similar problems as with a standard bicycle – missing cycle tracks, cars pass too close, block the cycle paths, etc.
- a little bit more dangerous use due to less flexibility and mobility with the big cargo bike;

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- on slippery pavement insecure with two-wheeled cargo bike.

and specific regarding the trailer:

- taking bends needs getting used to.

Altogether the project showed some possibilities for **general assessment of cargo bikes as means of transport.** Nevertheless, cargo-bikes are a very specific form of transport and somehow relevant for transport of goods bigger than transported with normal bikes and smaller as goods to be transported by car.

All cyclist gave a general positive outlook. The opinion to use a cargo-bike was really positive. Some users will buy a cargo-bike on their own in the near future. Especially for families and shared apartments it is a useful alternative.

In general, young people with a sustainable attitude are keen to try and use a cargo bike in everyday life. The reasons for this change in transport are on the one hand a change in behaviour, as many young persons don't even have a driver's license and refuse to buy an own car due to ecological awareness.

5.3 PP_4, Opinion of Cyclists in Slupsk / Poland

Following information summarize the opinion of several cyclists (men 25 – 40 years old) who used the citizens rental offer.

Not any lender used cargo bike before. They were excited to try something new.

Some mentioned that it's difficult to drive by cargo around the city because it has too little of cyclist roads and many narrow places.

Cargo bikes were mostly used to make trips around the town and in its suburb, but there were a few users who took it to do shopping or drive to their garden.

All these trips replaced a car trip.

There were no problems with parking slots. But user often said that it is hard to move safely, there are not enough bicycle lanes and it feels dangerous to use the car road.

Cyclist were happy with the rental cargo bikes and judge them as "nice addition to mobility, they want to use it for family trips." But nobody saw that cargo bikes can fully exchange cars.

There was only one user who considers buying cargo bike.

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5.4 PP_5, Opinion of Cyclists in Gdynia, Poland

People who rented a bike got **the information**

- in “Municipal Pilot” via internal e-mail, internal phone calls and face-to-face contact;
- in local “Business Pilot” by face-to-face contact, via e-mail (mailing list of over 300 companies from “I cycle to work Campaign”) and via Social media;
- and both pilots additionally at outdoor events, via social media, posters and via advertisements in local radio, TV, newspapers.

Most cyclists used a cargo bike **for the first time** in their life, few had prior experience – although only few rides – and just one pilot cyclist in Gdynia had already used a cargo bike regularly.

Most people were hesitant during the first ride.

It’s safe to say, that most of people interested in renting cargo bikes want to try if this new mean of transport will fit into their business model.

A small survey indicates the share of replaces means of transport:

- The pilot cargo bikes mostly replaced a car trip (11 of 18),
- two drove instead of walking,
- another two replaced a standard bike.
- Two of 18 interviewed cyclists would stay at home (travel was not necessary resp. recreational)
- and one user replaced public transport.

Following authentic sentences describe the **personal assessment**:

- “Cargo bikes are heavy, I wouldn’t be able to ride uphill”
- “You need to get used to steering”
- “You need to get used to handling such big bike, it’s tough to get used to such wide and long bike”
- “There is not enough room in bike for teenagers when using the tent”
- “It’s not safe to ride through city – lack of continuous infrastructure”
- “Car drivers are not used to seeing bikes or cargo bikes on streets”
- “There is no problem with parking!”
- “I can park wherever I want!”
- “I try to avoid sidewalks, but it’s much easier and safer”
- “The o-lock is super-fast and easy to use”.

And a little bit more universalizing: Cargo bikes

- are exotic, interesting, uncommon, eye-catching, good advertisement platform,
- can park anywhere

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- can ride directly to the destination, but not as unrestricted as a normal bicycle because it's so heavy – stairs are a big obstacle.
- quick, effortless and easy to ride.

General assessment on a scale 1-5:
30% users rate it "5", 36,7% rates "4", 26,7% rates "3" and 6,7% rates "2". There are no "1" ratings.

Biggest mentioned problem with cargo bikes is with parking when there is no access to garage or closed storage.

