



Middelburg pilot Mobilityhub Oude Veerseweg



Inhoudsopgave

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1 Introduction

This document contains a (process) description of the upgrading of the mobility hub Oude Veerseweg developed in the context of the European MOVE project, the studies applied for this and the results of the pilot.

The mobility hub Oude Veerseweg is also called the cycle hub. This hub was developed in the context of another European project "Bike Friendly Cities" in the period 2010-2014. In the context of this project, a bicycle and catering facility has been realized in this car park.

The aim of this pilot is to further stimulate the use of the mobility hub by increasing the value of the mobility hub (upgrading). This is achieved on the one hand by increasing the parking capacity of the mobility hub and on the other by physically giving various forms of transport (shared bicycles) and services (e-charging) a place on this mobility hub. Within MOVE this means adding various elements to the mobility hub compared to the existing situation.

The effect of this upgrading is that the mobility hub Oude Veerseweg contributes to an improvement in the accessibility of the city center of Middelburg and a reduction in the amount of car traffic towards the city center.

1.2 What is a mobility hub?

A mobility hub is a physical place where different forms of mobility meet. This collection of mobility options in one recognizable location makes combined mobility possible. A train station is often the main mobility hub for a city, but there are also mobility hubs for the neighborhood and/or business park. Spread across the city or region, mobility hubs provide an unambiguous, recognizable network of hubs. The main function is to offer mobility services, where other services are also offered, such as a catering facility on the Oude Veerseweg site. (from: Mobipunt, Advier 2018).

Each mobility hub contains a diverse range of mobility options, including the option of car sharing, bicycle parking, bicycle sharing or public e-charging facilities. The user must have easy access to the various transport options via a mobility hub. In addition, the user must be able to transfer smoothly from one mode of transport to another. Mobility hubs form an essential link in combined mobility for chain movements, as well as for combined mobility in time, which offers the user freedom of choice: eg by bus today, tomorrow by bicycle or as a pedestrian.

The establishment of one or more mobility hubs has positive effects in terms of modal shift. Modal shift is a change in the use of means of transport. For example, with car sharers or carpoolers, reflex car use is converted into well-considered (conscious) car use. A mobility hub reduces the number of cars and decreases the number of trips by car, which causes a reduction in the mobility flow towards the city center and creates extra space in the neighborhood and/or business park.

Mobility hubs can stand alone or be part of a local or regional network. The larger the network, the greater the recognizability and the added value for the user. A mobility hub can be located in a district, village, small core, a city center, business park or at a junction (carpool, P+R, bus or tram stop, bus or train station).

Mobilityhub benefits:

- *removing bottlenecks in small towns,*
- *improving accessibility (inner) city*
- *CO2 reduction through fewer car movements and*
- *reduction in use of individual vehicles*

LINK with the MOVE objectives:

- *greening mobility and reducing greenhouse gases* in the transport sector.
- increase accessibility, increase mobility options,

Frame: LINK with the mobility objectives

1.3 The mobilityhub pilot within MOVE

Within MOVE we want to achieve the following with this pilot:

- Spreading knowledge and experience about mobility hubs about the concept (design), communication, possible services, business cases, etc.
- Research into the effect of the design of mobility hubs on users and the influence of mobility hubs on the surroundings. After realization, this will be measured by perception research (interviews) of users, evaluation interviews with stakeholders and traffic counts (use of p-places, shared bicycles and e-charging stations). These findings and the conclusions and recommendations to be drawn from them are incorporated in the final report.

2. The Middelburg mobility hub within MOVE

What specific goals do we want to achieve with the Middelburg mobility hubs?:

Specific goal is improving accessibility of both the city center (reducing car journeys, relieving traffic flows and parking pressure) and the surrounding region. Every motorist who chooses to use the mobility hub means 1 car less in the last kilometer(s) to the center of the city and relief from the parking pressure in the center/inner city. So success in this regard is mainly measured by how good the use of the facilities on the mobility hub is. Due to the transfer options, the mobility hub should form a “bridge” between the (inner) city and the Middelburg area for both utility and recreational traffic and therefore contributes to improving the accessibility of the city center. Target groups of users: residents, visitors, holidaymakers, working at Ramsburg business park.

LINK with the MOVE objectives: removing bottlenecks in small towns, greening through fewer car movements and reducing the use of individual vehicles.

- Making mobility more sustainable (green and clean technology, such as e-driving) by reducing car movements and cleaning up transport. Here too, the higher the use of the facilities, the more sustainable mobility will be.

LINK with the MOVE objectives: Greening mobility and reducing greenhouse gases in the transport sector.

- More efficient and/or cheaper (by increasing transfer options, a journey can be organized more efficiently and/or become cheaper because time is saved (avoiding congestion) or avoiding search traffic for parking spaces, reducing parking pressure and parking costs for consumers. Instead of own car, use making a car-sharing or e-sharing car is much cheaper. The use of the facilities is measured. The higher the use, the more efficient and cheaper transport becomes for the travel consumer. And the more it is used, the more it meets the needs of the individual consumer and the greater the chance that the system will be financially profitable and therefore sustainable. This also applies to taking the same journey together in the car (in other words: carpooling).

LINK with the MOVE objectives: setting up financially sustainable transport systems.

- Increase social integration. Offering shared cars increases mobility, especially for those who do not own a car. The ideal image of a mobility hub is also that it becomes an attractive meeting place with various functions available. The use of the shared cars is measured and which target group this is (private user and employee of company/institution).

LINK with the MOVE objectives: increasing accessibility, increasing mobility possibilities, social integration.

Frame: LINK Middelburgse mobilityhub with MOVE objectives

2.1 Proces

The starting point is the mobility policy pursued by the municipality, in which accessibility (accessibility), road safety and sustainability are the most important key concepts. Sustainability is mainly determined by the National Climate Agreement. This climate agreement is, of course, again based on the Paris agreements on CO2 reduction.

Middelburg's mobility policy is based on the so-called Trias Mobilica. This is:

1. Reducing transport (less car trips)
2. Change of transport (modal shift: from car to, for example, bicycle)
3. Clean up transport (encouraging environmentally friendly modes of transport).

The municipality of Middelburg has various tools for this; such as stimulating bicycle traffic, stimulating electric driving and promoting the use of public transport. A mobility hub can make a substantial contribution to this.

The mobility hub Oude Veerseweg ensures that parking is provided at a distance from the center; the "last mile" is done by walking or another environmentally friendly mode of transport (bicycle or shared bicycle). A mobility hub is a facility where various forms of transport physically come together and where, for example, it is possible to switch from car to bicycle. Among other things, this contributes to a Middelburg policy objective: "car-free city centre". After all, it limits the number of car trips to the city.

To encourage the use of the mobility hub, the policy is aimed at increasing the value of the mobility hub. As mentioned before, we call this upgrading. This is achieved by physically placing various forms of transport on this mobility hub. Within MOVE this means adding various elements to the mobility hub compared to the existing situation.

The pilot in Middelburg consists on the one hand of investments aimed at infrastructure (to make expansion and/or reinforcement physically possible) and on the other hand of adding functions to the mobility hub.

The aim is to increase usage compared to the current situation by upgrading the mobility hub, which in turn leads to fewer car journeys and/or cleaner journeys.

Explore and design phases.

The MOVE WP3 knowledge team advised the MOVE project participants to use the so-called design thinking method. Middelburg has applied this method (including through interviews, stakeholder analysis and co-creation meetings) and has thus gone through the explore and design phases. These studies were conducted by the municipality of Middelburg itself and took place from September 2018 to September 2019. In addition, other relevant studies outside MOVE were also used in both the explore and design phases. These studies are relevant for the interpretation and/or legitimization of the Middelburg pilots.

design thinking

Design Thinking is an iterative, flexible, people-oriented design method within MOVE, where collaboration between the project team and all stakeholders is central.

