ULaaDS

URBAN LOGISTICS AS AN ON-DEMAND SERVICE

ULaaDS Bremen

Lessons learnt and outlook to the future

15/11/2023 (Barcelona)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833

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The setup for the trials

- three distinct trials
- Covid lockdown had severe impacts:
  - On setting ULaaDS trials
  - Increase e-commerce and related delivery volume
  - Shift of labour force to logistics operators
  - Accelerated problems for local shopping / re-defining city centres

Containerised last mile delivery by Rytle cargo bikes

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Insights from trial

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Existing trial uptake

City support (funding)

Project methodology

Within or because of ULaaDS, …

- Bremen trial 1 proved that general cargo (averaging 65 kg per shipment, i.e. twice the CEP weight limit!) can also be delivered successfully by (heavy) cargo bikes, marking a first / USP

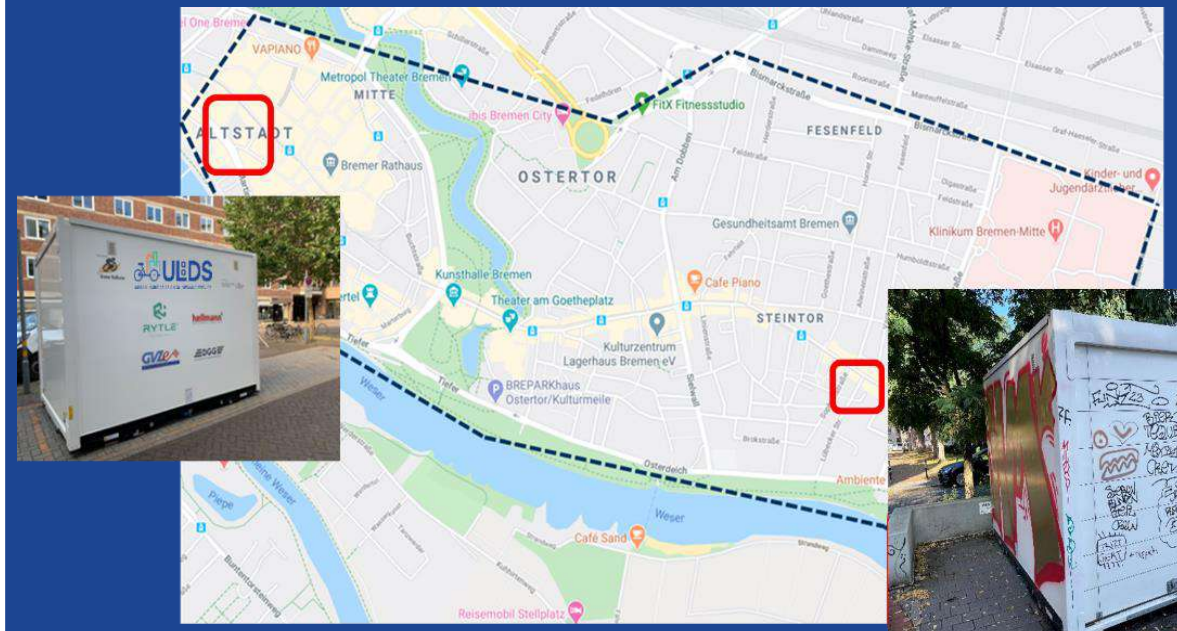
2022	Number of shipments / packages	Total weight (kg)	Number of operating days	Shipments / packages per day	Average weight (kg)
January	92	5.432	15	6	59,0
February	112	8.155	20	6	72,8
March	193	14.040	23	8	72,7
April	110	7.425	19	6	67,5
May	952	11.872	21	45	12,5
June	1.050	10.864	21	50	10,3

Within or because of ULaaDS, …

- a second site for a micro-hub was found and operated for several months (also collecting data), but had to be terminated due to lack of critical mass (business case)

BUT

- an additional micro-hub at the site of the first one was added as a specialized CEP service could be won to join the team (without receiving public funding!)



Within or because of ULaaDS, …

- a local urban logistics community formed
- encompassing the various stakeholders (municipal institutions, shipping companies, CEP service providers, shop-owners, associations, …) and
- (steadily) building up momentum for urban logistics needs

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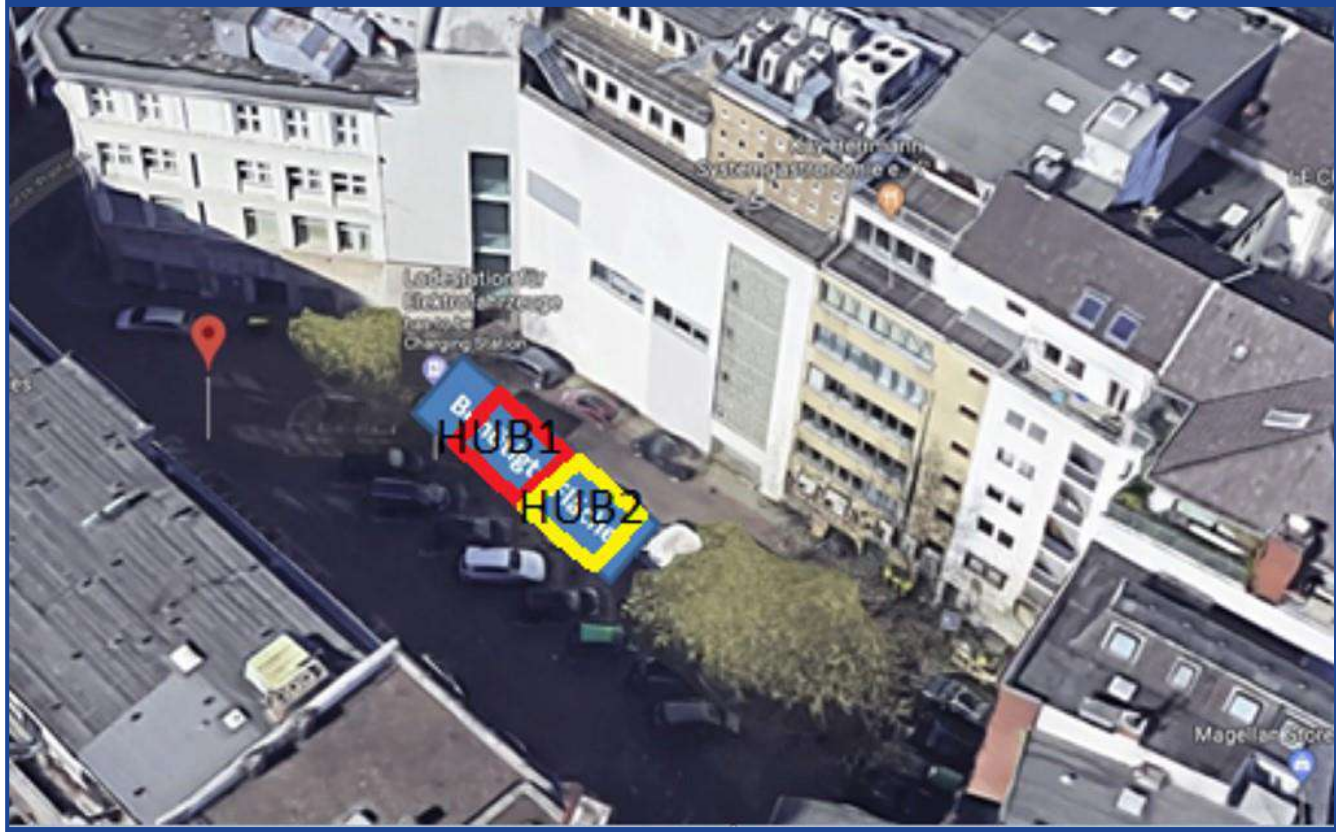
After ULaaDS

- the trial continues without public/ULaaDS funding, involving shipping companies, CEP providers and local bike couriers
- with the permit to operate on these grounds just renewed
- the search for additional sites and partners continues



Within or because of ULaaDS, …

- Insight that there are (unforeseen) barriers that made an adaptation of the trial necessary:
- Organisational (e.g. who brings transport items to vehicle / to recepient? – limitations of drivers)
- Practical (e.g. additional time needed)
- Legal (how to deal with subsidised on-demand passenger sercives)
- …

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Insights from trial

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Efficiency of different cargo-hitching models

Operational limitations of cargohitching

Importance and impact of location selection

Cargohitching with Via (ViaVan)

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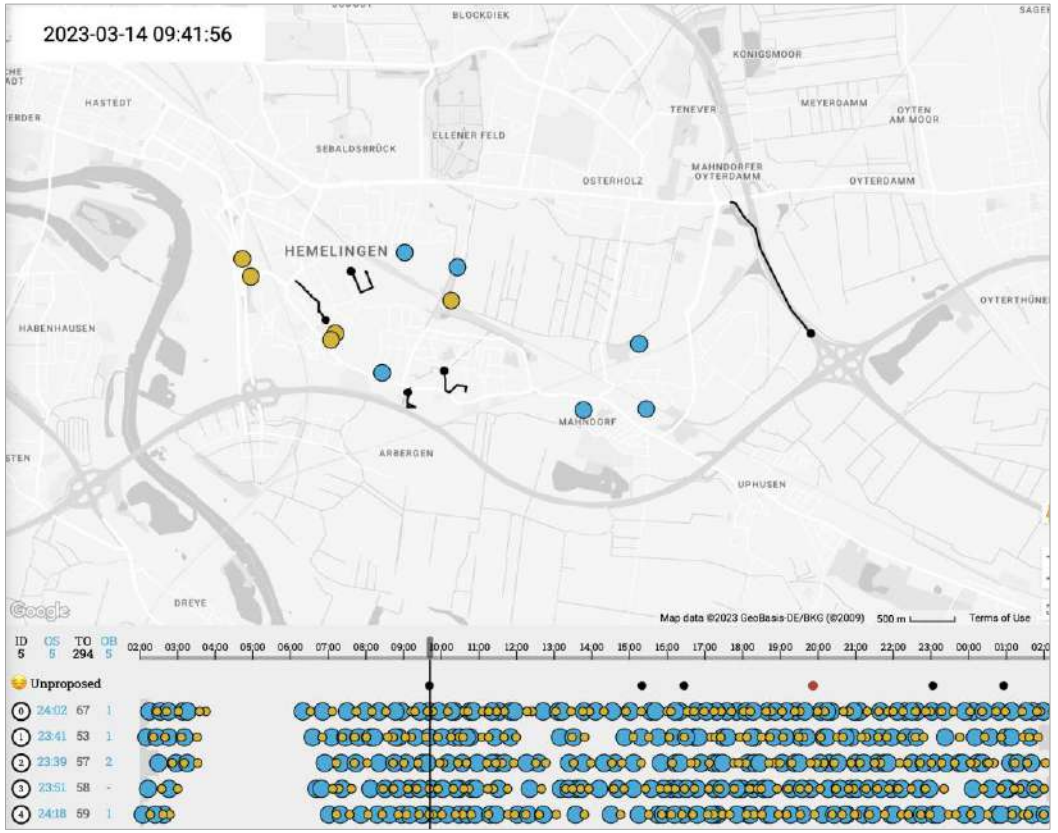
ViaVan (ridesharing) ran a virtual trial on different models of **combined passenger and parcel transport** in a residential area in Bremen.



