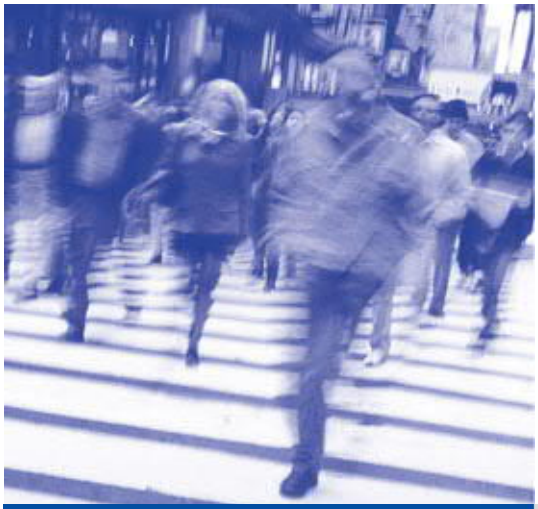

CIVITAS 2020
Cleaner and better transport in cities

ECCENTRIC

D.2.4 Implementation Report WP2 Cluster 2:

New parking policies

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Abstract

The Implementation Report D2.4 for Cluster 2 New parking Policies covers the current status of the implemented work on new parking policies with a special focus on new technologies and approaches that promote less car ownership.

The report describes the implementation status of the measures “Adaptive parking management based on energy efficiency and occupancy” in Madrid (MAD 2.3), “Dynamic occupancy based on parking fees” (STO 2.4) and “Green parking standards in Arsta development” (STO 2.5) in Stockholm and “Park & Ride System in a peripheral district” (RUS 2.6) in Ruse.

Project Partners

Organisation	Country	Abbreviation
Ayuntamiento de Madrid	Spain	AYTOMADRID
Stockholms Stad	Sweden	STO
Obshtina Ruse	Bulgaria	RUSEMUN
Club Sustainable Development of Civil Society Association	Bulgaria	CSDCS

Document History

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Disclaimer:

The views expressed in this publication are the sole responsibility of the ECCENTRIC consortium and do not necessarily reflect the views of the European Commission

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List of Acronyms

ACM	Adaptive City Mobility
API	Application Programme interface
ca	*circa* (around)
CO_2	Carbon Dioxide
D	Deliverable
DoA	Description of the Action
DMP	Data Management Plan
EC	European Commission
ECOMM	European Conference on Mobility Management
EU	European Union
EV	Electric Vehicle
e.g.	*exempli gratia* (for example)
FCEV	Fuel Cell Electric Vehicle
GA	Grant Agreement
H2020	Horizon 2020
HOV	High Occupancy Vehicle
IA	Innovation Actions
i.e.	*id est* (that is to say)
ICT	Information and Communications Technology
IEE	Intelligent Energy Europe
IHFEM	Integrated Action Program for the Promotion of Electromobility in Munich
IT	Information Technology
KoM	Kick-off Meeting
KPI	Key Performance Indicator
LAN	Local Area Network (of computers)
LDM	Local Dissemination Manager
LEM	Local Evaluation Manager
MaaR	Mobility as a Right
MaaS	Mobility as a Service
MER	Measure Evaluation Report
ML	Measure Leader

MR	Measure Report
MS	Milestone
NGO	Non-Governmental Organization
NOx	Nitrogen Oxides
OCG	Observers City Group
OCR	Optical Character Recognition
P&R	Park & Ride
P2P	Peer to peer
PAC	Political Advisory Committee
PAG	Political Advisory Group
PDM	Project Dissemination Manager
PER	Process Evaluation Report
PEM	Project Evaluation Manager
PMG	Project Management Group
PT	Public Transport
SM	Site Manager
SUMP	Sustainable Urban Mobility Plan
WAN	Wide Area Network (of computers)
WP	Work Package
WPL	Work Package Leader
WS	Workshop
WT	Work plan Table

Executive Summary

The Implementation report summarises the current status of measures MAD 2.3, STO 2.4, STO 2.5 and RUS 2.6 in Work Package 2 working on Inclusive mobility planning, mobility planning and new parking policies. Furthermore, critical challenges and key factors are described which can be used to identify lessons learned for the further implementation phase and replicability. The recommendations for further implementation can also serve as a guidance for other European cities.

Parking space is particularly limited in urban regions. There is usually a higher demand for parking spaces than there are available. As a result, there is an enormous increase in traffic searching for parking spaces, which has a lot of disadvantages in terms of environmental and noise protection. This burdens residents and suppliers.

Parking space and its management is of high importance in terms of urban planning and development. Parking spaces in urban areas are always in competition with other areas with corresponding possibilities of use. Wherever there is a playground, a cycle path or a park, there could also be a car park. This would, however, make a city much less attractive and would have a negative impact on the quality of life, even if the parking problems were solved.

1 Introduction

The EU-funded project CIVITAS ECCENTRIC has set itself the goal of ensuring a better quality of life for citizens while at the same time maintaining complete mobility - without owning a car. In the course of this, a variety of sustainable solutions for the promotion of future-oriented mobility will be implemented and demonstrated in neighbourhoods placed out of the city centre. One of CIVITAS ECCENTRIC's central tasks is to establish networks with the other five European partner cities and to exchange and transfer knowledge among each other. Each of the model neighbourhoods serves as a laboratory area in which the various measures are scientifically investigated, developed and tested and at the same time the transferability and adaptability to other regions and countries is examined and aimed at. The activities of WP2 are focused to demonstrate and test new concepts and services in the field of inclusive urban planning, new parking policies and innovative mobility management, which are suited for a more sustainable organisation of mobility.

Cluster	Measure	City	Partner(s)
3	MAD 2.3	Madrid	AYTO MADRID
3	STO 2.4	Stockholm	City of Stockholm
3	STO 2.5	Stockholm	City of Stockholm
3	RUS 2.6	Ruse	RUSE, CSDCS

2 Explanation of the work implemented in WP2 Cluster 2: New parking policies

The aim of parking space management is to influence parking space supply and demand in such a way that a balanced ratio is achieved, to reduce noise and exhaust pollution, to reduce the number of long-term parkers (e.g. employees), to increase the satisfaction of residents, suppliers, customers and visitors and to reduce parking offences.