5.5 PP_7, Opinion of Cyclists in Slagelse / Denmark

Instead of starting two diesel cars almost every day and drive 1,5 km to the harbor, the two cyclists of the pilot "Bisserup harbor" think that it was better to take cargo bikes. It is not good for the cars with small trips and it is not good for the CO2.

Both men have tried cargo bikes when they were young (50 years ago) they both bring out goods.

The **general assessment** of cargo bikes as means of transport is very good: "It is easy to park and stop up and talk to people, it is easy to make a short cut and it is easy to send a smile to the people you meet."

To use the cargo bike the two men also said it was good for their health.

Some people using a bike of the pilot "housing association" do not feel safe driving on a cargo bike, because they feel like they get too close to the cars in the traffic, and they find it a little difficult to turn the bike.

Users have seen obvious health benefits in using the bikes on a regular basis: Several users mentioned the increase in energy and have been feeling noticeably healthier.

5.6 PP_8, Opinion of Cyclists in Guldborgsund / Denmark

The information regarding the opportunity to use a cargo bike came top-down from the boss of the kindergarten to the staff members who should drive the pilot bikes.

There was no common instruction. But the drivers thought it was good to have a look at the bikes before riding the kids. They made few little rides by their own, tried the gears, the rakes etc.

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The pilot bikes were rated as "*really good bikes, comfortable and safe*", but "*they are heavy and big. Sometimes a little too big for the bike roads.*"

Opinions concerning the general assessment of cargo bikes as means of transport by the interviewed cyclists:

"*We have had allot of trips which we couldn't reach walking."*

"Also, it is sometimes faster to ride the bikes instead of walking to the bus station with the kids to take the bus. And the kids do not get as tired, so they enjoy the final destination much more."

"Riding the bikes gives us much more contact to the kids. We sit face to face nearly to all 6 kids, we can talk and sing. When we are in a bus, we cannot. And even when we are walking, we often walk behind or in front of the kids."

"We will use the bikes also in the future. It gives much more flexibility."

"A good way to reach further and also to go places where it is hard to get by public transport."

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6 (Cross-border) Comparisons of Pilots

The idea was to run similar kinds of pilots by several partners. But due to several reasons – in particular the difficulty to find local pilot partners – we have only few pilots which are comparable. Thus, we can pilots compare which run

- in city/municipality administration,
- in business companies and
- as public lending systems (bicycle libraries).

"Kindergarten"-pilots we have in Guldborgsund and Växjö, but Växjö is not documented by quantitative data.

Information concerning transported goods by pilot cargo bikes we have only in Greifswald. For reasons of data protection we had to avoid any link between personal information and collected GPS data. In Greifswald several cargo bike drivers used an online-questionnaire to deliver few more information about the use of the pilot bikes beyond the measured trip data.

6.1 Pilots in municipal administration

In Greifswald and in Slagelse the city resp. municipality administration run a pilot.

Fig. 12 shows very similar tracked data for both pilots, for instance the ratio of active days, the tracks per active day and the distance per track.

Figure 12: Comparison of "administration pilots" in Greifswald and Slagelse

admin pilots *in municipality administration*	Greifswald 11.09.19 - 31.03.21	Slagelse 18.03.20 - 31.03.21
number of available cargo bikes	2 cb	1 cb only
Total numbers of weekdays	731	379
Business days *(no Sat & Sun)* :	522	271
Active days (abs.):	**120**	**57**
Ratio (%): active days vs. all days:	16%	15%
Ratio (%): active days vs. business d.:	23%	21%
Number of tracks:	**365**	**142**
Ø tracks per active days:	3,0	2,5
Total tracked distance (in km):	**1.679**	**598**
Ø distance per active day (in km):	14,0	10,5
Ø distance per track (in km):	4,6	4,2
Σ of tracks < 2 km:	145	38
share of all tracks	40%	27%
Σ of tracks 2-5 km:	106	24
share of all tracks	29%	17%
Σ of tracks > 5 km:	114	80
share of all tracks	31%	56%
Total duration of biking (in min):	**7.110**	**1.950**
Ø duration of biking per active day:	59	34
Ø duration per track (in min):	19	14
Ø speed (in km/h)	14	18

A difference is to identify in the share of long-distance tracks (> 5 km): In Slagelse the users drove more long tracks than in Greifswald and they drove also a little bit faster in average.