The Design Thinking Method in summary involves the following steps:

1. Have Empathy: Make sure you know perspectives from everyone involved.
2. Define the problem: formulate the problem for which you are designing a solution in a human-centred way.
3. Generate ideas: generate as many ideas as possible and then choose the best(s).
4. Create a Prototype: get started and create a working version of your solution as quickly as possible.
5. Test the solution: test the solution you developed and process the feedback that comes from it.

The design thinking method was applied in the development of the mobility hub p-site Oude Veerseweg).

Below is a list of studies/publications used that have been done or produced within and outside MOVE (period Sept 2018 Sept 2019), but which are of relevant significance for the implementation of the MOVE mobility hubs pilots.

In the design phase, the following activities were carried out specifically within MOVE:

- Interviews, including consultation with CPOs (Charge Point Operator) for smart charging plaza
- Stakeholder analysis
- Specific (co-creation) meetings (traffic working group city)
- traffic counts, occupancy figures
- Design p-site Oude Veerseweg variant study
- Consultation chairman allotment garden association Kweeklust + deliberations council
- Advisory meeting Advier



Co-creation session to investigate the possibilities of an e-mobilitypark

External (outside MOVE) studies/publications used relevant to the mobility hubs

- Exploration of the Sustainable Mobility Zeeland Foundation for an e-carshare system in Middelburg and specifically on the Oude Veerseweg p-site
- Area-oriented approach Walcheren, Middelburg, Veere, Vlissingen, Water Board, Rijkswaterstaat, Province, 2019
- Mobi Points, Advier, 2018
- Buro Overmorgen, forecasts for the need for e-charging facilities in the future (2025).
- Charging plaza (public version)
- Shared bikes: province
- Traffic model Walcheren (Walcher road authorities)
- Occupancy figures for e-charging facilities Allego

There is some experience with setting up a mobility hub in metropolitan areas, but MOVE is working on setting up mobility hubs in smaller cities (such as Middelburg) and rural areas; adding the aspect of tourism. For the time being, there is no standard for the design of a Mobility Hub. Customization is provided for each location, partly determined by (future) users (in the explore and design phase). The concrete implementation of the mobility hubs is a combination of the guidelines from the literature on the one hand and the results from the explore and design research phases on the other.

Results stakeholderanalyse

Pilot cycle hub stakeholderanalyse

High potential influence	INVOLVE/ENGAGE Paardenstalhouder (i.v.m. uitbreiding) Volkstuinders (i.v.m. uitbreiding) BW en Raad	INVOLVE/ENGAGE PostNL e-scooter leverancier deelautobedrijf e-mobilitypark raad	PARTNER Cycle hub/, Innovam CPO's (laadpalen): - Allego - Delta/Vattenfall - AGRI snellaad - Park 'n Ride
Medium potential influence	INFORM Huidige gebruikers p-terrein	CONSULT Omliggende bedrijven Fietzersbond SWGW (gehandicapten)	CONSULT
Low potential influence	INFORM Bewoners in de buurt	INFORM VOM Forenzen Toeristen	CONSULT
	LOW Potential interest	Medium potential interest	High potential interest

Table: Stakeholderanalyse (source: several consultations cycle hub, provincie, VOM, Connexxion, meetings Cees Verhage e-mobilitypark).

3. Concrete implementation of mobility hub p-site Oude Veerseweg.

Based on the results from the explore and design phase, the existing parking place will be expanded for the upgrade required for a mobility hub with various functions.

- Expansion of parking space with approximately 50 parking spaces for:
- For optimal functioning of the mobility hub; in particular to support the Park&Ride function. Counts have shown that in the summer period there is a shortage of about 40 places on average. This number is apparent from, among other things, incorrectly parked cars. This is a specific addition to the Oude Veerseweg p-site from MOVE. An optimally functioning P+R function leads to a reduction in traffic flows towards the center of Middelburg.

LINK with the MOVE objectives: removing bottlenecks in small towns, greening through fewer car movements and reducing the use of individual vehicles

- The intention was to reserve part of the parking lot for an e-carshare system. The Sustainable Mobility Zeeland Foundation has made an inventory for Middelburg of promising places for e-car hubs; p-site Oude Veerseweg is one of them. Maximum 10 places. The use of an e-carshare system leads to mobility options for private individuals who do not own a car, it leads to more thoughtful use of a car (i.e. not using a car automatically) and traveling with an e-car is easier, cleaner than a fossil fuel car. The e-carshare system is a specific addition to the Oude Veerseweg p-site from MOVE. However, due to COVID 19, the operation of an e-carshare system within MOVE did not get off the ground.

LINK with the MOVE objectives: removing bottlenecks in small towns, greening through fewer car movements, reducing the use of individual vehicles and clean vehicles.

- The parking lot will be expanded with 12 special places for e-charging cars. Buro Overmorgen has forecast the need for charging station facilities for the next 5 years (until 2025; this shows that there is a need for approximately 300 charging points in and around the city centre. Buro Overmorgen has also investigated the extent to which tourists need charging facilities. that measures should also be taken for tourists.

The addition of a charging plaza encourages the use of clean vehicles and contributes to a short-term supply of needs of charging facilities for both residents and visitors of Middelburg. The e-charging facility is a specific addition to the Oude Veerseweg p-site from MOVE.

LINK with MOVE objectives: stimulating e-driving fits within green transport.

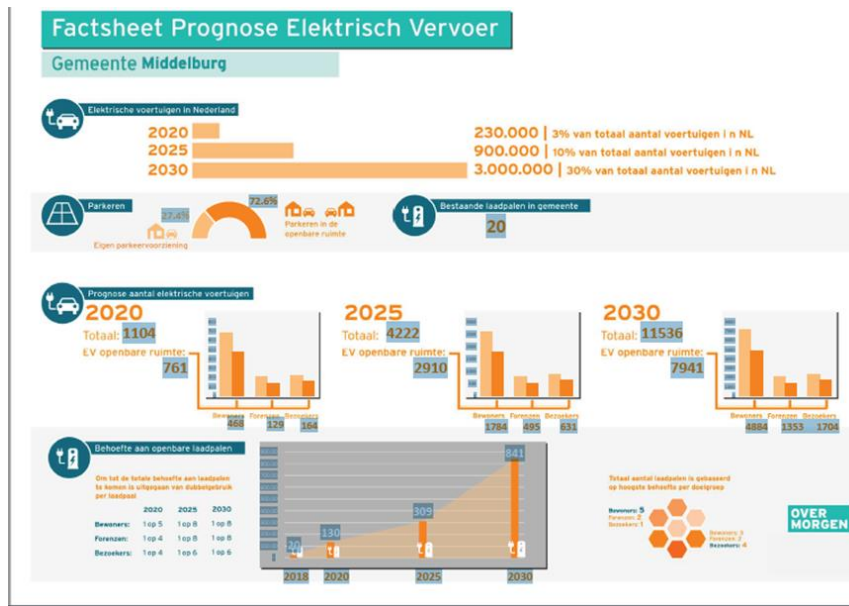


Figure: prognosis for electric transport for Middelburg

- The expansion is also used for special places for carpoolers. The Municipality of Middelburg regularly receives questions from citizens about carpool spots and requests to make places available for this. It concerns about 20 parking spaces. This is a specific addition to the Oude Veerseweg p-site from MOVE.

LINK with MOVE objectives: Providing basic mobility, reducing individual car use, greening transport through the efficient use of transport options.

- Shared bicycles The shared bicycles are mainly used as a means of transport for and after transport for motorists who use the Oude Veerseweg p-site as a transferium. The use of shared bicycles leads to a reduction in car movements in the center as well as alleviating parking pressure. Target Audience: Mostly commuters. This is a specific addition to the Oude Veerseweg p-site from MOVE.

LINK with MOVE objectives: reduce car flows in the city by encouraging the use of environmentally friendly modes of transport.