After ULaaDS

- there is a long list of lessons learned
- the allure of cargo-hitching remains, but expectations are now viewed more realistically
- potential applications and use cases (e.g. cargo tram) will be observed and weighed carefully
- no easy-to-apply tech solutions

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5. Lessons Learned

While many sections of this document cover Via's learnings during this digital pilot, the points below are the most impactful high-level takeaways:

- **Cargohitching increases the efficiency of both passenger-only and cargo-only on-demand services** - but this efficiency is largely due to a greater total number of trips rather than an inherent benefit of cargohitching. Any increase in trips would lead to greater aggregation - putting additional marketing efforts into a standalone passenger-only or cargo-only service could have similar impacts on utilization without the added complexity of a commingled service. Adjusting parameters to allow for more trip sharing can further increase efficiency.
- **Cargohitching yields a reduction in greenhouse gas emissions**, but the reduction can be less than one ton of CO2 depending on the service model and size of the service. The larger the volume of passengers and packages, the greater the reduction in emissions.
- **The cargohitching model has a meaningful impact on service finances**. Combining high levels of passenger and package demand increased the cost compared to running two separate services, because packages alone can be delivered with a lower-cost model than passengers. However, a cargohitching model where package delivery only occurs during off-peak hours of a passenger service can yield a meaningful cost reduction compared to running both services separately.
- **It is difficult to optimize for both passenger and cargo transport; usually one will need to be prioritized**. The logistics experts we spoke to, as well as representatives from the freight village, all indicated that cargo transport is complex to optimize and requires bespoke approaches focused on the specifics of a service, whether it be hub-to-destination or in-neighborhood on-demand cargo transport. Optimizing would be most effective if packages and passengers have peak demands at different times, or if packages can be delivered at any time during the course of the day.
- **It is vital to conduct due diligence on location and potential demand** prior to implementation, especially in environments that an operator is less familiar with. The initial industrial park physical pilot and the freight village digital pilot did not proceed because of the complexity and lack of need for a cargohitching service in this type of environment.

Private micro-logistics by ADFC's cargobike-sharing

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Cargo bikes for private use by individuals, to reduce car trips

Insights from trial

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Existing trial uptake

Business model: social value vs financial cost

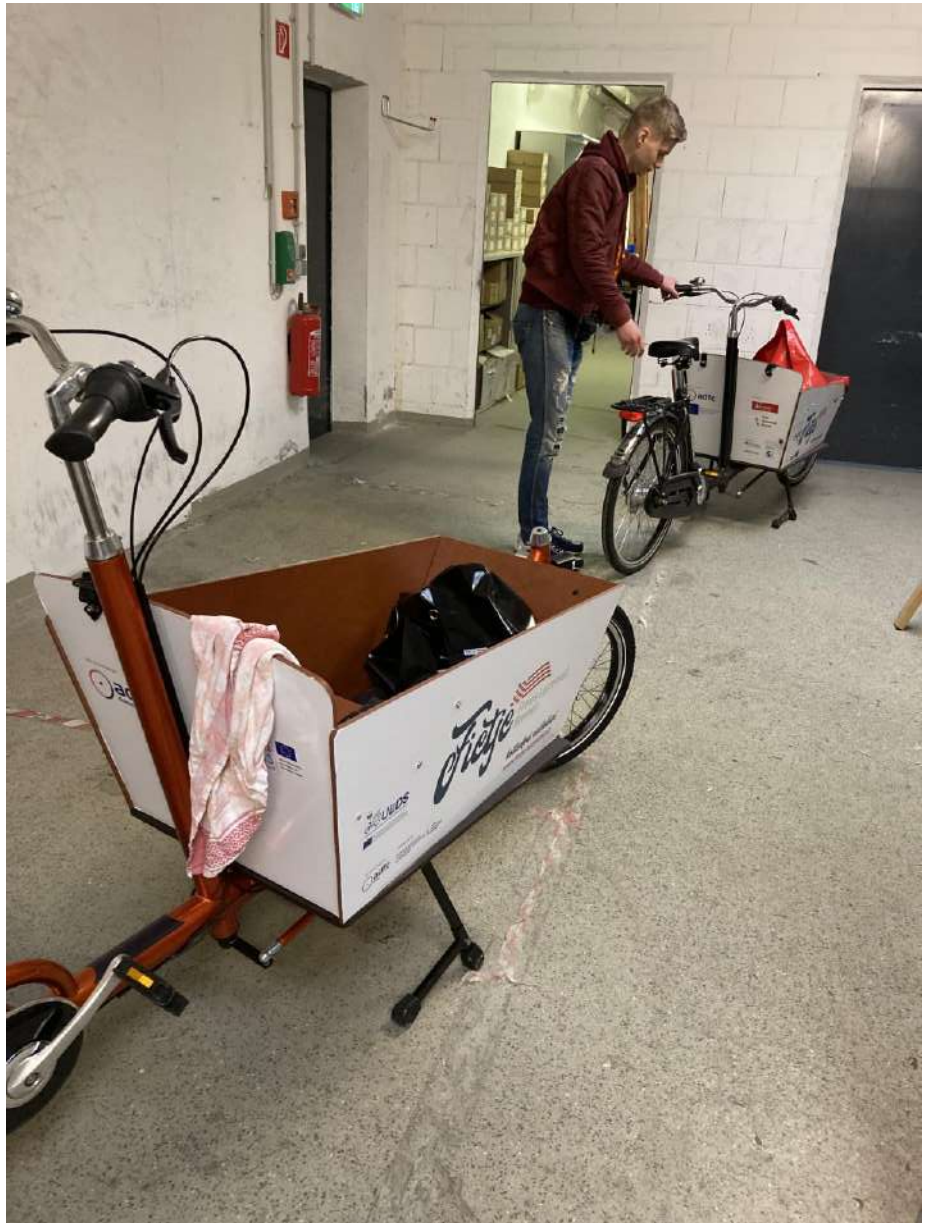
Survey results: positive impact

Within or because of ULaaDS, …

- Demonstrated demand for shared cargo bikes in more peripheral (and more car-focussed) neighbourhoods

Within or because of ULaaDS, …

- Maintenance and repairs as an ongoing cost and challenge
- The logistics of managing a growing fleet of cargo bikes



Within or because of ULaaDS, …

- Reduced need for car trips (and car ownership)

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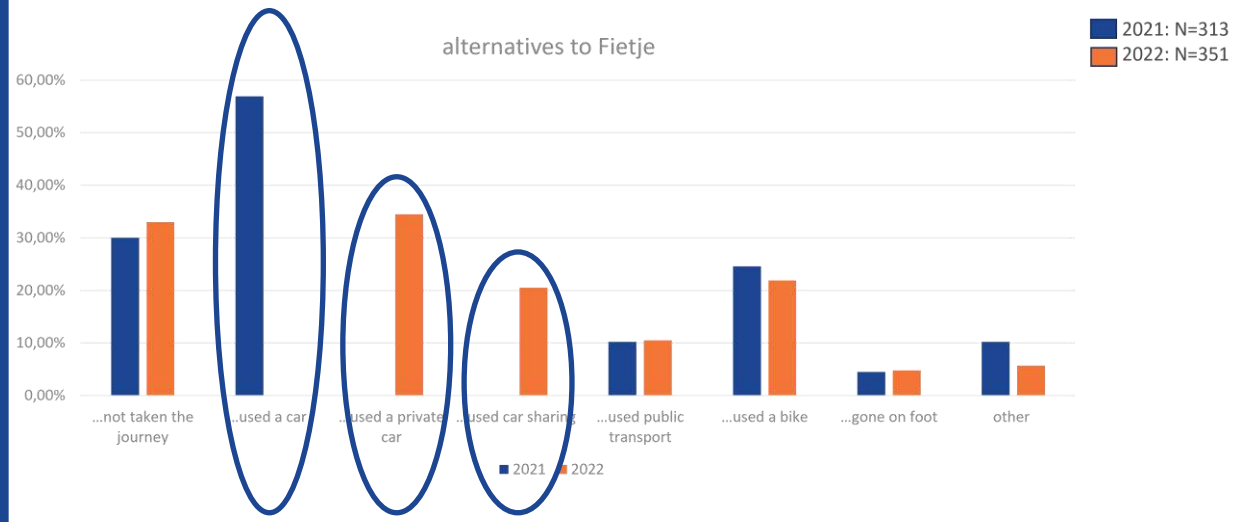
Survey: Without Fietje, I would have…



After ULaaDS

- Confirmation of the ambition to add more shared cargo bikes in more (and more diverse) neighbourhoods…
- Continuation of Bremen Cargobike Roundtable (initiated during the project), with stakeholders meeting regularly
- Annual Cargo BIKE IT! Festival
- Ongoing discussion about the cost of a shared cargo bike system and its contribution to achieving public goals

In summary: the ULaaDS legacy

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- Awareness for needs of urban logistics raised substantially
- Resulting in newly-created position of Manager Urban Logistics
- Cycle-friendliness found a pre-condition for use of cargo bikes
- Research insights from barriers, deviations, …
- Trials sometimes not as easy as thought (e.g. cargo-hitching)
- SULP is not SUMP – but even more complex
- Highly competitive market players – requiring careful (non-discriminatory) interventions of the public sector

Thank you!

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Groningen in the spotlight

Sjouke van der Vlugt
Jeroen Berends
Jacky van Geffen

City of Groningen

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833

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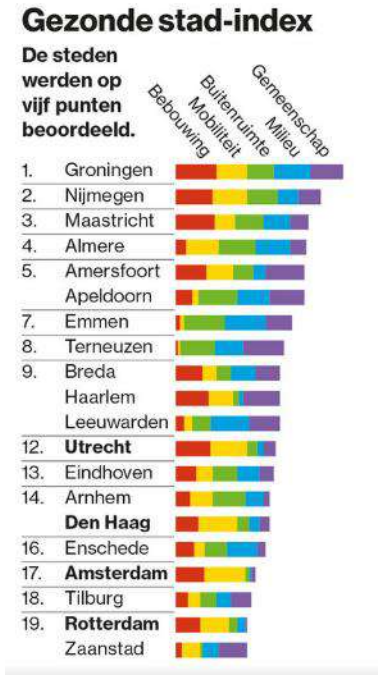
About Groningen

Population 2022	235.000
Population 2035	250.000
Daily Urban System	500.000
Jobs	140.000
Students	60.000
Of which internationals	8.000
Average age	36.4 years



#Green City
#Happy City
#Healthy City

40 years tradition of compact city

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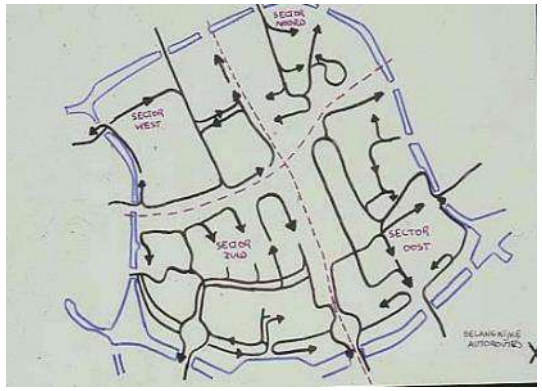
1977
Trafic circulation plan