To be discussed might be the low degree of efficiency in both pilots! This is measured by the indicators "Ratio of active days". About 20% active days means that the bikes are used only four to six days per month. The explanation (or excuse?) is very easy and similar for both partners: The long and heavy restrictions caused by the Corona pandemic – several months the pilots were not used.

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6.2 Pilots in Business

Comparable are the tracked cargo bikes of the business pilots in Greifswald and Slagelse. Greifswald run several pilots, but two pilots with very short duration (see fig. 13).

The longest pilot duration with business pilot cargo bike drivers has the partner in Gdynia. Unfortunately, Gdynia conducted their lending system for citizens and business within one pool and the cargo bikes have been used interchangeable. Thus, we cannot analyse the structure and behaviour of business users in Gdynia.

Figure 13: Comparison of the "business pilots" in Greifswald and Slagelse

Business Pilots	Computer Center Greifswald	Makerspace Greifswald	Health Care Service Greifswald	Bisserup Harbor Slagelse
pilot period	01.03.19 - 31.09.19	05.05.20 - 30.09.20	01.07.19 - 31.03.21	08.05.19 - 31.03.21
pilot duration	7 months	5 months	21 months	23 months
number of available cargo bikes	1 cargo bike	1 cargo bike	1 cargo bike	2 cargo bikes
Total numbers of weekdays	214	149	640	1340
Business days *(no Saturday & Sunday)* :	152	107	458	956
Active days (abs.):	**45**	**39**	**54**	**367**
Ratio (%): active days vs. all days:	21%	26%	8%	27%
Ratio (%): active days vs. business d.:	30%	36%	12%	38%
Number of tracks:	**137**	**83**	**119**	**1327**
Ø tracks per active days:	3,0	2,1	2,2	3,6
Total tracked distance (in km):	**226**	**272**	**106**	**1.820**
Ø distance per active day (in km):	5,0	7,0	2,0	5,0
Ø distance per track (in km):	1,6	3,3	0,9	1,4
Σ of tracks < 2 km:	90	36	108	1188
share of all tracks	66%	43%	91%	90%
Σ of tracks 2-5 km:	42	23	11	116
share of all tracks	31%	28%	9%	9%
Σ of tracks > 5 km:	5	24	0	23
share of all tracks	4%	29%	0%	2%
Total duration of biking (in min):	**1.308**	**1.152**	**606**	**8.625**
Ø duration of biking per active day:	29	30	11	24
Ø duration per track (in min):	10	14	5	6
Ø speed (in km/h)	10	14	10	13

This figure indicates three type of business pilots:

- The two pilots ("computer center" and "makerspace") run only for a very short period. Common feature for both is the very specific task they managed by their cargo bikes.
- The two cargo bikes used at the "Bisserup harbor" show a similar level of efficiency, but were used for a very long period. In this pilot the two people who drove the pilot bikes are the key factor for a good result.

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- A similar long duration of the pilot period and a similar share of short trips (about 90%) had the “health care service”. But this cargo bike was used on a very low level. The explanation might be that in this company several people should use the cargo bikes and there was always the option to drive a car – in case of bad weather or other excuses not to use cargo bikes. Compared with “Bisserup harbor” this pilot bike was used mostly for extremely short distance trips in the inner city: just 0,9 km per track. It seems, that such task is the convincing feature to use cargo bike.

6.3 Pilots as public lending systems

We run pilots as a public lending system in Greifswald, Slagelse and Slupsk. The tracked data from Gdynia we cannot compare because in Gdynia the cargo bikes have been used interchangeable between business and private lenders.