Measure MAD 2.3 tests a technological tool to prioritise HOV (High Occupancy Vehicles) in parking solutions for trip generation areas (e.g. business area, university campus).Once tested, this option will join and already in course positive discrimination for clean vehicles, and time-based regulation for parking in public administration buildings and other municipal services. In order to guarantee the set up of the scheme, once ready the technological tool, efforts will also be placed on the effective engagement of the management staff of the corresponding trip generators in the pilot project.

Measure STO 2.4 aims to research, test and evaluate new systems for smart, efficient and accurate parking surveillance, using laser radar and cameras on cruising vehicles. The measure also aims to test systems that guide drivers in Stockholm to currently unoccupied parking spots on the streets in Stockholm, providing live data in a parking app. This leads to a more efficient use of available parking, a more efficient parking management and thus also less “cruising for available parking” - traffic.

The measure STO 2.5 should result in a gain of experiences about strategies that cities could implement in order to accomplish a modal shift from car to other sustainable mobility options and to help citizens to manage their everyday life without having an own car. One possibility to support residents in car-free everyday life is pop-up recycling. This is a mobile activity that moves around between different locations in Stockholm. In every place, pop-up stops and residents in the area have the opportunity to hand in hazardous waste, portable coarse waste and exchange items with one another in a store section.

The goal of the measure RUS 2.6 is to promote a modal shift towards public transport and other active modes of mobility, by reducing the needs (of commuters and other users) to individually occupy cars for their regular trips to the city centre. The development of a Park&Ride facility will allow easy connection with public transport services and will relieve road congestion along the routes regularly taken from Druzhba to the city centre. The measure will also help reduce the number of cars parked on the streets and public spaces in the city centre.

2.1 MAD 2.3 Adaptive parking management based on energy efficiency and occupancy

Figure 1: Madrid DAVAO System in EMT parking

The strategic objective is to develop and implement intelligent parking space management in areas outside the city centre with a high density of office occupations. This will be done by promoting employee ride-sharing in order to increase vehicle utilisation and avoid travels. The long term aim is to combine an innovative tool to discriminate positively the High Occupancy Vehicles (HOV) with the existing tools to promote the use of clean vehicles in order to reduce energy consumption and traffic emissions. The measure focus on the development and test of a tool to make possible this positive discrimination of HOV.

2.1.1 Introduction

In the context of this measure, the City of Madrid initially wanted to carry out a pilot test for a Smart Parking Management System in the living laboratory area. In particular, the pilot was focused on the parking areas management with:

- Priority to HOV in parking solutions for trip generation areas (e.g. business areas, university campus);
- Priority to clean vehicles;

After the preparation phase analysis, the measure was focused on HOV, as the growth of the car sharing concept in Madrid was very fast and unexpected and this trend opens a real opportunity to reduce the use of cars for commuting trips.

Then, it has been decided to focus in an innovative tool to facilitate the promotion of HOV in parking management. The other part of the initial approach in the project proposal, the priority to clean vehicles has been successfully developed in Madrid in last years. The technology for the prioritisation of clean vehicles in parking systems has been standardised for Madrid's vehicles. All on-street parking spaces are fee-based and depend on the degree of cleanliness of the parked vehicle associated with the reading of the license plate.

Key steps

The measure aims to test an innovative technology-based system to automatically detect the number of people travelling in a vehicle so that its access to a future reserved area or any alternative option for prioritising HOV vehicles is permitted or not.

This technology uses an image processing system. This automatic control will make it possible to achieve positive discrimination against vehicles with more than one passenger. It can be complemented with other restrictions, such as the mentioned prioritising of clean vehicles or compliance with other regulatory conditions in the future.

After a long preparation phase, the measure was finally defined for the implementation phase in the course of the year 2018. Madrid approved the Plan A (Air Quality Plan), at the end of 2017, defining a framework for parking and integrating actions for its smart management.

A good opportunity for this measure appeared in 2018 when the ECCENTRIC management partner EMT (Madrid's public transport company) took over of public parking facilities in Madrid. The possibilities for upscaling this innovative solution are promising, as EMT is currently managing 21 car parks in Madrid (6,683 parking lots.

The EMT staff working at the central office amounts to 1,357 people. There are 149 parking places within the building, i.e., 9.1 persons per each parking place. Access to the parking is limited to authorised vehicles, and is controlled by an automatic license plate recognition system. This EMT headquarters are placed in the influence area of the Living Lab, and the company is initiating the implementation of a Mobility Plan. Conditions are optimal to test the innovative tool in this parking, and, if possible, establish a parking strategy in the future linked to the Mobility Plan implementation.

The measure leader has prepared a documentation to give the go ahead to the development of the new technology and the installation of the Doorgates control system, which aims to establish the number of passengers in each vehicle and to favour access, if necessary. Several innovative technologies and similar experiences were analysed because a really excellent tool is needed: the error rate must be really low to trust the automatic control.

The necessary equipment is the already developed discriminatory technology. It is simpler than the usual HOV detector for cars in the road, since the vehicles are in a stop position.

A second contract to analyse the collected data and feed the evaluation of its performance and current use of the EMT parking has also been completed. Surveys before and after the test are programmed.

Changes

Finally, the core objective of the measure shifted towards increasing the use of HOV through intelligent parking management tested in a peripheral area, in the border of the Living Lab.

The testing of the innovative technology in the car park of EMT's headquarters, which makes the control and evaluation of the operation easier and potentially upscalable to other car parks managed by EMT in the future.

Stakeholders involved

The City of Madrid (Mobility and Environment Area), is responsible for the Plan A and is the main actor of this measure. Parking management measures will be carried out by the Madrid Sustainable Urban Planning Board.

EMT (www.emtmadrid.es) is the main stakeholder involved in the test car parking: in detail, the car park operators and EMT's - human resources department, trade unions, etc.

INDRA (www.indracompany.com) is the company responsible for technology development.

Required infrastructure

The automated control doors of the multi-storey car park are the key to implementing this prioritisation for HOV vehicles in large car parks. The new technology makes it possible to detect whether the vehicle is used only by the driver or by two or more passengers. The technology controls the first row of the seats and also the rear part of the car.