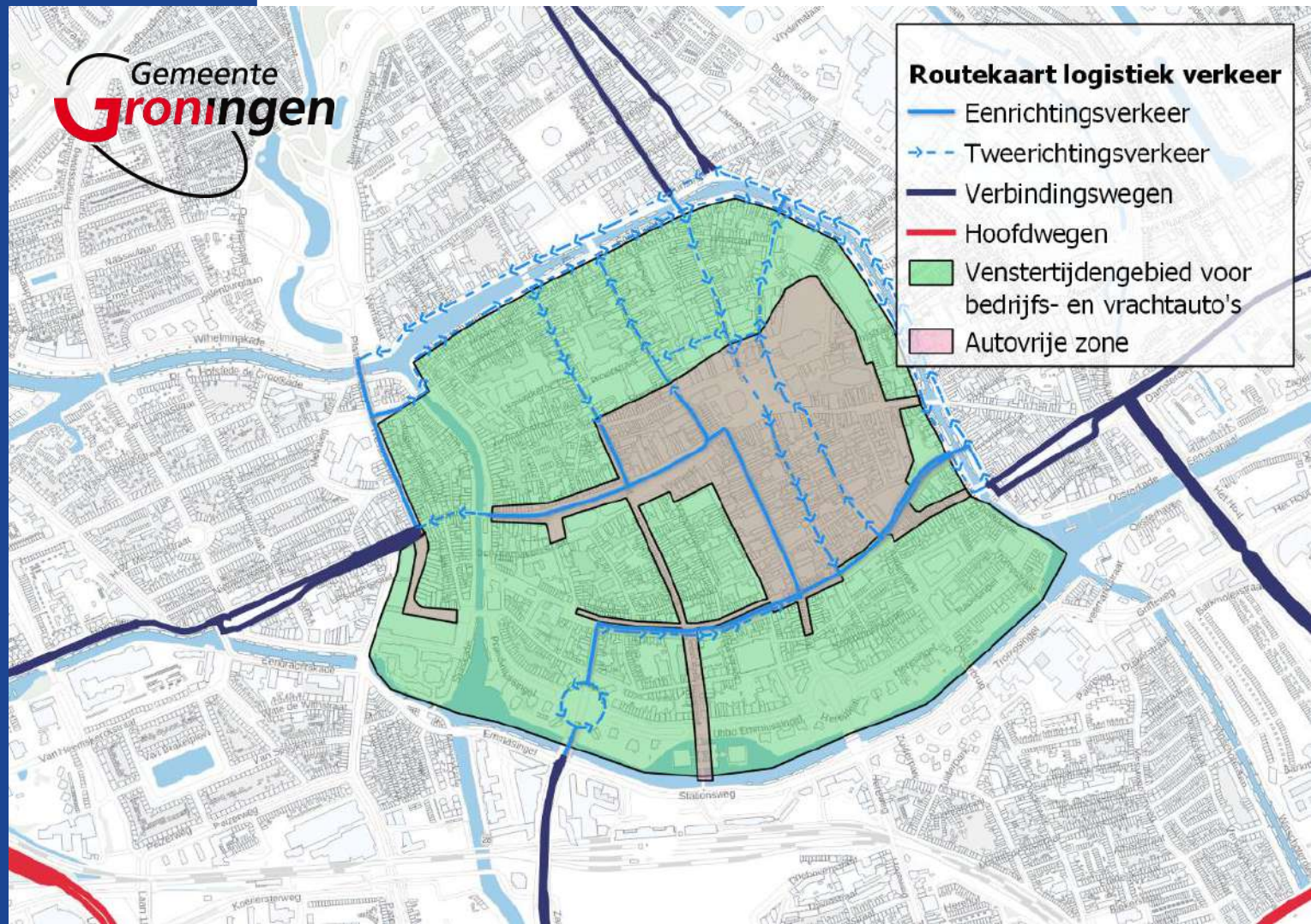
1996
Space for Space

2016
Space for YOU

Sustainable Urban Logistics Plan 2021

1. 2023: Enlarging area with time frame for deliveries
2. 2023: ANPR-camera's
3. 2023: New UVAR – exemption policy

4. 2025: ZE-zone for logistics



ULaaDS Trial 1
Inner city trial

Initial setup

In Trial 1, the municipality of Groningen (GRO) and the Groningen City Club (GCC) organize the development, implementation, and promotion of a platform that enables local shopkeepers and other entrepreneurs with access to different types of shared zero-emission vehicles.

Local Fora

- Meetings with shopkeepers
- Interviews - RUG
- Selection vehicle provider
- Requirements vehicles

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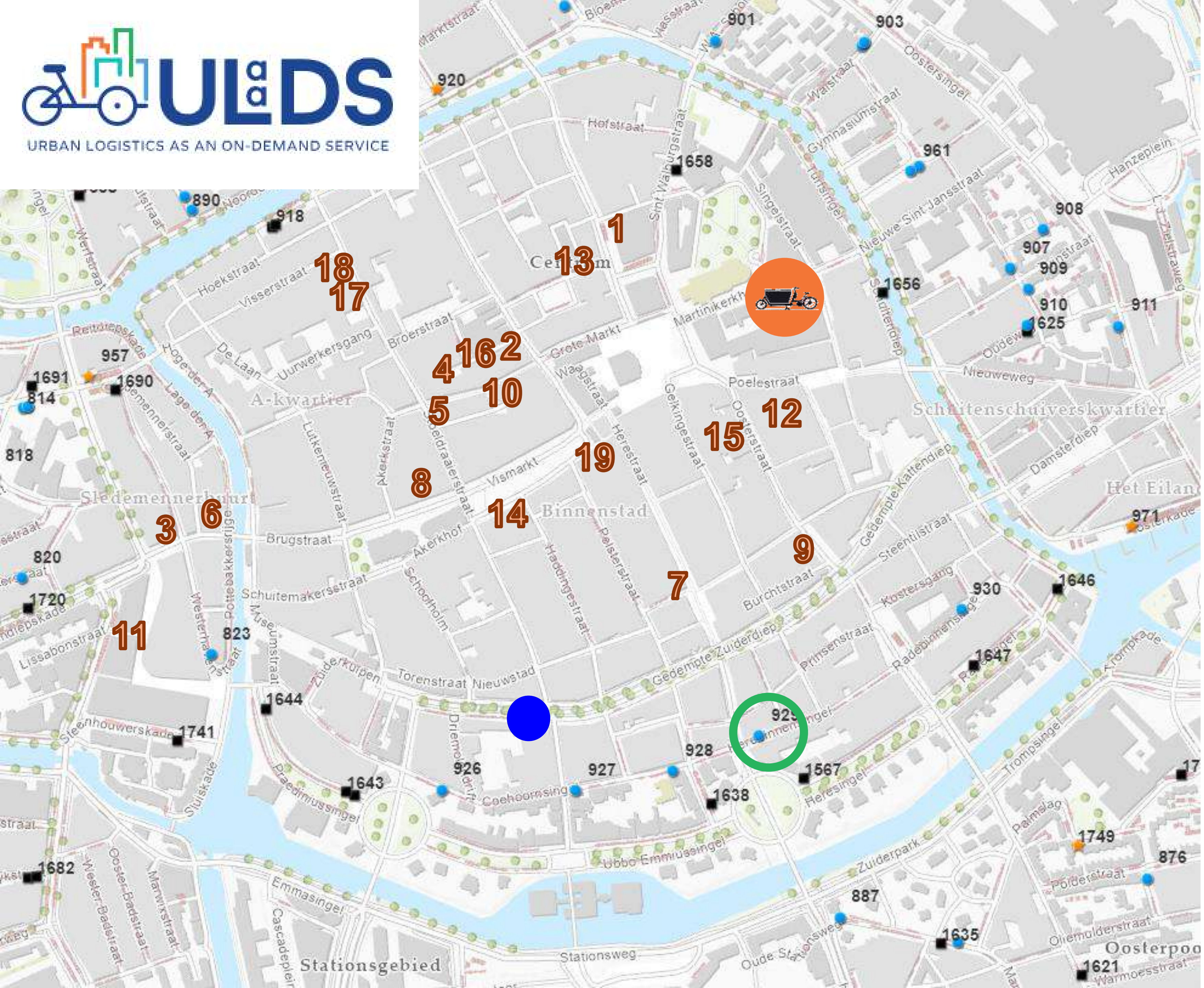
Location selection



Status van de laadpalen

- Mogelijke laadpaal
- Laadpaal in ontwikkeling
- Bestaande laadpaal

1	Boekhandel Godert Walter
2	Cledingraad Herenmode
3	De Roemer
4	Diezijner
5	Flokstra
6	Groninger Kaasboetiek
7	Jullens Bakkerij
8	Junior Shop Groningen
9	Kaashandel van der Leij
10	Kaaskop
11	Kaldi Koffie
12	Kokotoko
13	Laif & Nuver
14	Liatelier
15	Mary Jane
16	Musjes
17	Stadsakker
18	Wirwar
19	WAAR

Trialing

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Business and operating model

URBAN LOGISTICS AS AN ON-DEMAND SERVICE

<table>
<tr><td colspan="5">Mission statement: To pool zero-emission vehicles and freight flows of multiple local shopkeepers and entrepreneurs</td></tr>
<tr><td rowspan="2">Key partnerships:
1. Vehicle provider
2. Platform provider
3. Local authorities</td><td>Key activities:
1. Provide an overview of where and when vehicles are available
2. Facilitate the reservation of vehicles</td><td rowspan="3">Value proposition:
1. To enable the use of shared, zero-emission vehicles
2. Familiarize local shopkeepers with the use of zero-emission vehicles
3. Ensure that local shopkeepers and entrepreneurs keep having access to the inner city.</td><td>Buy-in & support:
1. Local shopkeepers and entrepreneurs that need a vehicle for urban freight flows</td><td rowspan="2">Beneficiaries:
1. Local shopkeepers who keep having broad access to the city
2. Citizens and other people staying in the city benefit from improved efficiency (e.g., less vehicles, fewer buildings for logistics)
3. Platform/vehicle provider who will obtain a new business model</td></tr>
<tr><td>Key infrastructure and resources:
1. Zero-emission vehicles
2. Infrastructure for parking the vehicles
3. Platform for checking vehicle availability and booking</td><td>Deployment:
1. Find entity that provides the vehicles
2. Find entity that provides the platform
3. Identify locations for parking the vehicles</td></tr>
<tr><td colspan="2">Budget costs:
1. Cost involved with the use of the vehicles
2. Cost involved with developing the platform
3. Transaction cost involved with the reservation system</td><td colspan="2">Revenue streams:
1. Fee for using the vehicles
2. Membership fee for access to the platform
3. Advertisement</td></tr>
<tr><td colspan="2">Environmental costs:
1. Energy for operating the vehicles
2. Energy for infrastructure changes
3. Energy for operating platform</td><td colspan="2">Environmental benefits:
1. Reduced greenhouse gas emissions from the use of zero-emission, rather than traditional vehicles
2. Reduced greenhouse gas emissions from better utilization of vehicles</td></tr>
<tr><td colspan="2">Social risks:
1. Not all shopkeepers and entrepreneurs may benefit from the use of the shared vehicles and may lose access to the city as a result
2. Vehicles use public space, which may result in less space for other social activities</td><td colspan="2">Social benefits:
1. A reduced number of vehicles operating in the city
2. More compliance with rules and regulations due to unlocking of up-to-date information directly to logistics providers</td></tr>
</table>

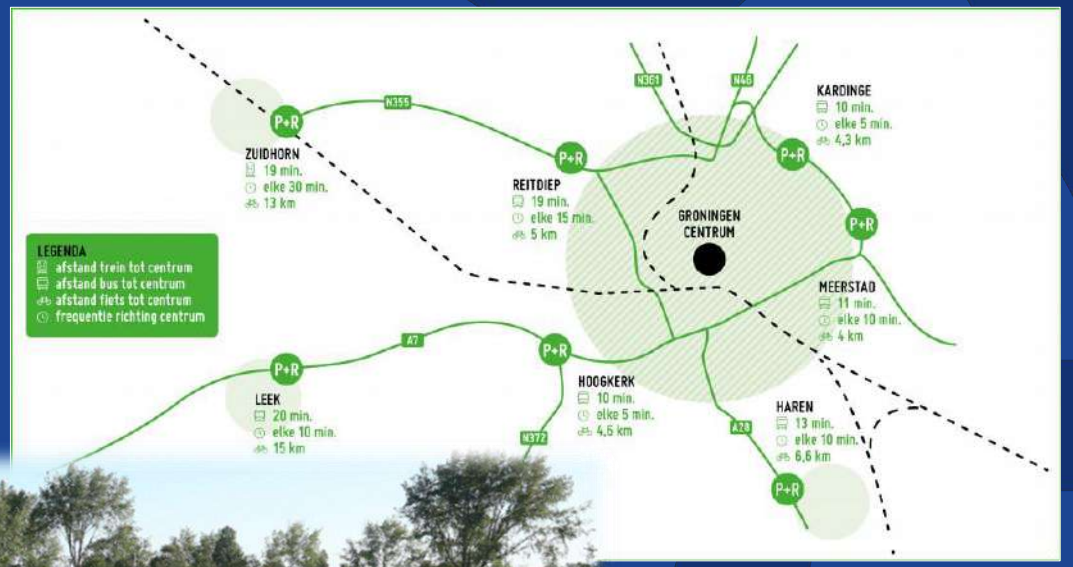
Lessons from GCC

- involvement of entrepreneurs
- ambiguity in the beginning about the end product
- several meetings helped to connect the entrepreneurs
- EV vehicles will become important as regulations are introduced
- it is positive that several vehicles could be tested
- the process took a very long time for the entrepreneurs
- connection of the university is positive
- inspiration from other cities

Next steps

- As of November 1 2023, vehicles and platform provider Century is switched to a ULaaDS follow-up model with payment by entrepreneurs.
- Working on a joint plan for scaling up the number of vehicles.
  - Century
  - GCC
  - RUG
  - City of Groningen
- ULaaDS trial 1 will therefore continue to exist.