Figure 14: Comparison of Cargo Bike Lending Systems

Cargo Bike Lending Systems	Germany	Poland	Danmark	Summary- all lending systems
name of pilot	"LARA" Greifswald	"SOSiR rental" Slupsk	"housing ass." Slagelse	
tracked duration	18,5 months	7 months	16 months	
target/user groups	citizens	citizens	140 families (citizens)	
number of bikes	3	4	3	10 cargo bikes
Total number of possible weekdays	1.692	856	1.461	4.009 days
number of possible business days (not Satur-/Sunday)	1.210	616	1.044	2.870 business days
Active days (abs.):	**485**	**174**	**299**	**958 active days**
Ratio (%): active days vs. all days:	29%	20%	20%	**24% active days vs. all days**
Ratio (%): active days vs. business days:	40%	28%	29%	**33% active days vs. business days**
Number of tracks:	**1.652**	**582**	**874**	**3.108 tracks**
Ø tracks per active days:	3,4	3,3	2,9	**3,2 Ø tracks per active day**
Total tracked distance (in km):	**4.326**	**2.252**	**2.261**	**8.839 km total tracked distance**
Ø distance per active day (in km):	8,9	12,9	7,6	**9,2 km Ø distance per active day**
Ø distance per track (in km):	2,6	3,9	2,6	**2,8 km Ø distance per track**
Σ of tracks < 2 km:	960	270	448	1.678 **tracks < 2 km**
Σ of tracks 2-5 km:	449	185	340	974 **tracks 2-5 km**
Σ of tracks > 5 km:	243	127	86	456 **tracks > 5 km**
Total duration of biking (in min):	**25.212**	**12.504**	**11.922**	**49.638 min total duration of biking**
Ø duration of biking per active day:	41	72	40	**min Ø biking time per active day**
Ø duration per track (in min):	14	21	14	**min Ø biking time per track**
Ø speed (in km/h)	11	11	11	**km/h Ø speed**

- Despite different background (size of city, infrastructure for bikes and acceptance situation) we have the (funny) result that in all three participating cities the people drove exact the same average speed (11 km/h) with the cargo bikes (see fig. 14).
- Concerning average use at active days lenders show very similar behaviour in Greifswald and in Slagelse (distance, duration per track).

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- Although the situation in Slupsk is much less developed for cargo bike use ("*not many citizens know about and the possibilities of riding a cargo bike*"; cyclist opinion: "*it's difficult to drive by cargo around the city because it has too little of cyclist roads and many narrow places*") than in Denmark, the share of use is the same (used 20% of all possible days).
- Lenders used/drove in Slupsk the cargo bikes much longer (72 minutes per active day in average; 75 to 80% longer time) than in Greifswald and Slagelse, drove 50% longer on their tracks and also longer average distances per track (exact again 50% longer 3,9 vs. 2,6 km) and also nearly double distances (12,9 km) per active day.

6.4 Car replacements

The avoided distances driven by a car (car replacement) are calculated on the tracked, driven distances of the pilot cargo bikes and the estimated share of trips which would have been done by a car if the cargo bike would have been not available.

The total sum of such distances depends on the duration of the pilot and the number of available cargo bikes in the pilot. Thus, the comparable indicator is "avoided car distance per month and per cargo bike".

Figure 15: Car replacement of pilot cargo bikes

Pilots name	*city / municipality*	*tracked distances in km*	*share of replacement of car trips*	*distances of car replacement in km*	*avoided car-distance per month and per cb*	*number of cargo bikes (cb)*	*duration of observation*	*area of application*	*remarks*
animal rescue	Greifswald	1.160	100%	1.160	**122**	1 cb	9,5 months	NGO	short period of specific activies
Makerspace	Greifswald	272	100%	272	**54**	1 cb	5 months	NGO	very short period of specific activies
healthcare services	Greifswald	106	100%	106	**5**	1 cb	21 months	business	extrem short distance trips
URZ	Greifswald	226	95%	215	**31**	1 cb	7 months	public	very short period of specific activies
bisserup harbor	Slagelse	1.007	90%	906	**27**	2 cb	17 months	business	activities in very specific niche
city administration	Greifswald	1.679	85%	1.427	**55**	2 cb	13 months	public	internal lending pool
ASTA	Greifswald	673	83,60%	563	**27**	1 trailer	21 months	public	specific target group (students)
housing association	Slagelse	2.261	60%	1.357	**30**	3 cb	15 months	private	pool for 140 families
LARA	Greifswald	4.326	45,90%	1.986	**36**	3 cb	18,5 months	private	lending pool for citizens
STRAZE	Greifswald	692	20%	138	**17**	1 cb	8 months	NGOs	internal lending pool for several NGOs
Pool municipality and business	Gdynia	6.240	19,30%	1.204	**6**	8 cb	about two years	public, business	lending pool for municipal services and business
Rikshaw "elder people"	Greifswald	0	0%	0	**0**	1 cb	10 months	business	additional social activities
kindergarten "Skovtrolden"	Guldborgsund	0	0%	0	**0**	3 cb	10 months	public	additional social activities