It is programmed for various weather conditions, especially the more difficult ones (rain, fog, winter days with poor visibility or hours of sunset or twilight, artificial lighting, etc.). Implementation requires an electrical connection in a place with good visibility as the main requirement.

The requirements for the new technology therefore include the supply and installation of the following systems and equipment:

- Vehicle detection and license plate reading subsystem: Optical Character Recognition OCR camera, vehicle detection sensor/camera shot and OCR software license.
- Front seat occupancy counting system, including front camera, optical, filters and infrared light source and other required installation elements.
- Back seat occupancy counting system, including front camera, optical, filters and infrared light source and other required installation elements.
- Information unit of Process (server) including a cupboard for equipment, LAN communication boards (Ethernet or Local Area of computer Networks) and WAN (Wide Area of Networks), serial converter/Ethernet and an uninterruptible power supply (UPS).
- Software for high occupancy detection system, including product license and ad hoc development for parking environment.
- Software such as Business intelligence (BI) for high occupancy detection system reports, including product license and ad hoc development for project requisitions.

Link to other measures

As mentioned, the measure is integrated with the other actions included in Plan A.

The City of Madrid Mobility and Environment Department, and in particular EMT as operator of the public parking in Madrid, are really interested in this new technology as a strategy to reduce the use of cars and increase the use of public transport, car sharing and more active forms of transport/mobility. According to the objectives of Plan A, it is possible to use this system in all public car parks (for on-street parking lots and for off-street large underground and above-ground car parks).

There is also a strategic approach to study the effects of "Madrid Central", a sustainable mobility plan for the restriction of private car access that is currently implemented in the city centre of Madrid.

Other private car park operators may be interested in implementing these alternatives to discriminatory parked vehicles in order to respond to the requirements of city regulations.

Timeframe

Following the delays in the preparation phase, the installation of the new system in the parking garage of the EMT headquarters was almost completed by autumn 2018. The first data collection campaign on cars entering started in November 2018. After this first test, the system will be tested again in the demonstration phase initiated in the first quarter of 2019.

The after data collection on the use of parking spaces is planned for June 2019 (at least six months after start of demonstration phase). There has been a short delay in the evaluation plans, but it will be possible to make a solid evaluation of this measure within the CIVITAS ECCENTRIC project's lifetime.

2.1.2 Business model and contractual partnerships

Ownership of the measure

EMT, a public partner with responsibility for the management of public parking facilities in Madrid, co-owns the pilot solution for positive discrimination of HOV vehicles under the management of two municipal departments: Urban Planning (design of car parks) and Mobility and Environment (implementation of Plan A).

Formal relationship between the public authority and the industry partner

This solution requires cooperation with a truly innovative technology partner. In this case, the collaboration with INDRA guarantees the excellence of the developed solution as well as possibly contributes to the possibility of a good replication of this solution, as this company is one of the best placed and influential technology companies in Spain,

Financing

The measure is financed by the CIVITAS ECCENTRIC project (budget for equipment and studies). In case of a broad replication by EMT, the municipal budget usually transferred to EMT will cover the costs for installation and maintenance of the new identification systems in other locations.

A possible upscaling to other private parking operators should be self-financed, with or without complementary public funding for the transitional period, if it is part of a solid local, regional or national strategy.

2.1.3 Critical challenges and success factors

Critical points for implementation of the measure have been:

- One of the conditions for HOV prioritizing is to have a critical mass of commuters with similar work schedule, in an unique company or in a business area with a number of companies.
- Technology location: The installation must be visible and well illuminated to avoid vandalism and misinterpretations.
- Technological maturity: The system must avoid errors in identification in order to be reliable and to configure the control system efficiently.
- Support by political priorities in urban mobility: A relevant success factor for this measure is the synergy with Plan A.

The core of this technological measure is the verification of the effectiveness of the system as a prerequisite for the replicability of the installation, so that there is at least a requirement that the data readout must be highly reliable.

2.1.4 Lessons learned from implementation/replicability

In this case, the option of a highly replicable and controlled parking environment (headquarters of EMT) has advantages for timely implementation.

The most ambitious first idea of implementing a complete parking strategy has found the barrier of the technological tool.

Once the technological tool designed and tested, it would be possible to address the initial idea of implementing a smart parking management scheme, combining HOV and clean vehicles prioritation in a peripheral business area.

2.1.5 Recommendations

Once the technology has been tested and approved, the limited parking areas and control gates in a business area with parking problems are implemented in cooperation with various companies and complementary measures.

It is recommended to proceed as follows:

- Use/develop an App or simple tool to find travel companions among the company's employees.
- Ordinance, parking regulation or parking management strategy to integrate exclusive reserved areas for HOV and/or clean vehicles in all car parks.

- The set up of prioritation and/ or advantages for clean and multipassengers cars in public car parkings, as an exemplary action showing the coherence of the city and its commitment with municipal policies: the sustainable management of urban car parks.
- To include the conclusions of this parking management strategy as a relevant part of the Mobility plans for businesses and for the city (Sustainable Urban Mobility Plan or SUMP).