Trial 2:
urban logistics as a service for commuters at park & ride



Initial setup

- Trial 2 was intended to add a logistics service to a P+R area on the outskirts of Groningen. Many commuters travel to the P+Rs around Groningen every day. The aim of this was to develop an attractive service for commuters and to make logistics more sustainable by reducing and replacing the driven transport kilometres.

Local Fora

- Forum 1: Several specialists of the city of Groningen were present, as well as the public transport organization, researchers, a supplier of white label parcel lockers and a commuter.
  - Travel mode – proximity
  - Spatial integration and land use
  - White label vs. single player network

Local Fora

- Forum 2: Several specialists of the city of Groningen were present, as well as the province of Drenthe, the public transport organization, researchers and three suppliers of parcel lockers.
  - Travel mode – proximity
  - Spatial integration and land use
  - White label vs. single player network
  - Parcel lockers as part of a pick-up/drop-off network
  - Differences between the three operators
  - Next process steps
- After the Forum, the municipality of Groningen had a one-on-one discussion with each of the three suppliers to clarify the specifications for the concession request.

Permits, agreements and requests

- Spatial integration
  - Presure on public space is growing
- Land use agreement
  - Very strict rules for using public space. So a policy framework is needed for a land use agreement
- Electricity connection
  - Long waiting period to get your requested connection

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Trialing…

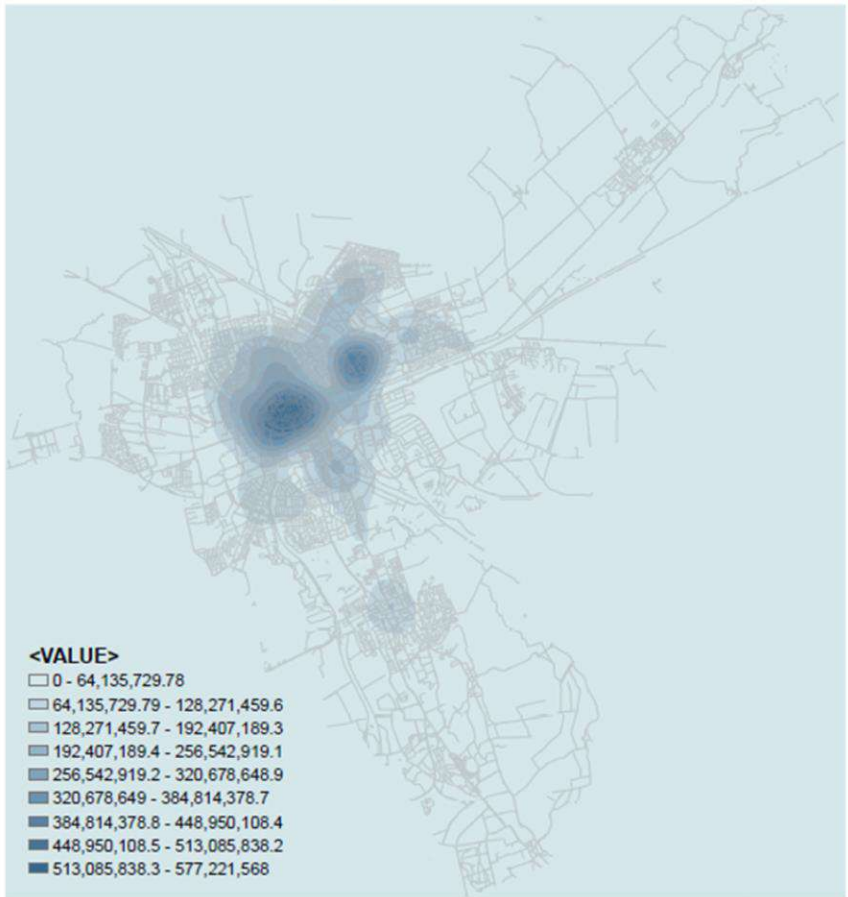
Policy framework

- The municipality is in the lead for lockers in public space
- All companies should use the same lockers
- The appearance of the lockers should be tailord to the location
- Parcel lockers can only be placed at specific locations (in public space)
  - Mobility hubs
  - Community hubs
- On private land permission by land owner is needed (+ meeting the municipal zoning plan and aesthetic policy)