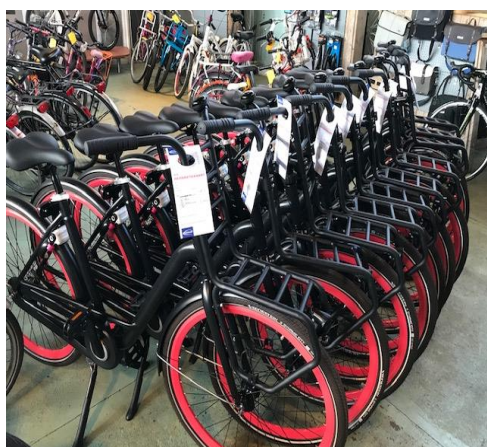


Photo: Share bikes on mobilityhub

Facilities already present on the mobility hub:

- Rent E-scooters. Is mainly intended for tourists to explore Middelburg and/or Walcheren in a different way than by car.
- Rental bicycles.
- Bicycle storage.
- Catering:
- Bicycle repair facilities

Initially, the expansion of the parking lot would take place on the allotment complex. However, there was such a lot of opposition to this that it was ultimately decided to expand the parking place itself.

The location of the e-charging plaza has also changed during this upgrading process. Initially, the location on the Oude Veerseweg road was thought for this. This is an road for the company site. Due to a negative advice from the police regarding road safety, the final location is located on the parking place itself. As a result, the number of e-charging stations has decreased.

In the summer, the Oude Veerseweg site is occupied by fairground cars and trucks for two weeks. The p-site is then completely closed off. Because the e-charging plaza is located on the p site and the CPO has set the requirement that the charging stations must also be accessible during the fair, it was necessary to develop an alternative site for some of the fairground cars. An existing overflow parking area in the immediate vicinity of the mobility hub has been expanded for this purpose.

A long-term parking space has also been realized along the Oude Veerseweg. These parking spaces have been made extra wide, so that the fair can also make use of them. This extra provision made it necessary to adapt some cables and pipes.

Framework: changes in the final mobility hub.



4. Results of the study.

The study focused on both the situation before and after the upgrading has been completed. A specific part of the research concerns the research into the so-called MOVE result indicator: Reducing the use of private cars in local mobility streams and the result indicator: Increase in the usage of sustainable mobility solutions.

4.1 Result indicator: Reducing the use of private cars in local mobility streams.

The assumption is that the Oude Veerseweg mobility hub will contribute to a reduction in the amount of car traffic towards the city centre.

The overview below shows how this was investigated.

Quantitative approach:

The share of this reduction is determined on the basis of the parking occupancy rate of the mobility hub Oude Veerseweg before the upgrading (2019) and after the upgrading (2021). In 2019, the total number of parking spaces was 210; in 2021 after the expansion and upgrading, the total number of parking spaces was 260.

Principles: parking occupancy:

A, Every car parked on the mobility hub means one less car in the local mobility flows (to the city centre).

B, Each parking lot is used by visitors on average three times a day.

C, Residents' parking concerns a total of 60 parking spaces in 2019 and 2021. This share of 60 parking spaces has been determined by performing several nighttime counts (outside the tourist season). After all, only residents park at night. This number should be halved because it is assumed that residents (can) be away during the day. This result is deducted from the result under A because these occupied parking spaces do not contribute to the reduction of car traffic towards the city.

D, It is assumed that in 2019 210/30th part and in 2021 260/30th part will be visitors to the business park itself (so they have no relationship with the city centre). This result is also deducted from the result under A.

2019 (210 pp)	juni	juli	aug	sept	okt
zaterdag	80% (165)	100% (210) 35 foutpark.	100% (210) 40 foutpark.	90% (185)	70% (145)
dinsdag	85% (180)	90% (185)	95% (200)	85% (180)	85% (180)
donderdag	85% (180)	100% (210) 25 foutpark.	100% (208) 60 foutpark.	85% (180)	85% (180)

Tabel: parkeerbezetting in % en absolute aantallen op diverse telmomenten afgerond op 5-tallen in 2019.

2021 (260 pp)		juli	aug	sept	okt
zaterdag		100% (260) 10 foutpark.	100% (260) 45 foutpark.	90% (230)	70% (180)
dinsdag		95% (245)	95% (245)	90%(230)	85% (220)
donderdag		100% (260) 25 foutpark.	100% (260) 10 foutpark.	85% (220)	85% (220)

Table: parking occupancy in % and absolute numbers at various counting moments rounded to 5 numbers in 2021.

Background Info: Number of parked cars, occupancy rate (sample, rounded to 5, averages per stated time period, 14.00h as assumed busiest hour). In the event of 100% occupancy (all 210 or 260 parking spaces occupied), it was examined to what extent illegal parking was taking place in the immediate vicinity. The corresponding numbers are assumed to want to make use of the Oude Veerseweg p-site. Parking Direction System: Static signage only, no full, free signage. Averages of observations in the period June to October, various days.

Basic principles of local mobility flow:

For this, the traffic model Walcheren and traffic counts Oostperkweg are used.

Counts: 11,500 mvt/etm

Traffic model 2030: 10,900 mvt/etm

Example calculation:

Compare between 2019 and 2021 at the busiest hour on one Saturday in July with 100% occupancy is as follows:

*2019 July Saturday $A*B-C-D = 210*3-30-30 = 570$*

*2021 July Saturday $A*B-C-D = 260*3-30-30 = 720$.*

This means about 150 more cars than in 2019 that do not drive the last part to the city center. The increase of 150 cars is an increase of about 26%.

In 2019, the decrease in the amount of car traffic in the mobility flow was $10900-570 = 10330$. $10900/10330 = 5.51\%$

In 2021, the decrease in the amount of car traffic in the mobility flow was $10,900-720 = 10180$. $10900/10180 = 5.92\%$

Total result (averaged over all counting moments)

2019: decrease of 4.9% per day

2021: decrease of 6.34% per day

Qualitative approach to user information

Survey 2019

In the summer of 2019, a survey was held among users: Car parkers on the Oude Veerseweg site

Below is an overview of the types of questions:

- Origin. Where are you from, what is your place of residence?
- Travel motif. Where are you going, what are you going to do?
- Frequency of use. 1st time? Regularly?
- Pre and post transport
- How did you get the cycle hub? Website, parking brochure, local knowledge, tip?
- Motive use cycle hub. Reasons to park at cycle hub, why park here and not elsewhere? Possible reasons: No place in the city center, crowded, no p-licence, free, easy to find, etc.
- Break down by target group (visitors, commuters, residents, bicycle renters, visitors to nearby businesses, allotment gardeners, carpoolers)
- Problems on the Oude Veerseweg site? Opportunities for improvement?

Key results of the 2019 survey:

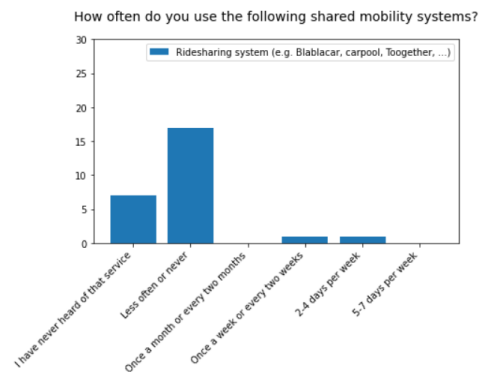
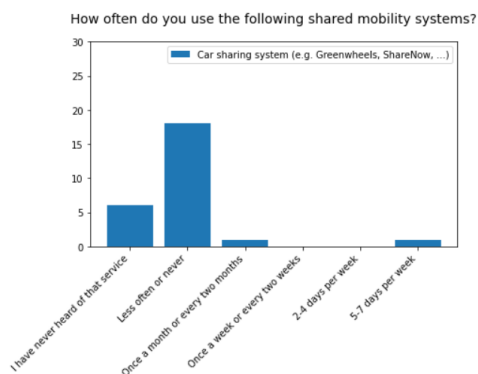
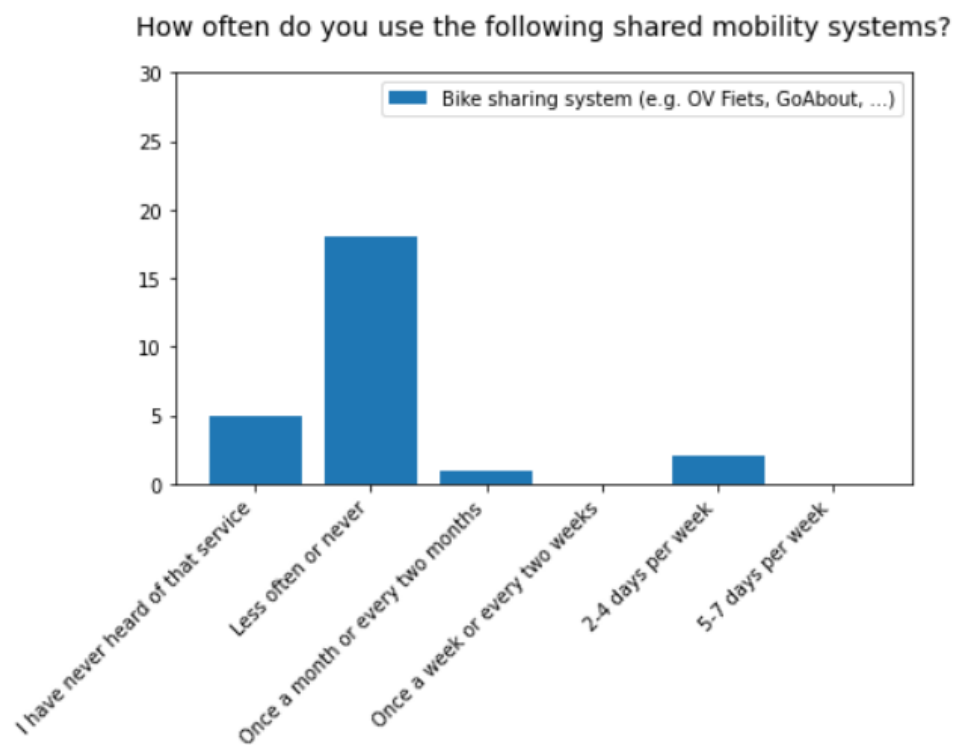
1. Too few parking spaces
2. No good pre- and post-transport facilities (rental bicycles, bicycle parking spaces)

4.2. Resultindicator: Increase in the usage of sustainable mobility solutions

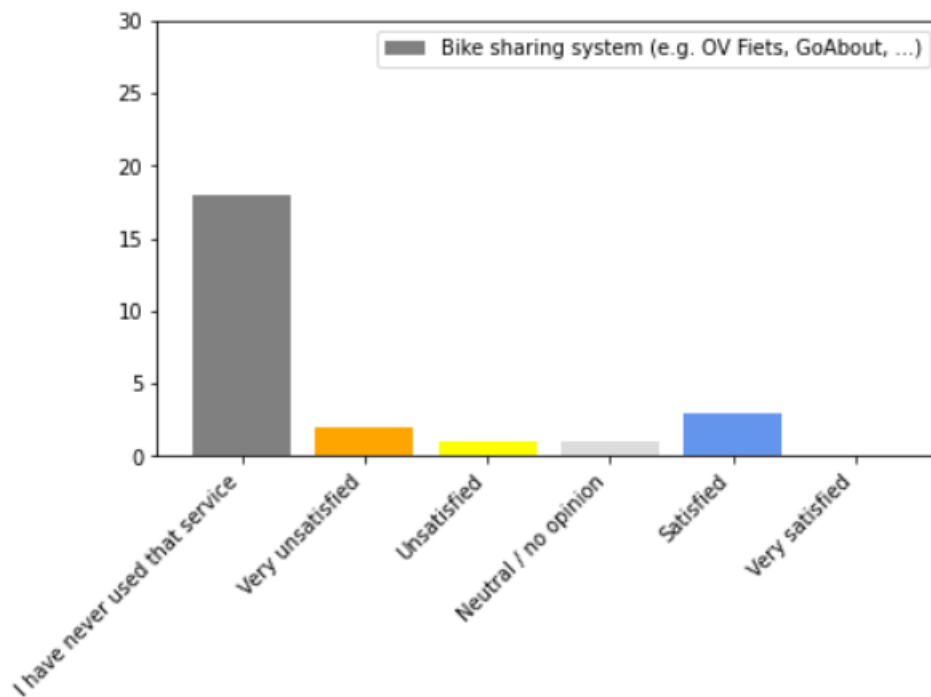
Results survey 2021

Familiarity with shared mobility systems

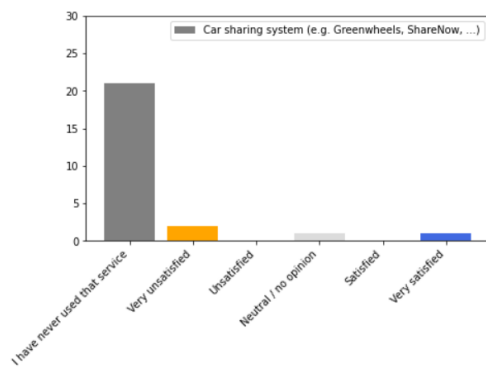
The users of the mobility hubs do not use shared mobility systems. Some have not heard of them. Most have no opinion about these systems either (see charts below).



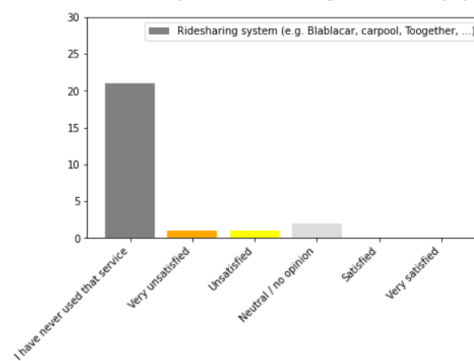
How satisfied are you with the following shared mobility systems?



How satisfied are you with the following shared mobility systems?



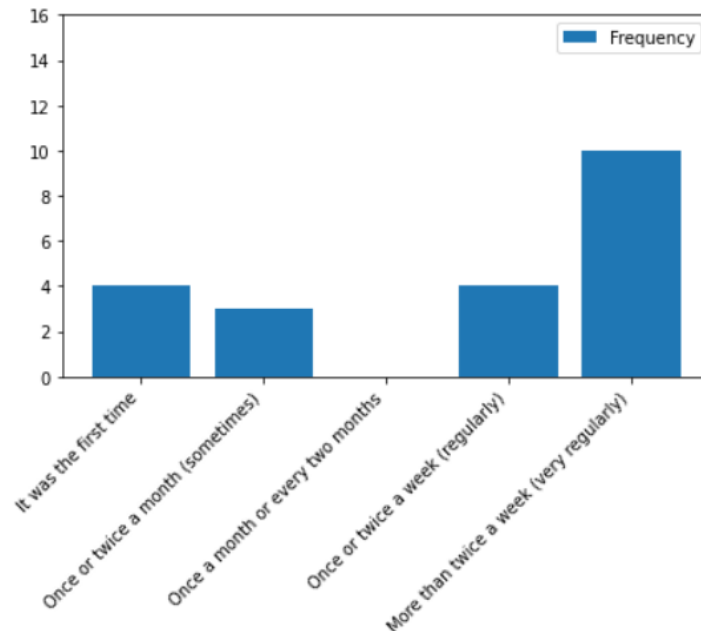
How satisfied are you with the following shared mobility systems?