2.2 STO 2.4 Smart and flexible parking by emerging technology

Figure 2: Parklings Scan Car

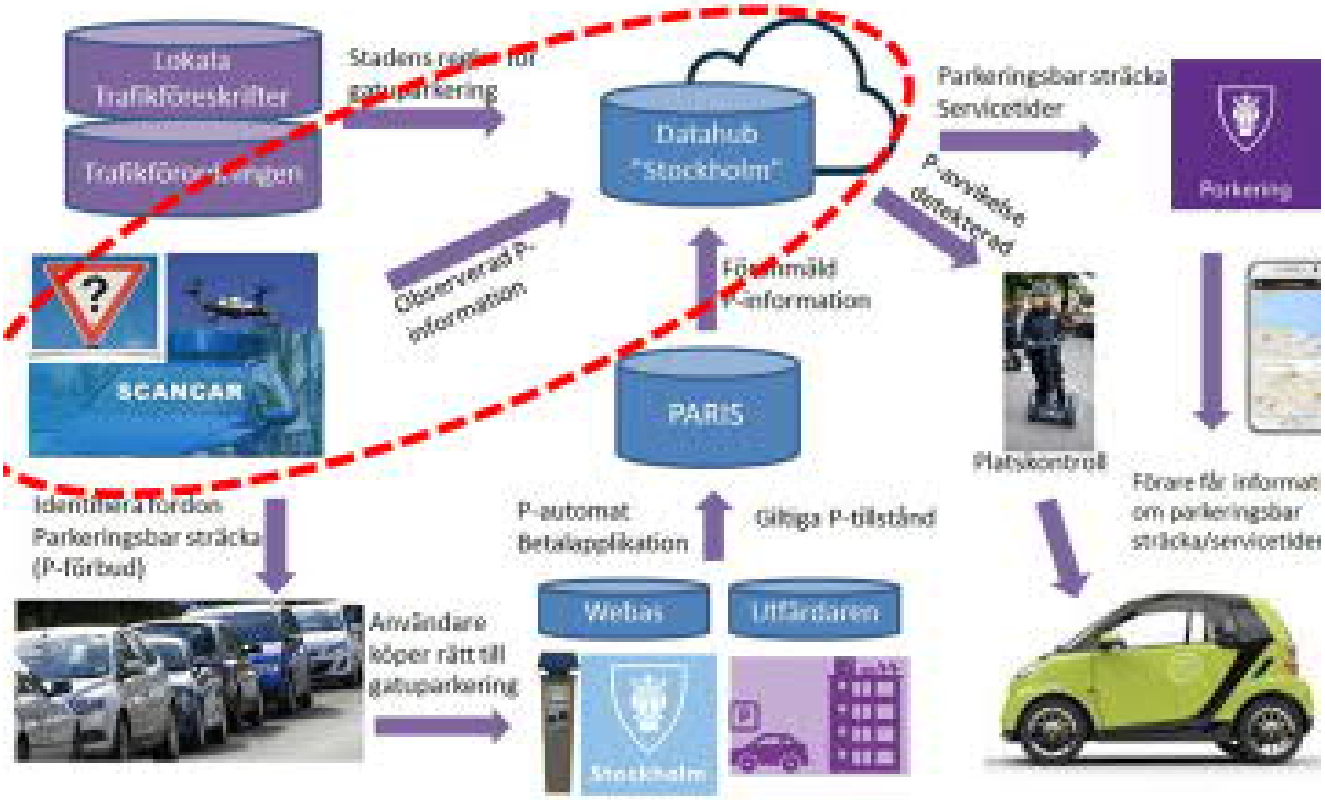

Figure 3: Concept of Demonstration

This measure will contribute to a more liveable suburban environment by reducing cruising time for parking, improving traffic conditions and traffic safety, reducing cruising emissions and optimising the road space available.

2.2.1 Introduction

Stockholm has recently adopted the implementation of a new parking plan, launched from 1 September 2016, including a major extension of flat rate on-street parking for residents in areas outside the inner city where parking until now has been free of charge. The goals are to increase the accessibility for the moving traffic, to reduce the environmental pollution and increase the number of free parking spaces. To facilitate public acceptance and maximise these goals, innovative pilots will be tested in the peripheral district of Årsta (Stockholm's Living Lab for CIVITAS ECCENTRIC). The focus will be on testing innovative and emerging parking monitoring devices that, if proven successful, can be replicated in other areas included in the Stockholm parking plan, as well as in other European cities.

The City of Stockholm has recently extended the area in which a fee is required for on-street parking. As a result, the city needs to cover a larger area for parking surveillance. To achieve this goal, this measure aims to research, test and evaluate new systems for smart, efficient and accurate parking surveillance, using laser radar and cameras on cruising vehicles. The measure also aims to test systems that guide drivers in Stockholm to currently unoccupied parking spots on the streets in Stockholm, providing live data in a parking app. This leads to more efficient use of available parking, more efficient parking management and thus also less "searching for available parking" - traffic.

2.2.2 Implementation

Key steps

To set up this pilot, the Stockholm Traffic Department launched a procurement of innovation procedure for which suppliers were invited to give innovative suggestions on how to solve the task. A jury from the traffic department selected two out of twelve contributions for a test. The winning contributions use technology from Brickyard (a Dutch company) and Parkling (a German company). Both systems use vehicles cruising the streets gathering data about occupied and available parking spaces along the roads. Data collected by the vehicles is combined in real time and streets with available parking spaces are marked green in an app, developed for this purpose, guiding drivers to streets more likely to have available parking. As the car leaves the parking spot the app reports the spot as available again. Hence the more drivers use the app the more accurate the information.

New technical solutions with a high degree of innovation will be demonstrated by the launch of an 'Innovation Contest'. Solutions such as a cost efficient monitoring tool of multiple parking spaces and smart vehicle detection will be piloted in a real environment. The data generated of parking occupancy will be incorporated into parking applications to visualise available parking spaces operated by the winners of the Innovation Contest. The data from identified parked vehicles will be used to explore an effective parking surveillance

management with the operating parking warden company (APCOA). Results from the demonstration will provide a basis for a possible full-scale implementation and significantly reduce search time, increase parking occupancy and provide experiences from the use of emerging technical equipment in a real life environment.

Relevant milestones were achieved. Planning and procurement has been completed. Planning and demonstration setup are in progress and the preliminary collection of data for the companies to set up a Stockholm (Årsta) database is in progress. This will serve to display the parking space utilisation in a detailed demonstration.

An app has been implemented in cooperation with the parking operator in Årsta (APCOA), which indicates possible parking violations. Vehicle data will also be collected for vehicle occupancy and available parking spaces. Several law studies have been carried out when a legal permit is required for the demonstration with the technical solutions (such as camera surveillance and LIDAR) in the context of the GDPR Act and the new national law on camera surveillance. Through the integration between the Parkling database and the Stockholm City database, a stress test was carried out to confirm that the internal IT environment can cope with new and higher demands on new technologies. The City of Stockholm can easily manage six cars scanning summing up to a scan of 3,000 cars per hour at the same time.