Location study

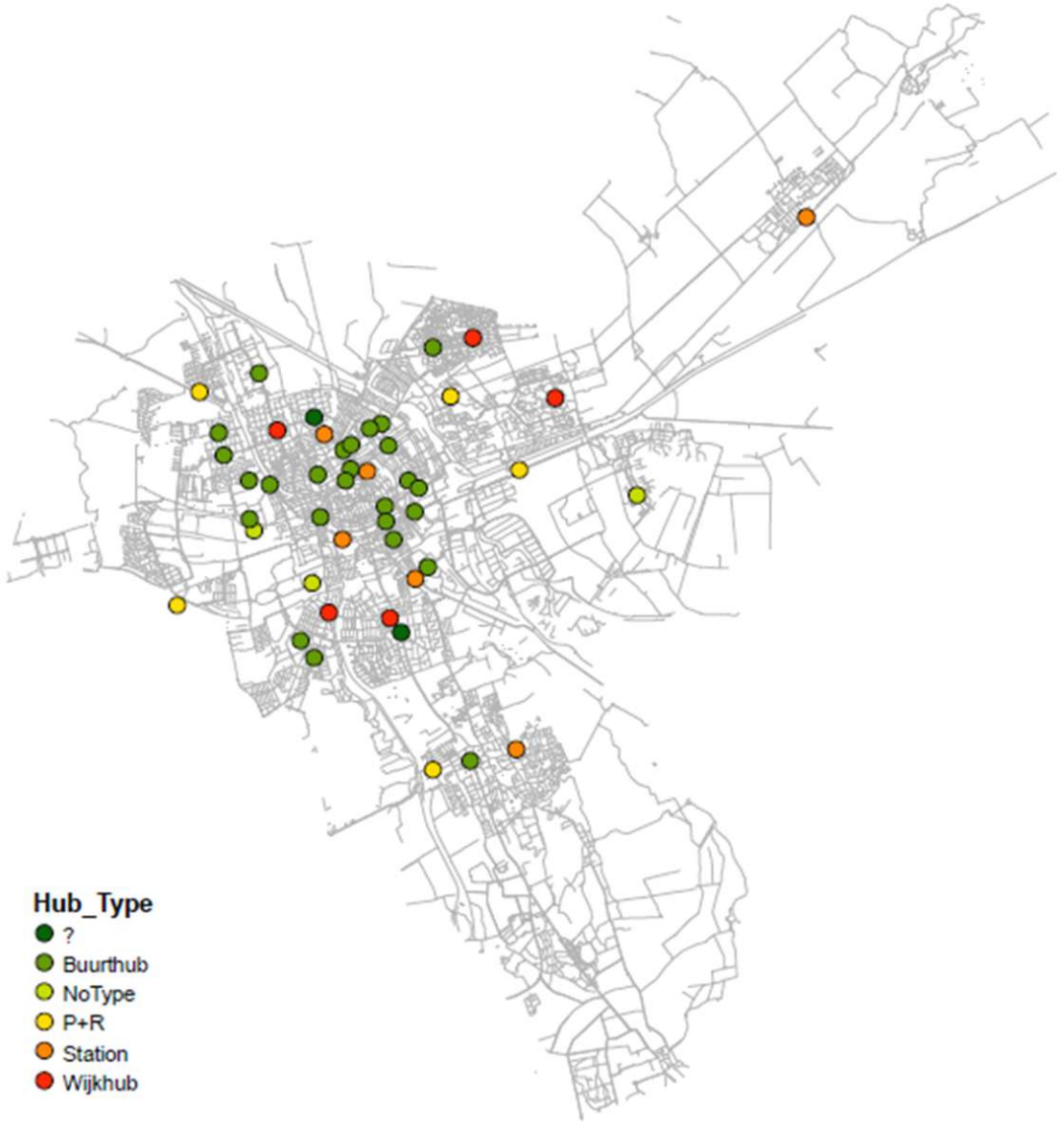
Space syntax: betweennness centrality

Betweenness centrality of the network

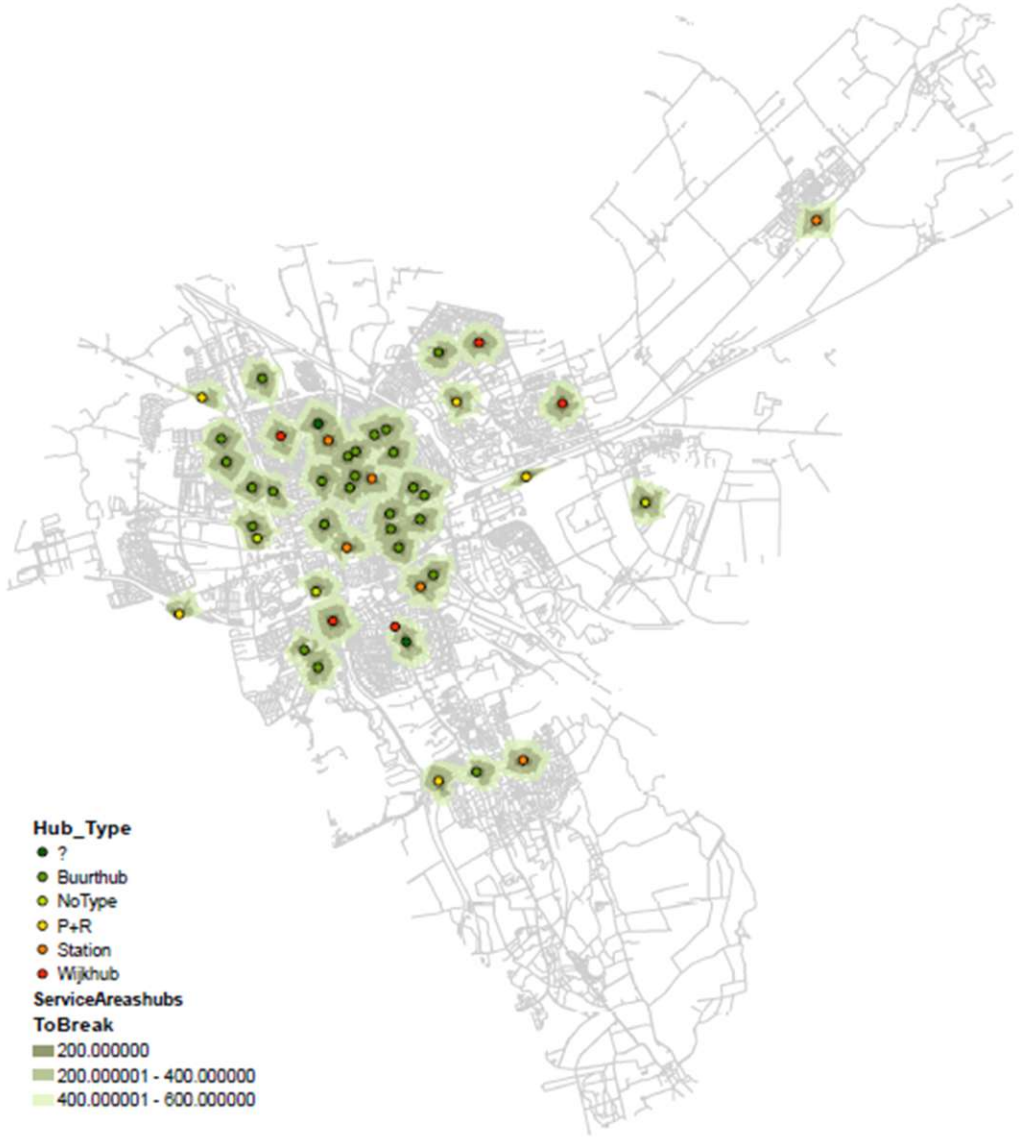


Kernel density of betweenness centrality

Possible locations and coverage

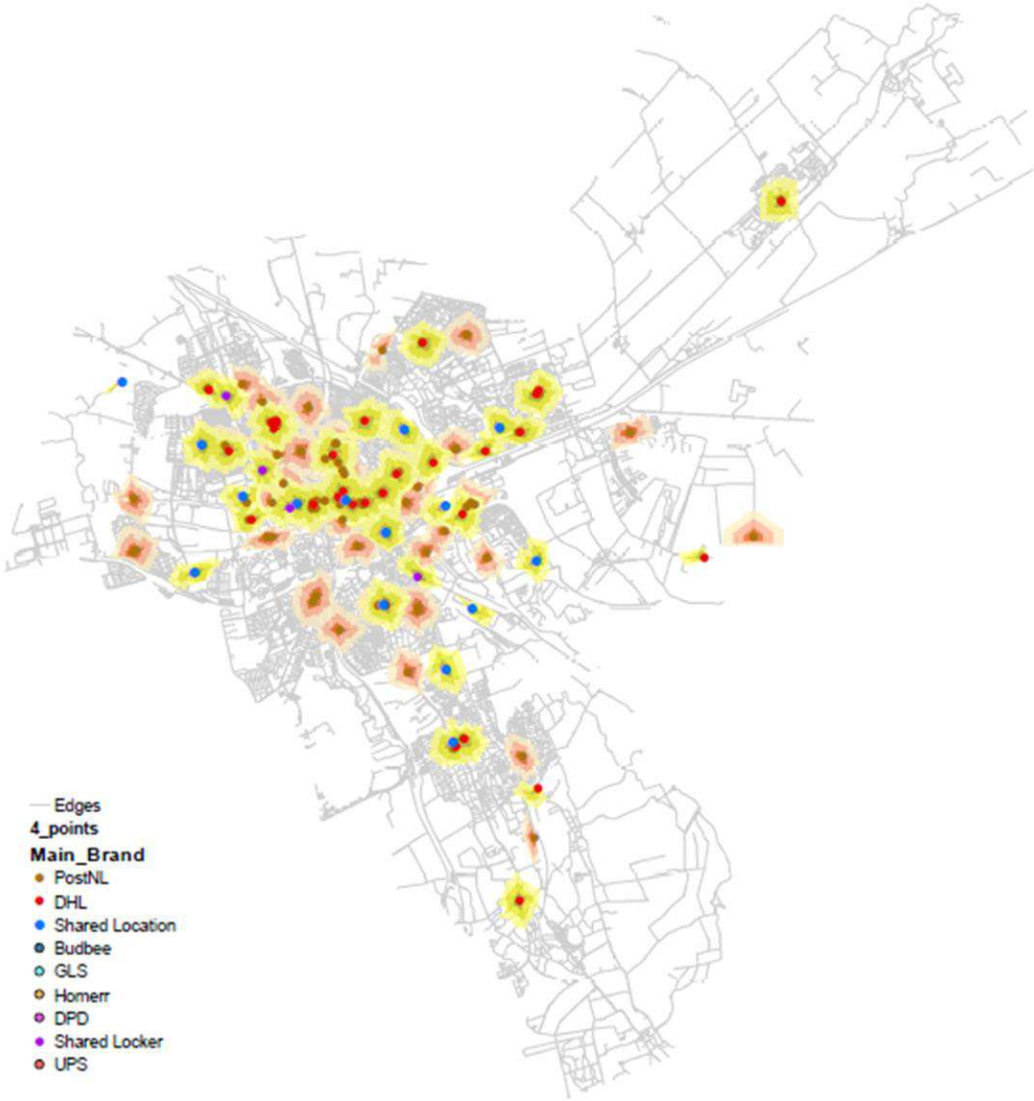


Possible PL locations

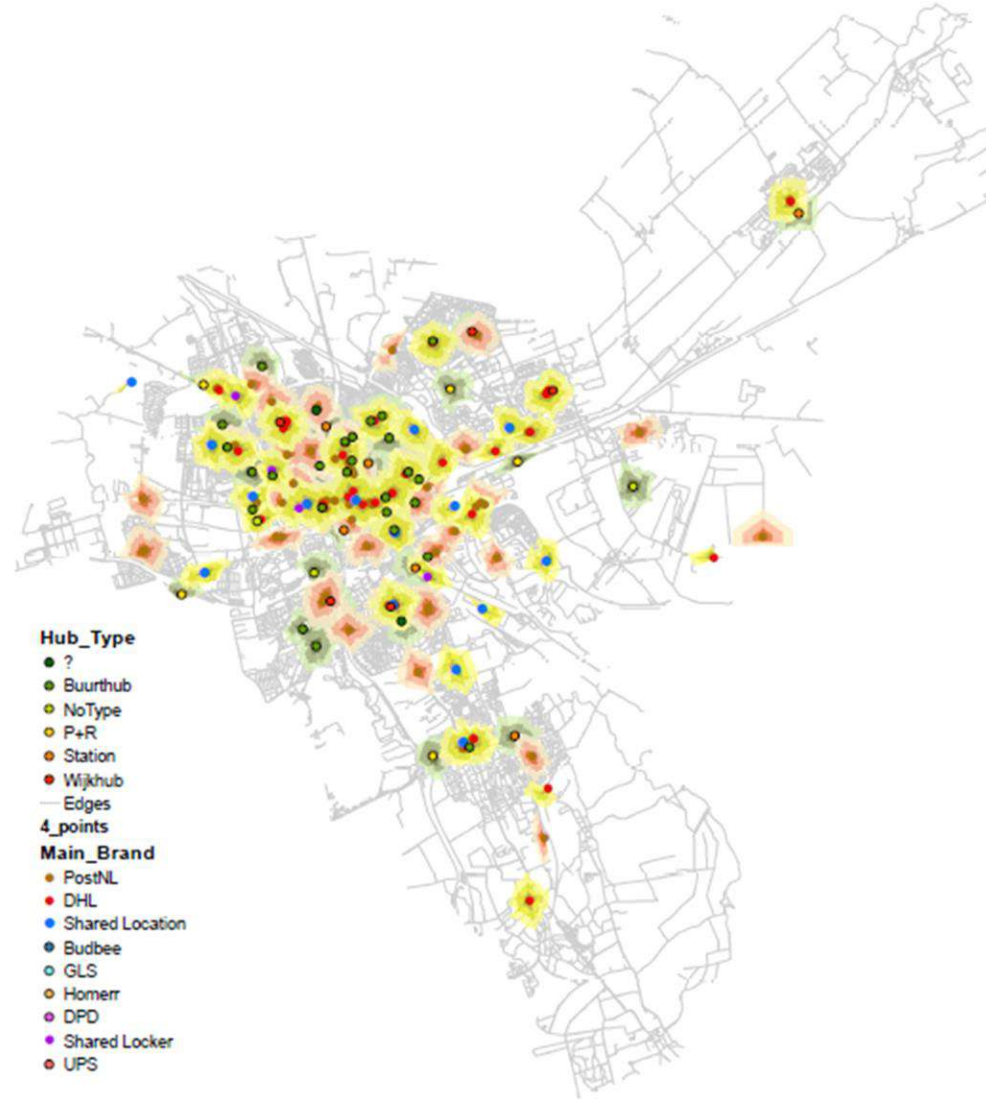


All possible locations' pedestrian coverage (200-400-600m)

Current and possible new locations coverage



PostNL & DHL pedestrian coverage



PostNL & DHL pedestrian coverage + possible new locations (green)

Next steps

- The policy framework will be submitted to the city council for adoption in December 2023.
- Part of the framework is a concession for gaining an agreement to operate parcel lockers in public space (for 1 operator).
- At least 3 companies will be asked to make an offer.
- The municipality of Groningen currently assumes a minimum of 10 and a maximum of 20 parcel lockers in public spaces. This can still be deviated from during the concession granting process.
- The concession period is 5 years.

Thank you!

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Mechelen

Final Event - Barcelona

15/11/2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833

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Mechelen in the spotlights

Recap – 2 trials

- Inner city trial – can we bundle first mile parcels to sustainably exit the city?

- Outer city trial – does cargo hitching on an AV work for the city of Mechelen?

Joint trial - Introduction

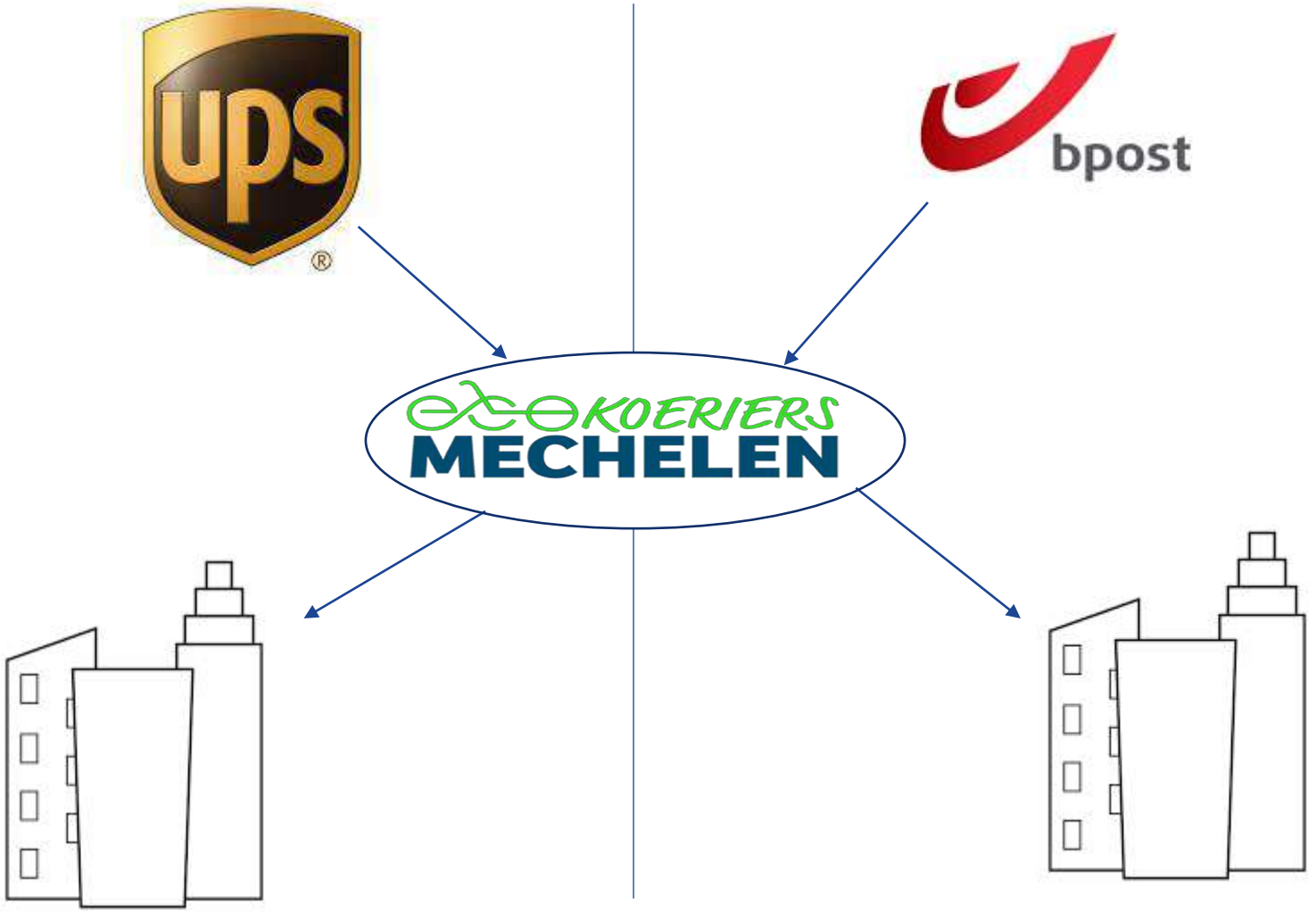
Recap

- 1 inner city trial
- 2 national players and 1 local player join forces to unburden retailer
- Focus on first mile – parcels sent with BPO and UPS picked up in same ECO cargo bike