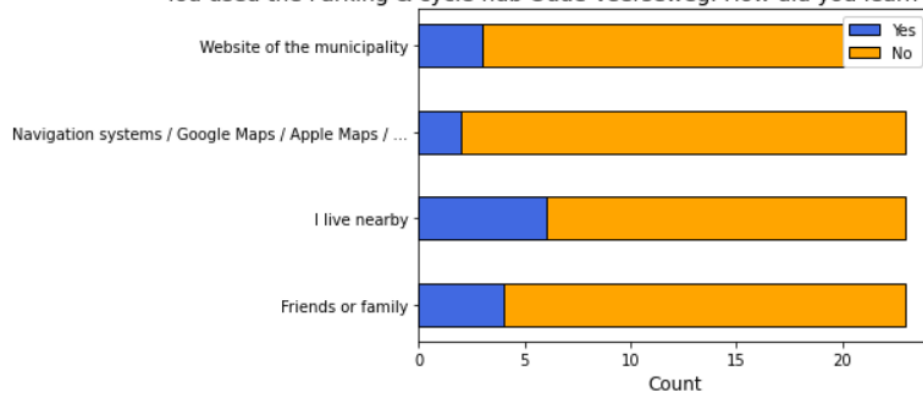
Oude Veerseweg

It is striking that a relatively large number of respondents regularly use the parking lot. If we look at how they discovered it, the largest group is people who live close by the p-place.. Some have learned about it through friends and family. There were also a few who said through the open answers that their work recommended it.

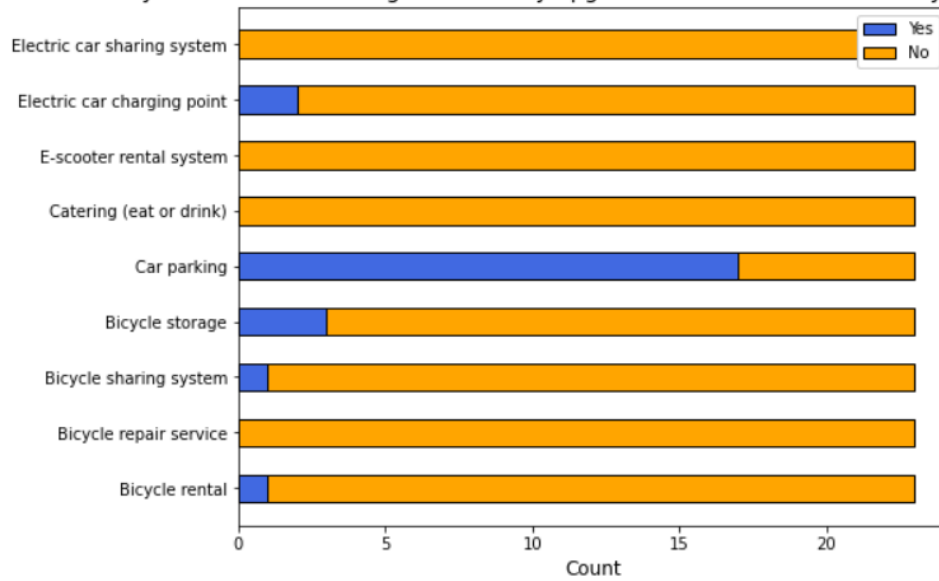
You used the Parking Oude Veerseweg. How often do you use this mobility hub?



You used the Parking & cycle-hub Oude Veerseweg. How did you learn about this mobility hub?



The mobility hub Oude Veerseweg was recently upgraded... Which facilities have you used in the past?



Judgment Oude Veerseweg

The respondents find the parking lot easily accessible, clean and safe. Most are neutral about the charging points and the rental bicycles. A group of respondents thinks that there is/was not enough available.

User information Charging plaza ParknCharge

Som van Energie (kWh)		
Maanden	Datum	Totaal
<22-1-2021		
jan		89
feb		460
mrt		637
apr		796
mei		1.593
jun		1.737
jul		2.488
aug		2.287
Eindtotaal		#####

The charging plaza was completed at the end of January 2021. The table above shows that use has steadily increased. With provisional peak the month of July 2021.

Aantal van Extern kaart ID		
Maanden	Datum	Totaal
jan		12
feb		40
mrt		73
apr		61
mei		113
jun		144
jul		177
aug		155
Eindtotaal		775

The table above shows the number of unique users

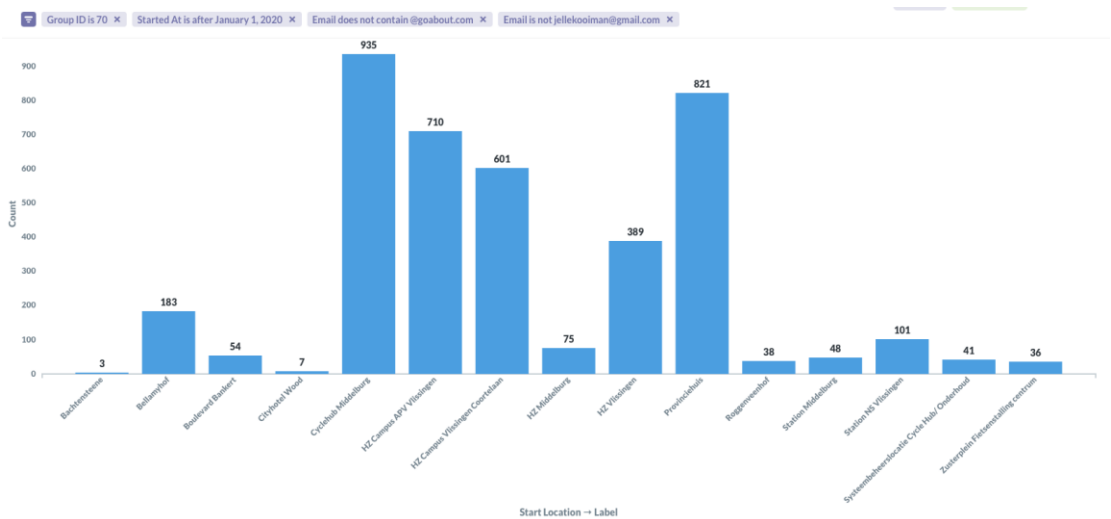
Aantal van Energie (kWh)			
Uren	Minuten	Tijd	Totaal
06			2
07			23
08			84
09			33
10			53
11			95
12			100
13			72
14			67
15			53
16			41
17			42
18			40
19			21
20			17
21			16
22			11
23			6
Eindtotaal			776

The table above shows at which time of the day how much occupation of the charging stations occurs. The busiest time is around 12 noon.

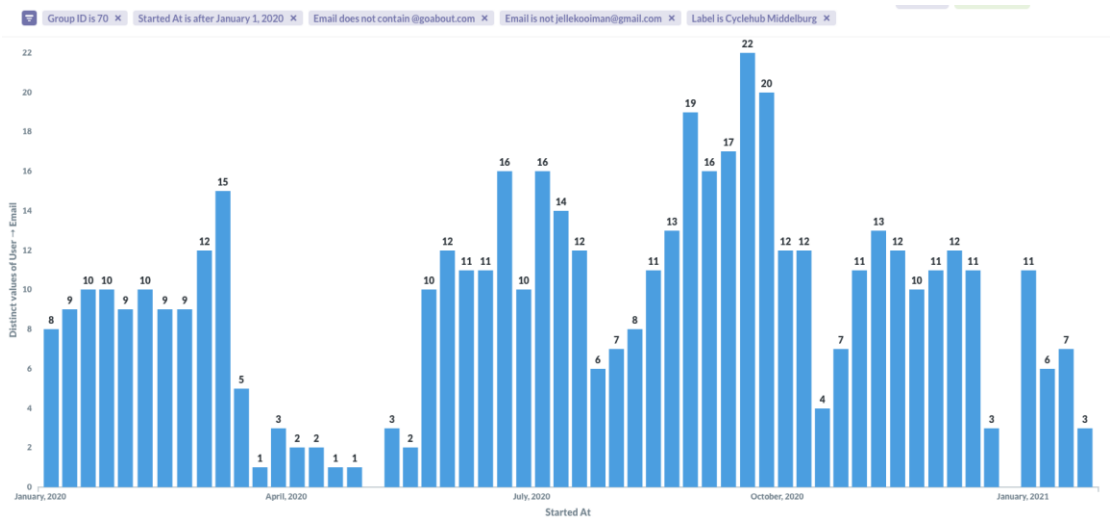
Aantal van Extern kaart ID	
Land	Totaal
BE	1,04%
DE	2,61%
NL	96,35%
(leeg)	0,00%
Eindtotaal	100,00%