The next steps include the recruitment of a fleet of test drivers as users of the Heat Map application for Parkling and Brickyard car parks. Furthermore, questions have to be defined for the test drivers who will participate in an online survey. On the Scan Cars of the city of Stockholm logos of the city must be attached. In addition, a press event is planned to inform the general public about the project through local newspapers and reporters.

Finally, a migration from the test environment to the operating environment for data exchange between Stockholm and Parkling/Brickyard is planned.

Changes

Some changes occurred during the implementation period. From the beginning there were dynamic parking fees to explore the potential with a new technical solution for parking on the road for identifying parked vehicles and detecting and providing information about the available parking space using a smart phone application. In terms of the procurement process, the Invitation to Tender launched the innovation contest and the winner was announced in February 2018. The first winner was Parkling (http://www.parkling.eu/) with LIDAR and ANPR. Second was Brickyard (https://www.brickyard.eu/se/om-brickyard/nyheter/stockholm-does-more-with-the-brickyard-scan-car/) with its scan car and integration into car park terminals.

Stakeholders involved

Stakeholders involved are the City of Stockholm, Parkling with Agendum and Genetec and Brickyard with APCOA and Flowbird.

Required infrastructure

It requires a digital infrastructure, which is a fully digital parking management system operated by the city. For example, digital parking machines and Applications for iOS and Android for on street parking.

Link to other measures

There is no link to the other measures being implemented in CIVITAS ECCENTRIC.

Timeframe

The first run started in May 2018 and will end February 2019. Both suppliers drive four weeks (eight weeks in total).

2.2.3 Business model and contractual partnerships

Ownership of the measure

The IM property rights and the technical solution are contractually owned by the suppliers. The City of Stockholm owns all data generated from the demonstration. Parkling is used to store non-sensitive data to create and calibrate a reference model for the Årsta area.

The demonstration is the result of the launch of an innovation competition, a rather unusual procurement method for the city of Stockholm.

Formal relationship between the public authority and the industry partner

The industrial partners (Parkling and Brickyard) won the innovation competition (pre-commercial contract award).

Financing

The measure is financed by CIVITAS ECCENTRIC, but is also partly financed internally by the City of Stockholm, and both Parking and Brickyard invest and risk large internal development and market funds to carry out the demonstration.

2.2.4 Critical challenges and success factors

There were challenges related to the legal permits due to the launch of the General Data Protection Regulation and a new camera surveillance law (https://www.regeringen.se/rattsliga-dokument/lagradsremiss/2018/03/ny-kamerabevakningslag/).

This was solved by issuing three different studies which all independently led to the same conclusion.

Another challenge is to attract a critical mass of test drivers for evaluation and to find a variety of drivers by gender, age, etc. The communications department published an article for the local authorities in Årsta and the external and internal website on the Stockholm City Council's homepage. If only a few drivers are found for the test phase of the second round, there will be two more test runs in November 2018 and February 2019.

2.2.5 Lessons learned from implementation/replicability

It has been considered important to publish announcements in the newspaper in order to find test drivers for experiments and to offer them a certain benefit.

In general, it is a good idea to publish information about the test via social media in order to increase user acceptance and public awareness of the subject. At the macro level, national stakeholders should be contacted and involved at an early stage, e.g. when it comes to parking management issues. Before the implementation phase begins, there must also be clarity about the legal possibilities and limits as well as procurement with innovative technical equipment. The integration of IT systems must be tested and validated in advance.

Before implementation, there must be complete political support behind the initiative and the relevant internal resources must be provided. External experts must be available for adaptation and performance testing in critical phases.

As unexpected things happen over and over again during innovative processes, there should be some flexibility with regard to the target and actual status.

2.2.6 Recommendations

It is recommended that the entire parking system should be digitalised. The city's own IT system should be prepared for possible adjustments, taking into account the components resources, time and budget.

An obligation to obtain legal approval is also required due to the employment of a technical solution.

A good and transparent atmosphere is important between both the supplier of technical equipment and the city, as unknown factors have to be identified in an innovation competition.

A static parking database with all city rules for on-street parking is essential for any technical innovation.

2.3 STO 2.5 Transforming parking areas into new green uses

Figure 4: Pop-up recycle station

The aim of the pilot project is to develop recycle stations in order to reduce the need for car traffic for local residents. At a selected site in Årsta a pilot project will be carried out. The use and ownership of cars and parking spaces should be reduced. In the long term, green parking standards will be promoted and sustainable development will be supported, which will contribute to a city worth living in. Available areas should be used efficiently.

2.3.1 Introduction

In 2017 Stockholm Water and Waste started a mobile reuse, a so-called 'pop-up recycling'. Pop-up recycling is a mobile facility that moves around between different locations in a city. In every place, the pop-up stops during a weekend (Saturdays and Sundays between 10am and 4pm). Residents in the area have the opportunity to deliver hazardous waste, portable coarse waste and exchange items with one another in a store section. Part of the purpose of pop-up recycling is to collect hazardous waste and coarse waste from local residents and to reduce waste through reuse.

The specific aim of the CIVITAS ECCENTRIC pilot is to provide a mobility service for users so that they do not have to use their own car when transporting waste or recycling items to such facilities. The service might lead to reduced need of a car in the suburbs of Stockholm and less need of parking space in the housing area. If scaled up, the service might provide a solution to adjust the green and flexible parking requirements, allowing urban space to be used in an optional and greener way instead of for parking.

Stockholm Water and Waste already has a functioning model for pop-up recycling and the purpose of the CIVITAS ECCENTRIC pilot project is to develop and evaluate the model by

providing an environmentally friendly mobility service for the general public when transporting waste to the pop-up recycle park. The pilot project will take place in Årsta as well as in other suburbs close to Stockholm, and will be evaluated thoroughly, as per all ECCENTRIC measures. It is expected that the experience gained in the pilot project will serve as a basis for the expansion and replication of pop-up recycling in Sweden and other EU cities.

2.3.2 Implementation

Key steps

For the pop-up recycling, a pick-up service will be set-up using an environmentally friendly vehicle, which will be procured at the beginning of next year (2019 or 2020?). The idea is that those living in the neighbourhood will be able to request the removal of items they want to send to recycling. The exact design of the service will be defined and further investigated during the project. However a driver, a vehicle and a booking possibility for users will be procured.