  = consolidated & zero emission
- Drop off at both cityhubs

Partners involved:

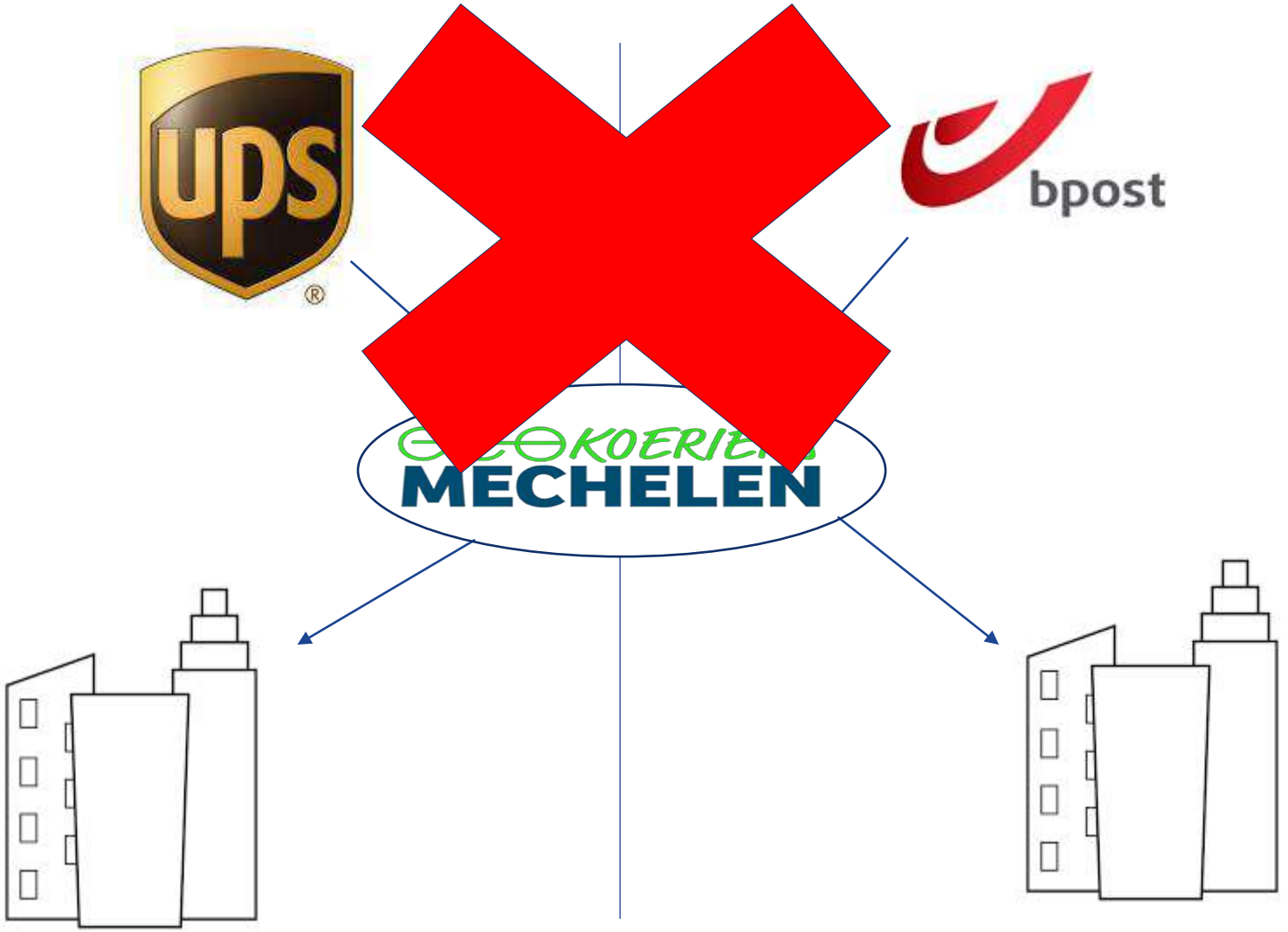
- UPS
- ECO
- BPO



Partners involved:

- ECO
- BPO
- UPS

Schematic view



Partners involved:

- ECO
- BPO
- UPS

Joint trial - Introduction

- Nice trial in theory, too sensitive in reality

- Agreement BPO - ECO: ☺
- Agreement UPS - ECO: ☹

- UPS already works with third party for PUDO

Partners involved:

- UPS
- ECO
- BPO

What can we take from this?

Lessons learned

1. *Solution for a problem that's not urgent.*
   No clear policy from our side = no incentive to change BAU

2. *Even though actual partners in project – too little will to make it happen. In the future: carefully choose partners and clearly state expectations while writing the project proposal*

3. *Changing things in logistics takes time + conflicts of interest that we may not always see*

What's next?

- ***Unchain*** *– IT cockpit to share resources on UDC's and UCC's*
- ***Urbane & wij.leveren2.0*** *– can we change the monopoly on our lockers?*
- ***Spotlog & GLEAM*** *– formulating logistics policy*
- ***Logistics in the sadle*** *– Belgian subsidy to make logistics more sustainable. Consolidation retailer – consolidation competitors – consolidation in own hands*
- ***MOW*** *– Flemish subsidy to test LEV fleet*

In the meantime…

- Two zero emission working groups every year with logistics parties
  - Content in consultation with signees covenant
  - Keeping the horizon of 2030 alive

In the meantime

https://www.youtube.com/watch?v=svqfEwidH2Q&t=2s

Thank you!

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Alba Iulia Municipality

Presenter: Liviu Stanciu, Project Manager

Date: 15.11.2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833

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Local Context - UPDATES

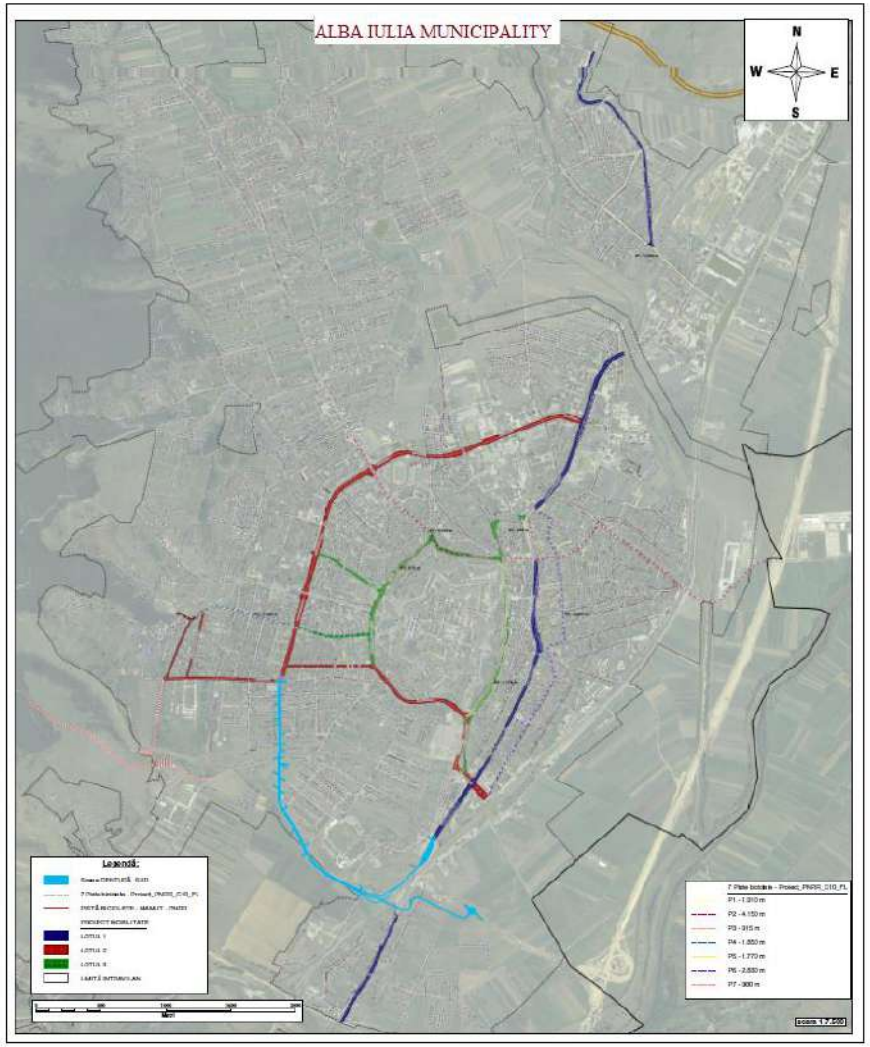
Alba Iulia (Romania) – Local context

Mobility and transportation projects (Cycle Logistics, ENergy efficiency in City LOgistics Services for small and mid-sized European Historic Towns - ENCLOSE, SUITS, TInnGO, SUMP PLUS, CityChangerCargoBike) + complementary **energy efficiency projects** funded by the **European Union**

Large **mobility infrastructure projects funded through Regional Operational Programme 2014-2020**

Mobility projects funded through Romania's National Recovery and Resilience Plan (for example the "Development of the environmentally friendly public transport system through the purchase of clean vehicles and charging stations" project in collaboration with Ciugud)

Next steps: 2021-2027: Operational Programmes & National Recovery and Resilience Plan (South and North ring road)



Key urban logistics developments (2021/2022)


URBAN
MOBILITY
over
50 mil.
euros

- **300** electric bikes, and bike sharing, integrated in urban transport routes
- **34** electric busses
- **142** charging stations
- **18 km** bus dedicated lanes
- **95** video surveillance cameras
- **45** new bus stations
- **1** traffic management center

Bike dedicated lanes

- **16 km** (existent)
- **37,43 km** in the making

SMART PUBLIC LIGHTING

over
14 mil.
euros

ÎN CIFRE

- **4114** LEDs
- **2753** new pols
- **232** PVs
- **180** km of smart lighting
- **50%** decrease in consumption and pollution
- **104** smart pedestrian crossings

- **223** de corpuri iluminat LED, în șanțurile Cetății


INTELLIGENT
SYSTEMS FOR PUBLIC
TRANSPORT
over
3,5 mil.
euros

- **Development of the intelligent urban management system in Alba Iulia Municipality through the purchase and installation of intelligent ticket vending machines in passenger boarding stations**

- **Development of the intelligent urban management system in Alba Iulia Municipality by installing an intelligent display system in passenger boarding stations**

- **Development of an intelligent urban management system in Alba Iulia through an e-ticketing system that allows the payment of tickets including by bank card**

2 meetings with stakeholders

Success stories and good practices

Alba Iulia – Success stories and good practices

- *Finishing the mobility projects until the end of 2023*
- *Finishing the smart lighting projects until the end of 2023*
- *Multiple Parcel lockers within the city (no logistic hub though)*
- *2 ULaaDS Stakeholders meetings*

Replication going forward

Alba Iulia would like to replicate…

- *Logistics micro-hubs*
- *Containerised last-mile deliveries and the implementation of the concept itself in terms of communication*
- *Cargo-bike sharing schemes for private logistics*
- *Stakeholders Fora methodology – continuation of stakeholders meetings*

Thank you!