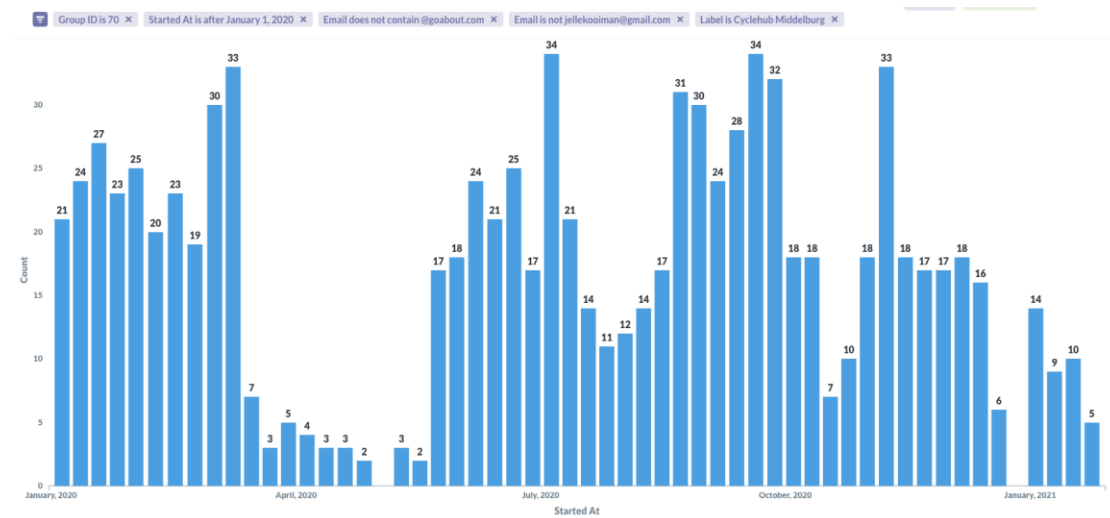
The table above shows the nationality of the users of the charging plaza in percentages.

User data Go About bicycles (shared bicycles)



Graph: Use shared bicycles from / per location in Middelburg and Vlissingen. Mobilityhub Oude Veerseweg is indicated here as the system manager location cycle hub.





Graph: Zeeland rides per week from Cycle hub location

5. Considerations and Conclusions

This report provides information about the use of the mobility hub Oude Veerseweg and to what extent the mobility hub and its upgrading contribute to a reduction in car use in the local mobility flows towards the city center of Middelburg.

It is important for the interpretation of the data that the years 2020 and 2021 are characterized by very different traffic and transport data due to COVID 19. First, the traffic intensities had fallen enormously and then they rose very high in the summer months. The reason (presumably) because of the increased choice to go on holiday in our own country (Zeeland). The influence of Corona on the traffic figures has meant that the research results should only be seen as a snapshot and that further monitoring of the use is necessary.

Finally, fuel prices rose sharply in the second half of 2021; compared to 2020. This can also influence the mobility behavior of the motorist.

A number of principles have been adopted for the calculation of the reduction in mobility flows. These may be arbitrary, so may be open to discussion.

For the determination of the result indicator "increase in usage of sustainable mobility solutions", the baseline situation is that there were no e-charging plazas and shared bicycles yet. This means that after these facilities have been into use, every use is an increase compared to the baseline situation. However, since the introduction of the e-charging plaza, use has increased.

The shared bicycles are mainly used by provincial staff. Incidentally, it was recently decided to further increase the number of provincial users. Other visitors to the mobility hub are neutral towards this facility and/or are not aware of this facility.

The upgrading of the mobility hub has led to an increase of usage and a reduction in the traffic flows towards the city centre. However, it can be stated that this is only a limited number of cars in relation to the total traffic flow. Additional capacity and/or multiple mobility hubs will have to be developed to have a greater effect on traffic flows towards the city centre. The use of the shared bicycles and the use of the charging facilities on the charging plaza is an incentive for the use of green transport.

User research shows that the provision of various forms of transport increases the value of the mobility hub and it is therefore likely that the mobility hub will also be used better.

Annexes

1. 2019 survey results

Summary of results of interviews grouped by target groups:

Targetgroup	features, motif, Pre-transport Post-transport?	Frequency usage	How knowledge about this parking lot and possibly. cycle hub why park here?	Encountered problems and possible improvements of the Oude Veerseweg p-site.
Commuter 1	as own bicycle in the car, company in the city center, (wo-we) origin: South Beveland	4 times a week	Works here in Middelburg, so is familiar with it	Improvement of bicycle parking facilities
Commuter 2	Provincial employee, has his own bicycle in the cycle hub Origin: Walcheren	A few times a week (also sometimes comes directly on the bike)	Works here in Middelburg, so is familiar with it	Enlarge car parking space
Commuter 3	walks to the city center Origin: Goes	3 times a week,		Enlarge car parking space, improve bicycle parking options Add cheap rental bike/share bike fine
Commuter 4	has its own bicycle, company on the outskirts of the city center (music school) Has a folding bike in the car, parking in the city center too expensive / no permit Origin: Brabant	5 times a week,		Adjust city center parking rates

Commuter 5	has parked his own bicycle here (public parking), works at a company in the city center origin: Wouwse Plantation	3 times a week		Improvement parking options
Commuter 6	Collect for carpooling. Origin: Walcheren	A few times a year		Improve accessibility p-terrain
Visitor 1	two persons Walks to downtown, Reason for parking cycle hub, city center too expensive, no p-place Origin: Veere	1x a month, groceries/shopping	Knows Middelburg	ther means of transport (than walking) onward transport welcome Enlarge parking lot More and free parking in the city center and no parking duration restrictions
Visitor 2	(German, family) walking to the city center Reason: unfamiliarity with parking options Origin: Germany, Zoutelande vakantie holiday park	First time	Via google maps and Navigation system car	no judgment
Visitor 3	possibly use rental bike (don't know yet) Motive city visit and recreation Origin: The Hague	Second time. So very little.	Via website and navigation system car	Is satisfied with this facility
Visitor 4	Motive: cycling on Walcheren	Second time	via acquaintance	Find the p-terrain a bit unheimlich; at least when it's dark. But haven't

	Origin: Zeeuws Vlaanderen			experienced that yet.
Visitor 5	Collect for carpooling Origin: From Middelburg.	Does this regularly	Lives on Walcheren	Enlarge parking place.
Visitor 6	Tourist visit Middelburg (German family) Has a holiday home on Schouwen Walks to town	Does this every year	Knows it because of past experiences	Found a full parking lot a few times. Expansion of the p- site is welcome.
Visitor 7	Tourist visit Dutch family Walks to center	First time	Via navigation Doesn't want to pay for parking, also because of a possible parking duration limitation	ad to search for a p-place anyway. Had expected that there would be more space on the edge of the city center.
Occupant 1	Lives nearby (Karelsgang) No space to park and no permit Origin: Middelburg	Daily	Lives nearby	Enlarge parking lot and change rates in his residential street and/or p-regime.
Occupant 2	Lives near Havendijkstraat Parking second car (considering applying for a second parking permit) Origin Middelburg	regularly	Lives in the neighbourhood	Adjusting the p- regime in the city center. Keep the Oude Veerseweg site free.