The City of Stockholm notifies users in advance to let them know that the pop-up park will appear in their local city centre and that advance reservations for larger items will be possible. The Stockholm Water and Waste Communications Department and the Transport Department will work together to optimise communication.

In-depth interviews with the users in the pop-up window as well as in the nearby local stationery recycling centre will be conducted to understand the needs of users. A protocol of the users using the booking service will also be used for the evaluation.

A survey about citizens who used pop-up recycling in Årsta Torg on 1st and 2nd September was initiated. The results of the survey will form the basis for identifying which service and how the e-cargo bike can/will be used to/from the pop-up recycling station. In practice, this could be the purchase of a new cargo bike or an electric golf car with a small trailer.

Changes

The former intention of evaluating the impact of the new parking policy on green and flexible parking standards was replaced. The reason for this is that very few apartments have followed the new guidelines and another national project will evaluate these apartments. In addition, as CIVITAS ECCENTRIC is a demonstration project, there is preference to carry out a practical demonstration rather than update a written guideline. In order to gain new insights of European interest, the project has been transformed into a practical demonstration in a real environment. The measure is a unique collaboration in which Stockholm's Water and Waste management and transport administration manage environmentally friendly transport to and from pop-up recycling facilities.

Stakeholders involved

Stakeholders involved are the City of Stockholm (Traffic administration and Stockholm Water and Waste), a procured supplier of mobility service, Royal Institute of Technology and Sweco (Consultants) as well as local users.

Required infrastructure

In terms of physical infrastructure, a suitable site in the city centre, two containers of six square metres each, a large crane truck for placing the containers and a 12-tonne distribution truck transporting waste and recycling goods to the nearby Stockholm terminal are required. In addition, an environmentally friendly vehicle (bicycle, golf car or similar) is needed.

Link to other measures

There is no link to other measures.

Timeframe

In autumn 2017, pop-up recycling was carried out at around 10 locations in the Stockholm suburbs over a weekend. During the measure, pop-up recycling will be carried out several times in spring 2019 to facilitate access for local residents. The frequency of on-site pop-up recycling will be decided in January 2019, but the first pop-up recycling park will start on 6 and 7 April 2019.Business model and contractual partnerships.

Ownership of the measure

Stockholm Water and Waste has the monopoly to dispose waste and hazardous waste. The transport administration is responsible for the management of transport to/from the pop-up recycling park. Full pop-up recycling will be a unique cooperation between the authorities mentioned above. A supplier of environmentally friendly vehicles will be procured in early 2019.

Formal relationship between the public authority and the industry partner.

The necessary equipment for the measure is procured directly and, beyond that, there is no link to an industrial partner.

Financing

CIVITAS ECCENTRIC will cover the costs for the mobility service and the additional personnel due to increased goods in the pop-up recycling park. Stockholm Water and Waste will cover all other costs related to the operation and planning of the pop-up recycling park.

2.3.3 Critical challenges and success factors

Since the CIVITAS ECCENTRIC project offers a mobility service, the pop-up recycling park is facing new challenges: more users have access to the park by using the mobility service or booking the disposal of waste or other objects.

It is possible that more waste will have to be transported into the facility and additional workload and space for more waste (than expected/planned) in the park will have to be considered. Due to space limitations, it is not possible to use larger containers, so the truck that transports recycled items could be used more frequently to the main loading centre in Stockholm.

The CIVITAS ECCENTRIC project will also offer the possibility (if approved) of transporting larger objects than those currently permitted for pop-ups. Today only the size of a chair is allowed - maximum. But in Stockholm, many multi-family houses no longer have space to accommodate large waste products such as sofas, beds, etc.

There is consequently a need to transport larger quantities of waste. This option is made available to users via the reservation service. The consequence for the park is that not only more objects are transported into the park, but also larger objects. It is planned to store these items on the nearby truck when it rains or to close the container when the weather is fine.

The target is to facilitate the transport of waste and furniture for people without the use of cars. The challenge is to avoid transport by car. If the CIVITAS ECCENTRIC project is successful in the evaluation, the mobility service can be used by Stockholm Water and Waste in the coming years.

2.3.4 Lessons learned from implementation/replicability

The city must have ambitious plans to recycle waste as a service for its citizens. Since this requires collaboration between different departments, the key is communication and enough time to plan ideas and integrate them into different departments. The affected citizens should also be contacted and informed about which wastes can be transported and recycled and where the pop-up park is located.

2.3.5 Recommendations

The geographical areas where the containers are physically placed must be well chosen. This can be a local city centre or a square. It must be possible to drive a large crane truck with sufficient space to support the truck when parking the containers. In addition, the areas must be safe for the employees of the pop-up park and a 12 tonne truck must have direct access to the container.