Liviu Stanciu
staliviu@gmail.com

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The ULaaDS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833. ULaaDS is a project under the CIVITAS Initiative.

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City of Bergen

Lars Petter Klem – Project manager

Final event Barcelona – 15 November 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833

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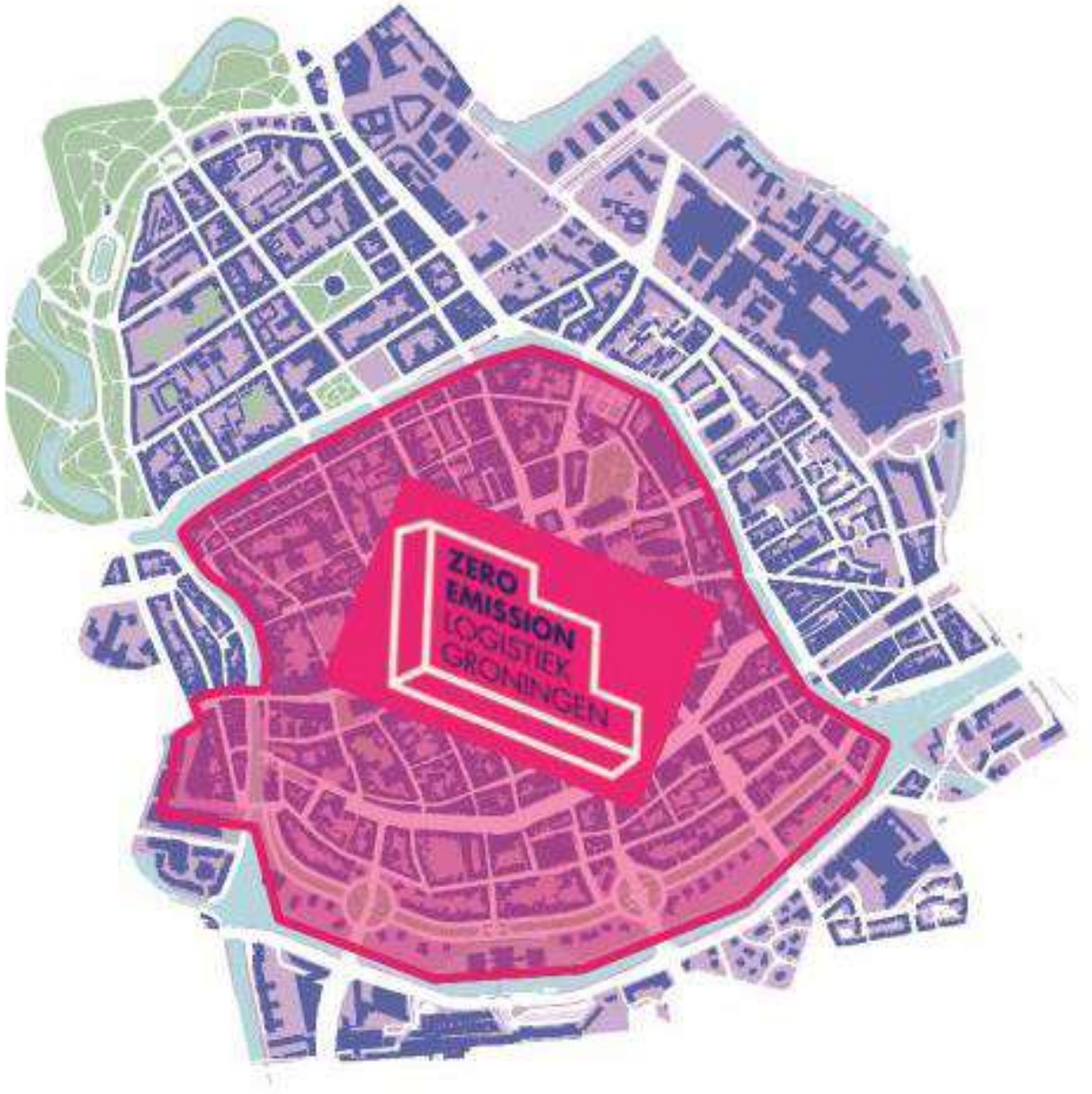
Zero Emission Zone



Zero Emission Zone

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Bergen får nei til å lage nullutslippssoner

Bergens klimastrategi får ikke drahjelp fra regjeringen, som avviser å tillate nullutslippssoner nå.

Stockholm to ban petrol and diesel cars from centre from 2025

Scheme goes further than most, as Swedish city tries to reduce pollution and noise


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Deelmobiliteit voor ondernemers
Gemeente Groningen
GCC
century
Scan mij


HYRE
Last ned. Lås opp. Kjør.
bildeleringen

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Cooperation with local stakeholders


Dat lucht op.
Uw pakjes en brieven
duurzaam geleverd.
Vous pouvez respirer.
La livraison de votre
courrier est plus verte.
bpost
bti

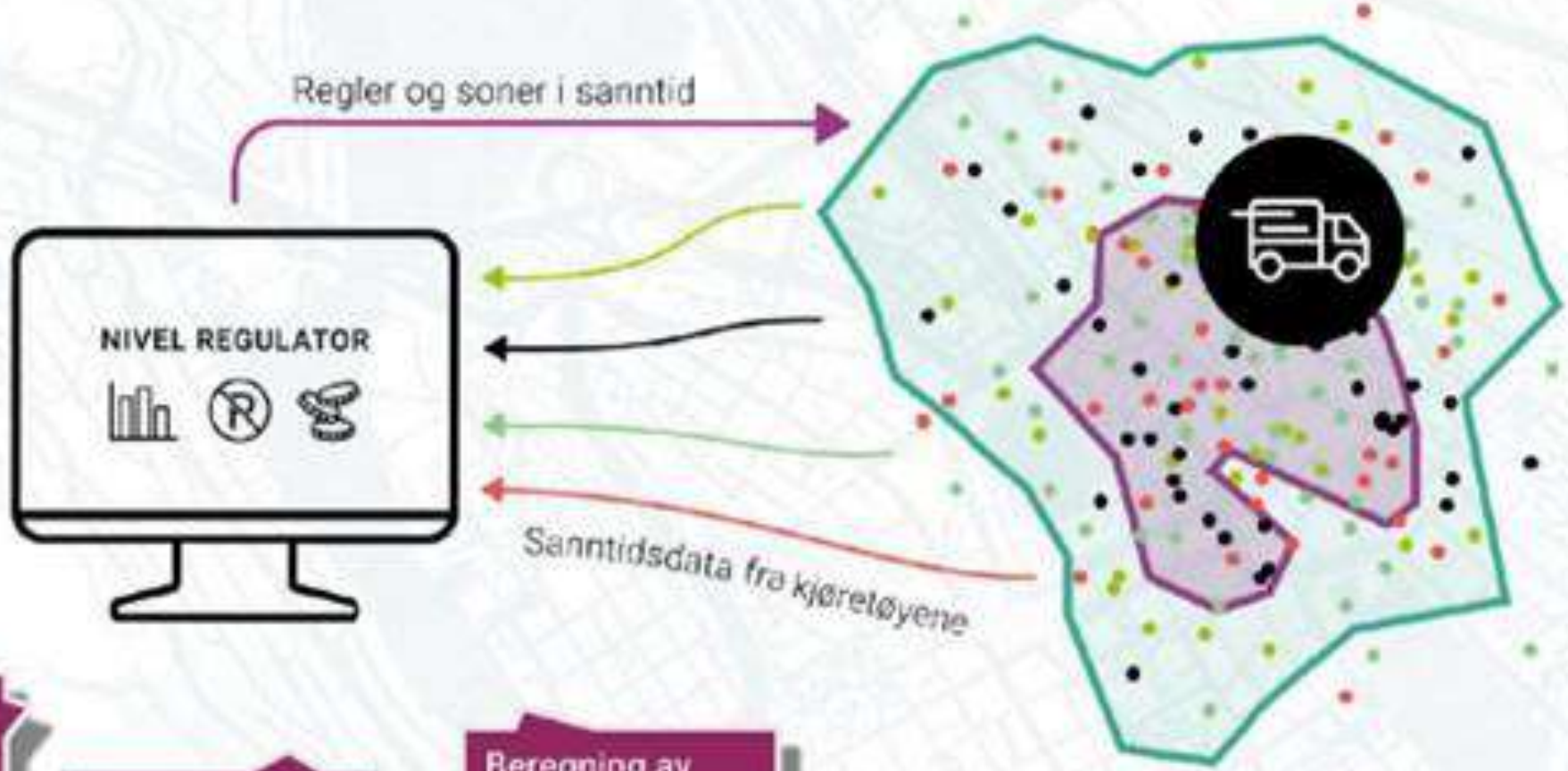

Pakkeboks
Pakkeboks
Pakkeboks
Plastemballasje
BIR
Soløsen 2


FRISØR
Pakkeboks
Pakkeboks
Pakkeboks

And ahead…?


#ELSKEDEBY
#ELSKEDEBY
#ELSKEDEBY
#ELSKEDEBY
entra
posten
bring
Regus

Dynamisk styring med **2-veis data**deling



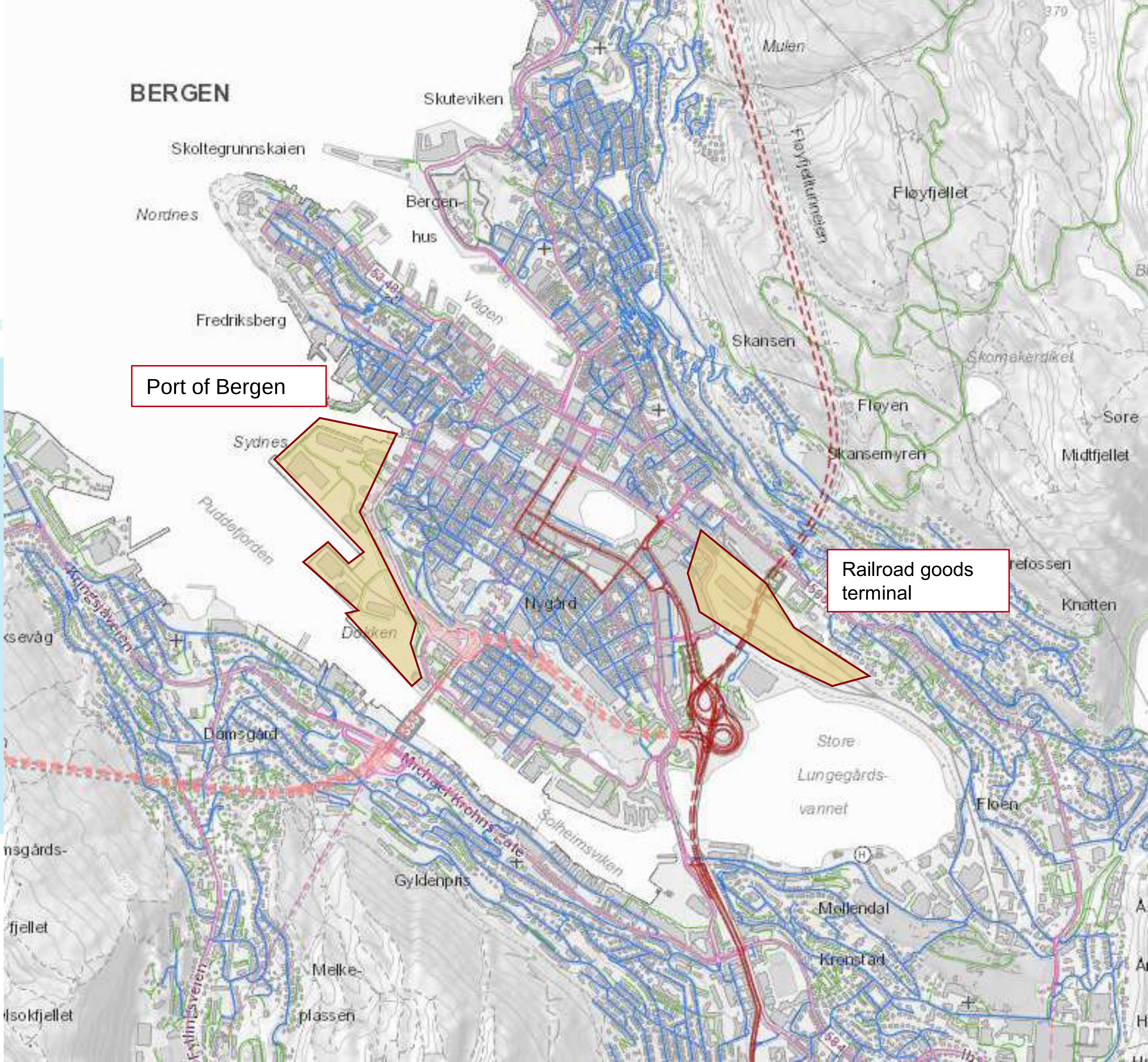
Soner med regler & gebyr

Analyse av mobilitetsdata

Beregning av parkeringsgebyr - og subsidier


KAFFEBAR
Holberg
bring
Finding New Ways
bring.com
BGLU 250115-0
SUNDT
MEET THE SUNDTS
ONLY