Occupant 3	<p>Park a second car here due to shortage of p-places in the city center.</p> <p>Origin: city center of Middelburg</p>	Regularly, depending on parking options near his home	Lives here, so know	<p>More parking spaces in the city center.</p> <p>Expansion of the Oude Veerseweg p-site.</p>
Occupant 4	Parks here due to e-charging facility	<p>Regularly</p> <p>Depending on occupancy e-charging options in the city</p>	Is Middelburger so know it	<p>More e-charging facilities in the city.</p> <p>Expansion of charging facilities on the Oude Veerseweg p-site.</p>
allotment gardener	Lives nearby	Occasionally, usually comes by bike	Has his allotment here	Enlarge p-site, better shield allotment garden with p-place
Visitor business park (Ramjsburg)	Lives Middelburg	Once a month	Know because of regular visit	<p>Increase p-terrain, especially in summer. Better access from p-site to directly adjacent businesses.</p> <p>Abolish motorhome parking spaces</p>
business park (Ramjsburg)	Lives in Middelburg, comes by car	Once in two weeks		

2. Interviews

1. Cycle hub results

Bicycle rental is getting better (still growing). Mainly recreational use. Multiple nationalities. Also many e-bikes for rent. Cycle hub is a training location of INNOVAM (including bicycle repair shop). This contributes to the further development of the bicycle repair part. Now also rental of e-scooters. Becoming part of a bicycle sharing project is the next step. (beginning of November 2019. Note: now realized. At the moment an attempt is being made to further expand the trial with shared bicycles (at organizations such as the municipality of Middelburg).

2. Province results

Considering e-car sharing at two hubs (Damplein and cycle hub). These shared cars can also be used by residents 24/7. SDMZ (operator of the e-mobility park HZ Vlissingen) has conducted an exploration for this. April 2020: SDMZ inventories candidates (companies) for commitment.

3. Interview about smart charging plaza with NKL (National Knowledge Platform Charging Infrastructure and project leader).

Construction of smart public charging plazas: What can we learn from the Smart Charging Plaza Experimental Garden? See below.

Question 1: For what reason did you install a smart charging plaza?

It is fair to say that Middelburg wanted a charging plaza on an existing mobility hub and not necessarily a smart charging plaza. The fact that it has become a smart charging plaza is the result of a combination of factors: the municipality of Zeeland was asked to participate in the Smart Charging Squares Experimental Garden and then drew Middelburg's attention to the available subsidy.

Question 1a. How does it align with the vision and ambition of the municipality?

Of course, the municipality of Middelburg also has a sustainability challenge. The mobility hub (parking on the edge of the city and on foot or by bicycle or bicycle further to the center) and the smart charging plaza contribute to this. The smart charging plaza can be an incentive for EV use and V2G and load balancing help to overcome the peak load on the electricity grid.

We will discuss various aspects of the construction of the square: organisational, legal, financial, technical and the end user.

1. Organizational

General by category:

- What went well, as planned in advance?

No specific success factors

- Ask whether this generally applies to a charging plaza or whether this was a context-dependent point, specifically applicable to this project.

N/A

- What went wrong or could have been handled better afterwards?

The traffic order could not count on the approval of the police (see also below). As a result, the project had to be restarted. In addition, this location is used for 2 weeks during the summer months as a storage place for commuters and trucks from the annual fair. Despite the construction of an overflow location, the fairground storage was the reason that the smart charging plaza only has half the number of places than originally envisioned. The lesson is to listen more informally to those involved.

- How did you solve this?

The charging plaza has been drawn up in a different place, but with half the number of places.

Can this be advised in general or with regard to specific project characteristics?

Specifically

1.1 Execution model

- How did the tender process go? / the permit application procedure

Middelburg has an open market system. The vision behind this is that this results in qualitatively better plans from providers than always doing business with the same party. Four CPOs were approached with the program of requirements for the smart charging plaza, two of which were local and one (Allego) who already provided many charging stations. In the end, 2 parties submitted an offer (Allego due to a reorganization and 1 local party did not see any benefits in this square) and PARKnCHARGE won.

- How did it go to choose the right parties to construct the squares?

The municipality has worked with three parties before, PARKnCHARGE was requested as a result of an earlier collaboration with the province of Zeeland. The proposals of the registered CPOs are valued and assessed according to a transparent scoring system.

- What should you take into account when working with each of these parties?

Make clear agreements about who does what. The municipality was responsible for the choice of location, design, traffic decision and asphalt turning. PARKnCHARGE for the realization of the smart charging plaza, including the connection to the grid.

- Which stages can you identify? And in which stages are which parties involved? CPOs, MSPs, network operators, other nl

* Location choice

* Design

- * Tender
- * Award
- * Realization
- *Monitoring

- What is the best way of collaborating and making agreements?

A number of errors of judgment have been made that could possibly have been avoided if the plans had been informally laid aside. The issues (traffic order and fairground) took place between municipal departments. For the rest, the collaboration went well. Municipal project leader was the pivot in the web. There were no joint project meetings.

1.1 Placement policy (vision and policy)/environment and location (basic set)

- Which locations did you choose and why?

The mobility hub is a parking lot that serves as a transfer location. Motorists can leave their car here and continue their journey by bike or on foot to the center of Middelburg. In the future, there must also be a good public transport connection. A (smart) charging plaza is a nice addition to make the hub attractive for EV drivers.

- Are there other functions at the locations? Short-term parking, long-term parking? Parking visitors, residents ratio?

Location is mainly aimed at visitors/tourists. In general, they park at this location for a longer period of time.

- Monumental/other 'obstacles'?

Terrain is used for stables living/trucks summer fair. This would mean that the charging plaza will not be accessible for 2 weeks in the summer. That was a no go for PARKnCHARGE. To maintain the fairground parking and to keep the charging plaza accessible, extra asphalt has been laid as an overflow location.

- How did the cooperation with the parties in this area go?

Internal processes of the municipality (fairground/traffic decree) difficult. Execution smooth.

- What were the delaying factors in the construction of the square? supply of materials, permit purchase? Poluted soil? Neighboring objections? Different?

Place was completed six months later than planned. This was because the police did not approve the traffic order. The EV spots were initially drawn at right angles to a main 50 kilometer road. The police thought that was unsafe. As a result, a new design had to be made. This meant (taking into

account fair wishes) that the number of charging stations/places had to be halved. Contaminated soil was also found, but this had been taken into account in advance.

- Why did you choose this number of charging stations per location/how did it come about? Based on forecast cards, request and/or user data? Why based on this?

The forecast maps for EV growth, plus the figures and forecasts about tourist visits, were examined. Based on this, initially 12 charging stations would be installed (24 places), but due to the aforementioned complications, these have become 6 posts (12 places).

1.1 functionality

- Do the charging stations function properly?

Yes

- Do all those involved take responsibility and do they comply with the agreements?

Yes. In addition, an agreement has been made that the municipality and PARKnCHARGE will meet once a year to discuss the date.

- Do you receive a management report from charging manager with data, malfunctions, etc?

Yes

- Maintenance and service agreements? Are they clear and are they well adhered to?

Yes. 1 x malfunction and it was quickly resolved

Financial

General by category:

- What went well, as planned in advance?

Stayed within budget. It should be noted that the municipality also receives a European subsidy (MOVE programme) for the expansion of the hub. Extra costs for the fairground overflow and collision protection charging stations could be charged here.

- Ask whether this generally applies to a charging plaza or whether this was a context-dependent point, specifically applicable to this project.

European subsidy is specific to this location. Perhaps a lesson in linking these types of subsidies together.

- What went wrong or could have been handled better afterwards?

Both overflow fairground and collision protection were only recognized at a later stage.

- How did you solve this?

Costs added to European subsidy scheme

- Can this be advised in general or with regard to specific project characteristics?

N/A

- Can a municipality realize financial benefits with this solution?

Not in this particular case. However, it is being considered that in the future if CPO earns money through the use of public space, costs will be charged for the benefit of the municipality.