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This indicator delivers broadly varying results. There are several pilots with good indicator values. The additional information about specific features of the pilots (see column “remarks”) deliver an idea regarding fields of application in which cargo bikes can substitute a car on a good level.

The “winner” are those pilots which

- run only short periods,
- focus on specific activities or
- offer the cargo bikes to many people, means the pilots are managed as lending systems (bike pools).
-

6.5 Transported goods in Greifswald

Regarding the transported goods, we have only information from an online survey in Greifswald (LARA lenders and students). There are 255 answers from 178 people.

Fig. 16 shows the answers concerning the motivation to drive (or lend) a cargo bike.

Figure 16: Motivation of using a cargo bike in Greifswald

motivation for lending/using a cargo bike	*% of respondents*
transport of heavy or big good	**39,7**
drive for testing/curiosity	**35,1**
for shopping	**27,8**
transport of children	**21,1**
other reasons	**7,7**
n = 178 respondents with 255 answers	

There are 64 more in detail describing answers we know which goods people transported. The main categories of „heavy goods“ were:

- furniture, move of flat (32%)
- construction material, tools (24%)
- water boxes (19%)
- event equipment (11%)
- waste paper, waste glass (8%)
- plants/crops, green stuff (8%).

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7 Lessons learnt from pilots

In total 16 pilots have been conducted in six partner cities and more than 45 cargo bikes were involved – some bikes have been used for short periods in two pilots.

Unfortunately, the pilots have been disturbed heavily by Corona pandemic caused restrictions. But nevertheless, many valuable information could be gathered.

7.1 Experiences and recommendations concerning the management and running cargo bike pilots

The reality of implementing cargo bike use appeared to be more difficult and there are more problems to solve than we considered in advance. As the project also set out to explore the practical aspects of cargo bike implementation in various fields of use, this is not a surprising.

Concerning the tender and implementation procedures national and often local problems had to be solved. Solutions are difficult to transfer because the national rules and restrictions are very divers. Nevertheless, our experiences from different countries, different sizes of cities and diverse levels of cargo bike use in the societies possibly deliver for other cities and actors useful hints what to check in advance to avoid known problems. In this regard the above reported experiences with the pilots should be read carefully and in detail.

With regard to the management of cargo bike use similar challenges have been noticed in nearly all participating cities:

- The provisioning of a fitting pitch for the cargo bike - easy access (no steps, sufficient space) but also safe – is often the biggest challenge to solve.
- The persuasion of staff members to use a cargo bike requires always one or more enthusiastic people. Just giving a positive example is not sufficient. Instead, you need to offer constant information on the one hand and also possibilities to test the bike on the other hand within a safe space.

7.2 Concerning the general fields of application

7.2.1 *Administration, public bodies, NGOs*

We can confirm the presumption that public organisations offer very good opportunities for cargo trips. Usually, public bodies are big organisations with a broad field of activities and a high number of employees. There are two different approaches for the management of cargo bikes:

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- **Departments with specific activities**, which matches to the capabilities of cargo bikes, use "their own" cargo bike(s). This supports the option to have specific equipment and models of cargo bikes, which fit to specific needs. Of course, the number of staff members and activities has to be adequate to operate at good capacity.
  - Our pilots (in Växjö and Slagelse) show that **kindergartens** are a very **good** field of application. But you have to keep in mind that
    - you always need several cargo bikes, because the groups of children are usually larger than 4 or perhaps 6 small children;
    - this application does not replace any CO^2 emission as kindergartens don't own cars; cargo bikes in kindergartens are just a very useful and nice support for their activities.
  - The Pilot at the computer center of the university in Greifswald worked well for a very short period of time with a very specific duty. But a cargo bike system managed by the university with several bikes for lending would have been the better solution.
- **A pool centralised managed** with several cargo bikes offers the bikes to all departments and employees for running their duties. This approach might be more efficient, but it requires an agent for the management of the lending procedure. Furthermore, you need to offer several different models of cargo bikes or the chosen cargo bikes have to be equipped on a good level of flexibility (different cargo boxes, saddles and handlebars etc.).
  - The pilot in Gdynia proved that this field of application works well – but it showed also the need of intensive management by an agent.

There are more potential facilities to use cargo bikes than it seems at first sight. **Often NOGs** are not well-known or work successful but **unnoticed from the public awareness**. Such organisations can be found by promoting events and PR work. In Greifswald for instance the pilots "Straze", "Makerspace" and "Tierrettung" are examples for this strategy.

7.2.2 *Private users*

Concerning the application field of private users – shown by our library pilots in Greifswald, Slupsk and Växjö – we can conclude:
There are specific target groups who used these pilots very often and appreciated such offers, those are in particular

- people without driving licence
- people with strong ecologic attitudes
- people who try to avoid to buy a second family car
- people who go by bike anyway and are used to this way of transport.

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These users appreciate such lending offers very much and use it very often – just for getting experience, to test different cargo bikes or "just for fun" as well as an environmental-friendly opportunity to conduct specific kinds of transport.

Thus, it is highly recommended to implement "everywhere" private user open systems for citizens and for tourists, too.

7.2.3 *Business*

In this project business as field of application has been the most difficult one because as public funded project we had to consider always state aid rules of EU projects, which means in detail not to prefer single companies of a city within the selected field (e.g. home care companies), but to offer the use of project financed bikes and equipment to all companies.

Nevertheless, several pilots were conducted – in Gdynia, Greifswald and Slagelse.

There are again two different approaches to improve the use of cargo bikes running by business:

- A lending system for all entrepreneurs (analogue to the system for private people).
  The pilot in Gdynia has shown that such a system can work very successful. But this requires an agent for the management, who is very active, communicative and convincing, and a big effort in promotion. These costs are usually not covered by business. Nevertheless, in an initial phase for promotion and awareness rising this as a successful procedure.
- Identification of specific business branches and running visible pilots.
  This was done by pilots in Greifswald and Slagelse. These document that there are on local level small branches which fit to the use of cargo bikes. The tested branch of "home care service" is such an optional area, indeed. Unfortunately, usually projects cannot offer very flexible models of cargo bikes. So, often the project bikes do not satisfy the requirements of business users.

Thus, it is **recommended** to prefer the first approach **offering a lending system to all entrepreneurs**.

The biggest success of our project is the awareness rising in the public, as well as by some small business companies. During project's lifetime several companies as well as private people bought a cargo bike for their own use.

7.3 Concerning the necessary infrastructure

The precondition for a growing number of driven cargo bikes is a good bicycle friendly infrastructure, which comprises specific bicycle lanes as well as parking facilities.

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As cargo bikes are much bigger than standard bicycles, they require an improved bicycle infrastructure, for instance broader bicycle lanes and larger parking places.

Even in Greifswald, which is already known as a bicycle-friendly city, drivers complain about not enough and bad public parking places for cargo bikes. In general, these heavy, big and electric driven bikes need high quality streets without potholes etc., especially when the cargo box is filled.

7.4 Concerning promotion

In general, a lot of information, conviction and possibilities to test the cargo bikes in safe surrounding without much traffic load is highly recommended. As people who drive standard bikes have no big issues to test and drive cargo bikes, for the remaining skeptical user group a lot of effort is needed to convince them. Over-all possibilities to test the bikes and get familiar with the use is highly suggested, as some people feel very insecure to try new things for the first time, especially in public.

Promotion for the use of cargo bikes is also simply done by their high visibility at streets. They are still not that common and especially the big cargo bikes gain a lot of attention in daily traffic as car drivers and also other bikes automatically get in contact with them while sharing streets and bikes lanes.