2.4 RUS 2.6 Park & Ride system in a peripheral district

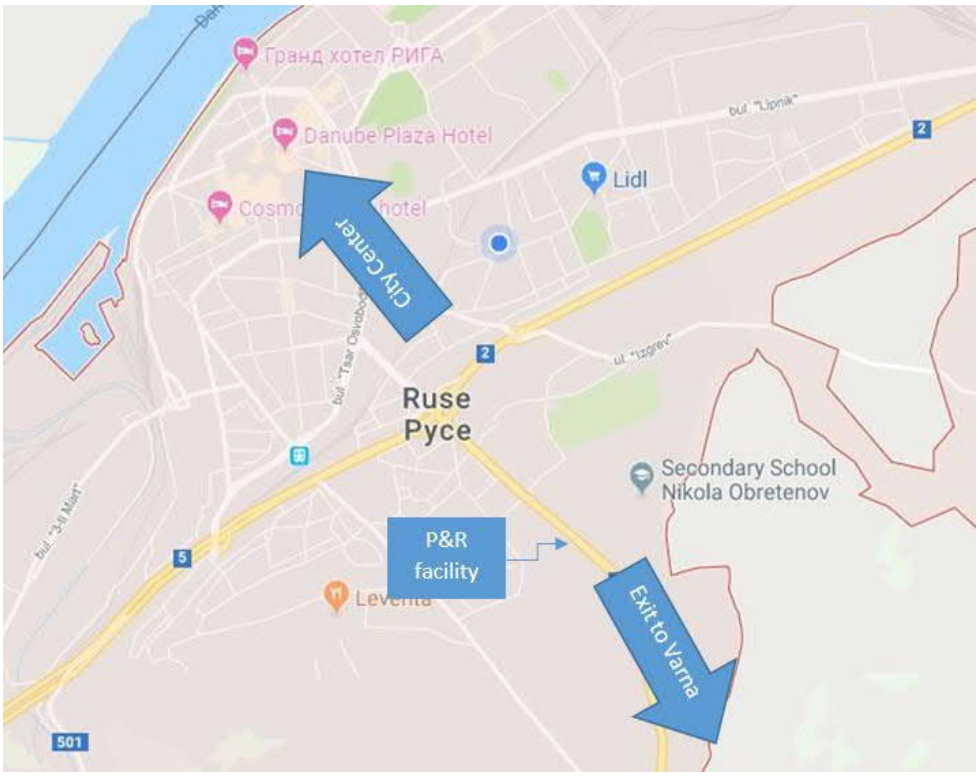

Figure 5: Location of the P&R facility in Ruse

This measure describes the implementation of a Park & Ride (P&R) scheme in the Druzhba district, in the City of Ruse. Druzhba is Ruse's 'living lab' (or demonstration/pilot area) in CIVITAS ECCENTRIC, and one of the entrances to the city centre with high volumes of traffic. This district is currently affected by high traffic volumes, and public space has deteriorated greatly due to the high number of cars parked on the streets occupying various public areas.

2.4.1 Introduction

The ultimate goal of the measure is to promote a modal shift towards public transport, and other active modes of mobility, by reducing the needs (of commuters and other users) to individually occupy cars for their regular trips to the city centre. The development of a P&R facility will allow an easy connection to public transport services and will relieve road congestion along the routes regularly taken from Druzhba to the city centre. The measure will also help to reduce the number of cars parked on the streets and public spaces in the city centre.

2.4.2 Implementation

Key Steps

The implementation of this measure involved the following steps:

- First, an identification and selection of a suitable location for the P&R station took place.
- Then the car park was designed (41 parking spaces, four of them for disabled persons).
- The connection of the car park to public transport (trolleybuses and/or buses) was also taken into account. At the moment there are negotiations with an external contractor about the technical solution for the barrier at the entrance of the plant and the payment system.

Currently the parking is free-of-charge, as its construction was finalised in January and a decision by the Municipal Council's decision on the price for the service is not yet taken.

Thereafter the service will be fee-based. A final decision has not yet taken, but the price will most probably be 2.50 BGN – which will include the price for two one-way tickets for a single person and 24-hour stay of the vehicle in the parking facility. The service is expected to be launched in the beginning of 2019.

During the research and planning phase, a survey was carried out to identify mobility habits in the three districts of the Druzhba district. After evaluating the results, the municipality identified the potential locations for the P&R facilities and developed the technical specifications for the implementation of the P&R system. A contractor was chosen after a selection procedure.

Changes

There were no changes from the original plan.

Stakeholders involved

Several stakeholder groups were involved during the research and planning phases and the actual implementation of the measure. Residents in the Druzhba district were involved through surveys and interviews to help identify their mobility habits and requirements/suggestions for the location of the new facility. The Transport and Spatial Planning departments in Ruse Municipality were also involved in defining the location of the P&R facility. Experts in the field of P&R systems and the public transport service providers were engaged for discussing the possibilities for integration of the P&R service with the city's general public transport service. In addition, external contractors were involved for the design and construction of the P&R facility.

Required infrastructure

Negotiations are currently taking place with an external contractor on the technical solution for the barrier at the entrance to the facility and the payment system.

Link to other measures

Being situated in Druzhba, the success of the P&R scheme strongly relies on the successful realisation of the following CIVITAS ECCENTRIC measures Ruse is implementing:

- RUS 4.3 and 4.4, 'Providing Secure Pedestrian Crossings' and 'Safe pavements with cycle paths toward the city centre', two measures which envisage the construction of safe crossings and pavements leading to the city centre;
- RUS 5.3 'Analysis of public transport demand and reorganisation of the network in Druzhba': The achievement of the new facility's objectives also depends heavily on the implementation of Measure 5.3, which reorganises public transport (buses and trolleybuses) in Druzhba to better meet the needs of residents, commuters and visitors to the city;
- RUS 5.4 'Introduction of 'Good Night' Line to Druzhba': Introduction of the new bus night line servicing Druzhba and the city centre will further complement the services of the P&R facility.

Timeframe

The development and implementation of the P&R system will take a little more than two years (including the research and planning phase, the tendering procedures, the construction of the facility and the actual launch as a P&R system).

2.4.3 Business model and contractual partnerships

Ownership of the measure

The owner of the measure is the municipality of Ruse. One of the plans for the implementation of the measure is that the newly built Park & Ride facility will initially be freely accessible to citizens and commuters, not only for public transport users, but also for other active means of transport - walking, cycling, etc. - and also for advertising purposes. After that, the service will have to be paid and connected to the public trolleybus servicing the city (the company is owned by the municipality of Ruse).

Formal relationship between the public authority and the industry partner

The formal relationship between the public authority and the industry partner (chosen company for the design and construction of the P&R facility) is Contractor - Subcontractor.

Financing

The measure is financed by CIVITAS ECCENTRIC and has a total budget of € 127,032 (€ 67,500 for the municipality of Ruse and € 21,814 for CSDCS).

2.4.4 Critical challenges and success factors

The central challenge in this measure was the identification and selection of a suitable location for the P&R system. It was not an easy task to find a suitable location because there were not so many vacancies, close to the entrance of the city, with a good connection to public transport and large enough to serve as a P&R facility.

This problem was solved by a detailed analysis of the territory of the Druzhba district laboratory area. In addition, this question has been discussed at meetings and information events with representatives of citizens living in the district and experts from the field of parking management. As a result, the best site for the facility has been identified meeting the criteria above.

2.4.5 Lessons learned from implementation/replicability

If other cities are considering replicating the measure, the area in which a P&R facility should be located needs to be analysed carefully so that it can operate as initially planned.