- What can you save on (connecting to existing networks / need for distribution boxes)

N/A

- What additional costs do you have as a municipality with such a solution?

No. The municipality has had no involvement with the network cabinet and the type of poles. At most extra civil servant hours, but not worth mentioning.

- Were you able to estimate all of these in advance? Or were there any surprises?

No surprises

- Who is financially responsible for the operational costs of the charging plaza?

PARKnCHARGE. Only signage and enforcement for the account of the municipality

- Which non-financial advantages do you recognize compared to regular charging stations?

Environmental gain, both by boosting EV and load balancing and V2G to relieve the load during peak times. (Smart) charging plaza should also help prevent many separate charging stations from appearing in the streets in the historic center.

- Did you encounter problems in making financial agreements with the various parties involved?

New

Technical

General by category:

- What went well, as planned in advance?

All went well. Program of Requirements from Rijk/Elaad have been passed 1-on-1 to CPO PARKnCHARGE and have been realized.

- Ask whether this generally applies to a charging plaza or whether this was a context-dependent point, specifically applicable to this project.

Specifically

- What went wrong or could have been handled better afterwards?

Perhaps you should have thought about collision protection charging posts earlier. On a technical level, the municipality is not aware of any technical problems during the realization phase. First use shows no problems.

- How did you solve this?

N/A

- Can this be advised in general or with regard to specific project characteristics?

N/A

- Clear which part falls under whose responsibility, eg at the takeover point client/energy supplier, ownership of equipment and cabling?

Yes

- Why did you choose these techniques/combination of techniques?

Opted for V2G and load balancing to test how peak loads on the power grid can be overcome in this way. Furthermore, technology has been applied to prevent pole sticking; a connection fee is charged for cars that occupy a space but do not charge.

- AC/DC current? If DC, why did you choose DC?

AC. There is one pole that charges faster than the others, but this one is AC too. DC has been considered, but given the target group – generally drivers who park and charge for several hours – DC has not been seen as necessary.

What do you expect this technique to solve/improve?

Overcome peak load power grid. Prevent pole sticking.

- How long was the test phase/is the test phase?

From the point of view of the municipality, there has been no specific test phase. When the square was completed, it was immediately operational. PARKnCHARGE is responsible for the operation of the square.

- How variable are the applications on the charging plazas? What technical adjustments can still take place.

In terms of technology, there are currently no specific needs or wishes for the future. However, the idea is to expand the square further in the long term.

- Can it also be used “normally”, so not smart, etc.?

Yes.

- If applicable, what is the v2g linked to (net, building, battery)?

On the power grid.

- Is v2g already functional? When do you expect to have this functional? What do you need for it?

V2G is functional, but there are hardly any cars that are suitable for this technology.

- Was all hardware and software already present? If not, what is/was the most challenging?

As far as is known, existing techniques have been used.

- What are the Smart charging challenges?

No.

- What are the innovative components of this specific solution?

V2G, load balancing and the connection rate.

- What are important lessons that you have learned regarding the construction of such an innovative charging plaza?

No innovative lessons during construction. In terms of use, these are expected, but it is still too early to make any statements.

- How does the placement of such a square compare to a normal charging station?

No big differences. It is noted, however, that it is more efficient to install 6 charging posts in one go, as in this case, instead of always having separate posts. Particularly with regard to the traffic decision to be taken.

- Which technique applied, in addition to V2G ready and AC/DC combination.

Load balancing and connection rate.

- Properly apply V2G and smart charging technical settings. How did the network operator and other stakeholders work together?

Good. PARKnCHARGE has taken care of the contacts with the grid operator. No known problems with connection of the square to the grid.

- Other technical settings (software installation, etc.)

N/A

Legal

General by category:

- What went well, as planned in advance?

Fairly formal process. The agreement with PARKnCHARGE has gone back and forth several times for coordination. Although an agreement with another CPO (Middelburg has an open market system) was taken as a guideline, this took time.

- Ask whether this generally applies to a charging plaza or whether this was a context-dependent point, specifically applicable to this project.

Specifically

- What went wrong or could have been handled better afterwards?

Traffic decision had to be redone. See earlier.

- How did you solve this?

Created a new design. See also earlier.

- Can this be advised in general or with regard to specific project characteristics?

Specifically.

- What legal challenges did you foresee and what have you encountered during the trial?

No challenges.

- Can all acquired knowledge/experiences be shared publicly? Or is this also specific from CPO, etc.?

Knowledge can be shared.

- How long do the contracts with the tendering parties run? What happens when it's over?

Agreement with PARKnCHARGE is for 10 and can be extended thereafter by mutual agreement. If not, PARKnCHARGE can transfer the square to another operator. If the square is no longer functional, PARKnCHARGE must remove the installation.

- Integration of charging infrastructure into the environment? E.g. participation of local residents, traffic decision,

Traffic order see earlier. The site is located on the edge of the city center. Before the (new) traffic decree was made available for inspection, informal consultations were held with the city center district traffic group, which is standard procedure in Middelburg. This means participation. Another factor is that no residents live directly on the square. No objections have been raised from either local residents or companies on the industrial estate.

- Did changes to the traffic decree cause problems?

Yes, initially yes.

End user (/customer journey)

General by category:

- What went well, as planned in advance?

Although the moments when all charging stations are occupied are scarce, the charging options are already being used well. Furthermore, there are virtually no problems with use.

Ask whether this generally applies to a charging plaza or whether this was a context-dependent point, specifically applicable to this project.

Specifically. The choice of location – a busy traffic hub on the edge of the city center – ensures that the EV places are already well used.

- What went wrong or could have been handled better afterwards?

The only known problem is that when there is a lot of traffic, the EV places are sometimes occupied by vehicles with fossil fuels.

- How did you solve this?

Enforcement has been asked to take a closer look at the smart charging plaza.

- Can this be advised in general or with regard to specific project characteristics?

General

- How is the EV driver informed about AC/DC/V2G, etc.?

At the square is a large sign with an infographic explaining how the square works. Among other things, V2G and the connection rate are discussed.

- How does the EV driver find the square?

Via the EV parking apps and the website of the municipality of Middelburg.

- How does the EV driver know that there is room to charge?

Included in the EV parking apps.

- Is it clear what the end user will pay?

Yes

- Are there any specific challenges when connecting the car to the charging station?
new

- How does the EV driver know how much charging capacity the pole/square provides?
It has been indicated that 1 charging station charges faster than the other, but just the specific charging speed.

- Is the same payment system used for this square as for the regular charging infrastructure?

Yes. Despite the open market system with various providers, the payment system in Middelburg is universal.

- How can users feed back their questions/complaints?

Technical questions preferably via PARKnCHARGE. The municipality can also be reached, for example for complaints about incorrect parking.

General:

- What is the most important (technical) addition for future-proofing the square?

Future-proofing is mainly due to the fact that mass has been created that allows the EV driver to work at this location for the time being. Despite the troubles with the fair, there are opportunities to expand the number of places in the future at a short distance from the square. V2G also makes the square future-proof.

- What was the duration of the various processes? What do you have to invest the most time in? / take lead times into account?

In this case, the construction of the smart charging plaza turned out to be tailor-made. Due to objections from the police, the first design had to be thrown in the trash, after which that phase had to be repeated. In the new design extra asphalt had to be laid. Although it did not cause any delay in Middelburg, it was noted that it is important to arrange the grid connection in time.

Bibliography

1. Exploration of the Sustainable Mobility Zeeland Foundation for an e-carshare system in Middelburg and specifically on the Oude Veerseweg p-site, 2020
2. Area-oriented approach Walcheren, Middelburg, Veere, Vlissingen, Water Board, Rijkswaterstaat, Province, 2019
3. Mobi Points, Advier, 2018
4. Buro The day after tomorrow, forecasts for the need for e-charging facilities in the future (2025).
5. Manual Charging Square National Knowledge Platform, public version 2020