Also, a very useful way of promotion is to give the bikes to someone who acts on conviction in terms of mobility transition, e.g. in Greifswald NGOs like Makerspace, Animal Rescue or Straze. As they deal with these aspects in their daily life and business, they are also very keen to contribute to a more sustainable way of transport.

Furthermore, the opinion of political stakeholders can be changed sometimes by public visibility. Example from Greifswald: Since the public lending system LARA runs very well with positive public awareness the local political committee “suddenly” allocated budget to continue the LARA after project’s lifetime.

7.5 Concerning cargo bikes and its users

After all it would be very helpful to adapt the bike model to the need of the specific user. For “beginners” a small box would be recommended. Also, some users stated the idea of flexible boxes; e.g. to have 3 boxes of different size to use for a bike according the cargo. The problem with a fixed box is simply that users complained. Sometimes it is too big and sometimes it is too small and it makes no sense to use a bike with a very huge cargo box just to transport smaller goods.

One remaining issue is the higher maintenance rate of cargo bikes, especially if they are rented to many different users. Cargo bikes are a bit more complex than normal bikes and need to be taken care of in a very professional way.

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Apart from the maintenance the purchasing of the cargo bike is another critical issue. Some private users said they really liked and used the open available bikes, but can't afford to buy an own one due to high costs of several thousand euros, depending on the configuration of the bike.

In general, many users have been fond of the possibility **to drive with children** at one bike. It is definitely one major field of potential use. Adults get a good feeling with children sitting safe in front of them inside the cargo box. Some of the test users also bought an own bike after using the open access bikes offered by the project.

Apart from children, the drivers used the bikes very often to transport groceries, work equipment (e.g. workshop material) and even goods from hardware shops.

Crucial is also the **dependence on weather and seasonality** in terms of cargo bike use. The GPS data showed clearly that the bikes are used in summer time more often than in winter time.

Very positive is also the verification that most cyclists after first skepticism confirm that you become already by very short time of exercise familiar with a cargo bike and then **feel it is easy to drive**.

The project results show very clearly the use of cargo bikes is **mostly for short distance transport**.

Although cargo bikes are a niche product between car and bicycle today, they might get much more relevant in the future as the cargo bike market is growing very steadily in all participating countries of the project.

Apart from that, project sites or even single pilots conducted within big cities and rural areas might have shown very different results and should be tested in the future.

7.6 Concerning barriers and drivers

There are many barriers which hinder a fast increase of cargo bike use in business as well as in society.

These are the main **barriers** we identified during our project:

- The cost to buy and maintenance a cargo bike is relatively high, in comparison to a standard bike. In some cases, a high-quality cargo bike can even be more expensive or at the same level like a used car.
- Beyond the bike and some necessary equipment additional costs occur for facilities/organization if the bike will be used by several drivers: for instance helmets (all drivers will not use the same one helmet), rain protection or all-weather clothes, dressing room for the staff.

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- Due to size and weight often, a problem with overnight storing position occurred, as they need to be stored in a safe (burglar-proof), roofed room at ground level.
- Apart from that, also missing local bicycle infrastructure in the cities is a barrier for using cargo-bikes.
- Another issue, but a more human based one, is the fear of unexperienced (cargo-bike) cyclists to use an electric driven bike of such a massive size. Smaller cargo-bikes are a good option as an entry-level opportunity.

On the other hand, several **possibilities** to push the usage of cargo-bikes exist.

- The target group is kind of fixed, namely:
  - People who go by bike very often anyway
  - Ecologically responsible persons
  - Persons without an own car or driving license
  - Young persons with an innovative attitude towards alternative ways of transport
  - people as well as facilities which (like to) carry children
    (because children are the "most carried goods" in our pilots and delivered the best feedback)
  - Organizations with high workforce
  - Organization with lots of local transport
  - Organization with ecological goals.
- local events, public as well as target group related ones,
  to introduce and promote cargo bikes as mean of transport
  to offer possibilities to test a cargo-bikes in a safe surrounding.

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