It is also very useful to discuss the issue with the residents of the district, as people sometimes have the best ideas and can give good advice to find the best solutions that will be better accepted later by the community and that meet their needs.

2.4.6 Recommendations

Citizens should be involved in the implementation of such measures. Participation is expected to increase the acceptance and use of the P&R system, as citizens already have knowledge about the measure and have been directly involved in details of its implementation.

3 Lessons learned from implementation

The measures described here use new parking policies and innovative approaches such as pop-up recycling to facilitate the decision not to use one's own car, especially in areas with little parking space, such as inner cities, but also residential areas.

In measure 2.3 several approaches are tested which are intended to encourage individuals to choose not to use their own car - for example HOV parking. This is a very interesting measure, because so far only HOV lanes are well known and there is no experience with the implementation and effect of HOV parking. Measure 2.3 has set itself many goals at once, which are very ambitious. In order to complete the planning, implementation and demonstration within one project period, it is therefore recommended to consider prioritising the goals and, if necessary, to focus on one or a few goals. It is important to think of a correspondingly larger test field during the planning phase and to include this in the planning - because this shows that the system should be tested on a larger cross-company parking lot in order to be able to better evaluate the impact and in the best case a later replication or upscaling. One could conclude for other planning phases that implement this measure: "think big!"

Measure 2.4 aims to detect empty parking spaces by scanning and to inform drivers in order to make more efficient use of parking spaces available. This is an ambitious goal, which must also cover legal issues due to the detection of vehicles. This shows that the planning and implementation of a measure must not be one-dimensional, it is necessary to consider technical, legal and logistical issues.

Measure 2.5 explores a new approach for waste management with pop-up recycling schemes. This measure is to be seen as a component in the series of reasons for the ownership or use of one's own car. There is still a lot to be learned about the mobility behavior of users. For example, which means of transport is appropriate for specific objects in order to be able to manage the transport from home to pop-up without a private car.

Measure 2.6, Park and Ride, is still quite new for Bulgaria. A careful analysis of the right location and its traffic impact must be carried out in advance in order to achieve a successful outcome. Here too, communication of the measure to the general public is essential. Positive factors, such as comfort, simplicity, economy or time saving for users must be analysed, measured and communicated in order to attract potential users the Park and Ride scheme.

In summary, it is important to consider the following aspects:

3.1 HOV parking and integration into a company’s mobility management system

The most important thing here is careful site planning, as measure 2.3 for Smart Parking shows for the positive discrimination of HOVs. Locations should be identified where journeys typically end which represent a destination for several people at the same time. This works very well, for example, with larger employers/companies who may require shift work.

The integration of positively discriminated parking into a holistic mobility concept of a company appears to make sense. Measure 2.9 (Deliverable 2.3) is also currently considering whether parking space management for cars in companies in which employee have joined on the way to work is an attractive reward that leads to the increased formation of them.

In contrast to measure 2.9, however, no technologically complex detection of the HOVs is considered, but rather a check of the license plates of the cars that have started as a shared car on the respective day through the integration by an online solution, which accordingly transmits the license plate.

3.2 Technological development and legal aspects

Legal aspects must also be taken into account. In times of Big Data and IoT, the amount of data collected and processed is growing ubiquitously. The General Data Protection Regulation was already published in May 2016. In contrast to the previous directive, it is an European level regulation and does not have to be implemented in the EU Member States through a patchwork of national laws.

The aim is to establish a uniform level of protection for the personal data of its citizens across the EU. Measure 2.4 was confronted with the problem that parking space surveillance by cameras is used to film arriving cars. In order to clarify whether this type of surveillance of public space can be problematic, one had to familiarise oneself with the current legal situation beforehand. Several legal studies were carried out to determine when legal approval is required for the demonstration of technical solutions (such as camera surveillance and LIDAR) under the GDPR Act, and the new national law on camera surveillance.

The fact that legal development sometimes lags behind rapid technological development must always be taken into account when new measures are implemented.

3.3 Advertising new measures to potential users

How can you use a new fact if you don't know about it? The problem of informing potential users in a targeted and motivating way about a new mobility solution is faced by all the measures in this work package.

The respective communication includes the communication of innovations in simple, understandable messages. For example, through linguistic and visual translation, as well as through the application of storytelling or campaigning. In the respective measures, the focus was primarily on the measure itself; now, between implementation and demonstration, everyone is faced with the question of how the measure should be communicated.

Communication of new measures should ideally be considered at an early stage during the measure’s planning phase. If the project group does not have the capacity for a communicative launch moment, the engagement of an external agency for the launch communication can be considered.

When it becomes clear after a while that the target group's reach - the interaction on social media channels and the tonality of reporting leave something to be desired in view of the goals that have been set - there should be a Plan B that has already been anticipated in the context of probable and improbable development scenarios.

4 Conclusions and Next Steps

The measures are ultimately all quite different for the purpose of drawing standard conclusions. It turns out, however, that communication about what is happening in the respective laboratory area is necessary and important to inform about the advantages of the use of the respective measure in order to generate ultimate sustainable number of users, which can be eventually quantified as a traffic effect.

In the measures described above, the work is being intensively pushed forward and continued.

The next project phase will focus on demonstration tasks, which include the following activities for each measure:

2.3 City of Madrid Parking management with high occupancy criteria	• The system will be tested and the demonstration phase will be initiated in the first quarter of 2019. • The second data collection on parking use is planned for June 2019.
2.4 City of Stockholm Smart occupancy and clean on street parking	• The demonstration phase will continue in November 2018 and February 2019 to test the technical solutions under different weather conditions. • Activities will be launched to attract a growing number of test drivers for Test Run 3. • The city of Helsinki in August initiated the purchase of a scanner car in the city for two years in order to replicate the measure.
2.5 City of Stockholm Flexible and green parking standards	• Purchasing environmentally friendly means of transport. • Provide the mobility service for local residents in the direct neighborhood of the mobile recycling station.
2.6 City of Ruse, CSDCS Park & Ride in the peripheral district	• Introduce the new service as soon as possible and implement promotional measures to encourage citizens to use it. • If the measure turns out to be a success, there are plans to expand it and introduce it in other parts of the city.