Trondheim
Aalesund
Maaloey
Bergen
Fusa
Oslo
Moss
Fredrikstad
Stavanger
Larvik
Kristiansand
Bremerhaven
Hamburg



BERGEN
Port of Bergen
Railroad goods terminal
Skuteviken
Skoltegrunnskaien
Nordnes
Bergenhus
Vågen
Fredriksberg
Sydnes
Puddefjorden
Dokken
Nygård
Skansen
Fløyfjellet
Fløyen
Skansemyren
Midtfjellet
Knatten
Damsgård
Gyldenpris
Store Lungegårdsvannet
Møllendal
Kronstad
Solheimsviken
Michael Krohns gate
Melkeplassen
Mulen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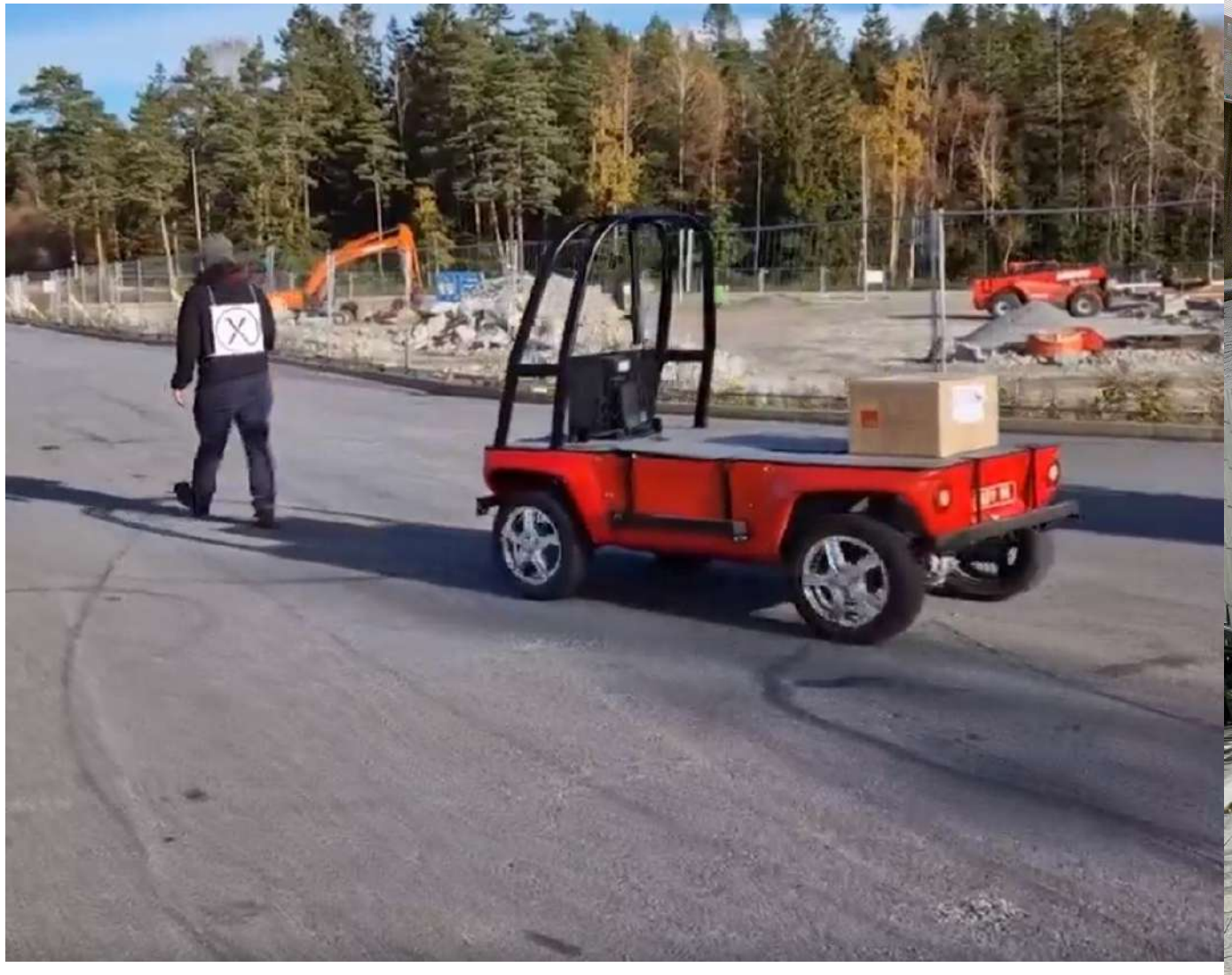
www.mechelen.be/
zelfrijdende-shuttle
ULiDS




#ELSKEDEBY
#ELSKEDEBY
#ELSKEDEBY


Bli kjent med meg
posten
Hold avstand
Jeg er under opplæring


RYTLE

Thank you!

Lars Klem

Lars.klem@bergen.commune.no

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Edinburgh

George Lowder MBE (Transport for Edinburgh)

ULaaDS Final Event, Barcelona, 15 November 2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833

Edinburgh – Local Context

Policies:

- *Carbon Net Zero by 2030*
- *The City Mobility Plan 2030*
- *City Centre Transformation*
- *Low Emission Zone*
- *Public Transport Action Plan*
- *Circulation Plan. Balancing finite road and public realm space*
- *Active Travel Action Plan*
- *EV infrastructure development*

Supported by:

- *SUSTRANs*
- *The Cargo Bike Movement*
- *City of Edinburgh Council funding*

Tram to Newhaven

- *Open for service 7 June 2023. Support for business package now complete.*

Key Urban Logistics Developments (2021/2022/2023)

Edinburgh – Key Developments

Cargo Bike Movement

- The Cargo Bike Movement was established in April 2020 in response to the first national COVID-19 lockdown. It provides cargo bikes on short and long term loans, delivers cycle and cargo bikes awareness raising events and provides cargo bike training required to use a cargo bike.
- In 2022, the project engaged with a total of 6825 people.
- It completed 22 direct long term loans to businesses and community groups.
- And 167 direct and 201 partnership generated short term loans to individuals and families.
- It has 47 active volunteers. As at December 2022, they had collected and redistributed 11.5 tonnes of food to Shrub Co-op Food Bank and Refugee Community Kitchen, which would otherwise have been thrown away, saving circa 91 tonnes of CO2e when compared to fuel consumption of a car.
- It recorded a total of 7,825 miles bike travel and an estimated overall CO2 saving of 113,507.40kgCO2e (including CO2e savings from food collected and distributed using the cargo bikes).

Edinburgh – Key Developments

DHL, the UK's largest logistics company, has announced the start of a trial of the EAV eCargo bike for its small-item home delivery service.

Operating in Edinburgh, the eCargo bike will deliver items that do not require two-person services, but still require special handling. Current plans will see the vehicle make around seven to eight drops a day, carrying around four items at a time. The city was selected as its mix of terrain and size of the city provides the ideal environment to test the bike as part of DHL's last-mile fleet.

Manufactured by EAV, the new bike has a load capacity of 2 cubic metres and a range of around 40 miles on a single charge. The eCargo bikes have been specifically designed for urban environments, and are zero-emissions, reliable, easy and cheap to operate.

Edinburgh – Key Developments

Tram to Newhaven – Support for Businesses Through Construction

- During the construction of the 4.69km extension of Edinburgh Trams tram line to Newhaven, which began in November 2019, a package of measures has been developed to support businesses along the route.
- The objectives of WPX:
  - Support businesses through the disruption caused by the construction of the extended tram line.
  - Learn from provision of last mile deliveries by cargo bike and trolley.
  - Collaborate with Transport for Edinburgh, Sustrans, City of Edinburgh Council, Turner & Townsend, Morrison Utility Services, and Sacyr Farrans Neopul to deliver Logistics Hubs.
  - Inform future decisions for Logistic Hubs and Cycle Hire Scheme.

Edinburgh – Key Developments

- 13 locations, 12 supermarkets, 1 filling station
- 24/7
- Brands are already using the lockers, including schuh, PrettyLittleThing, New Look, Boohoo, JD Sports, Evri, Hermes and Gymshark.

Edinburgh – Key Developments

Logistics Hub in Edinburgh

In collaboration ZEDIFY Logistics, SEStran and Edinburgh Napier University are carrying out research on sustainable logistics.

The pilot logistic hub in the Haymarket area of central Edinburgh offers the opportunity to explore different commercial approaches to logistics in a crowded urban environment. The Scottish partners re-mode deliveries typically made by diesel van or truck and consolidate, making the whole process far more efficient. The pilot will provide valuable insights into future approaches to sustainable city logistics by investigating:

- The establishment of commercial operations through bottom-up rather than top-down approaches.
- The importance of key partnerships, both public-private and private-private.
- The need to increase public awareness.
- The importance of validating the concept of the last sustainable mile in order to increase commercial confidence.

Edinburgh
Success Stories and Good Practices

Total number of goods received in and out of the logistics hub.

	2019	2020	2021	2022	2023	Totals
Montgomery St	252	2476	3935	7063	549	14275
Albert St	164	5456	6118	799	0	12537
Dalmeny St	100	6688	8402	6150	0	21340
Foot of the Walk	268	6964	7482	7646	481	22841
Mitchell St	54	3244	858	0	0	4156
Totals	838	24828	26795	21658	1030	**75149**

Edinburgh – Key Developments

Cargo bikes are definitely more prevalent around the City. Not just the Cargo Bike Movement Ones.

2 x cargo bikes made available for City of Edinburgh Park Rangers.

New Cargo Bike Projects

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- Cammo Forest Kindergarten. Possible second cargo bike trial.
- Libraries short term loan of a Cargo bike for Health and Wellbeing events.
- Pool e-cargo bike at the Council's main offices at Waverley Court.
- Car Free Day Event – Cargo Bike Breakfast.
- Further funding secured for Cargo Bike Movement.
- City Circulation Plan and City Centre Transformation (consultation ongoing).
- Success of Support for Business Package means likely replication for future infrastructure projects.

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Rome

Marco Surace (Rome Mobility Agency)

Date: 15/11/2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833

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Local Context

The context at a glance

SUMP - Approved in February 2022

SULP - Adoption by December 2023

SULP - Presentation by early 2024

Key urban logistics developments (2023)

Key developments and actions taken

Hub for passengers and logistics mobility

- **Parking lots for loading and unloading goods**
- Central area dedicated to PT
- Special pathways to connect the station and PT stops
- Bike parking and car/bike sharing & recharging e-vehicles parking places
- Kiss & ride area

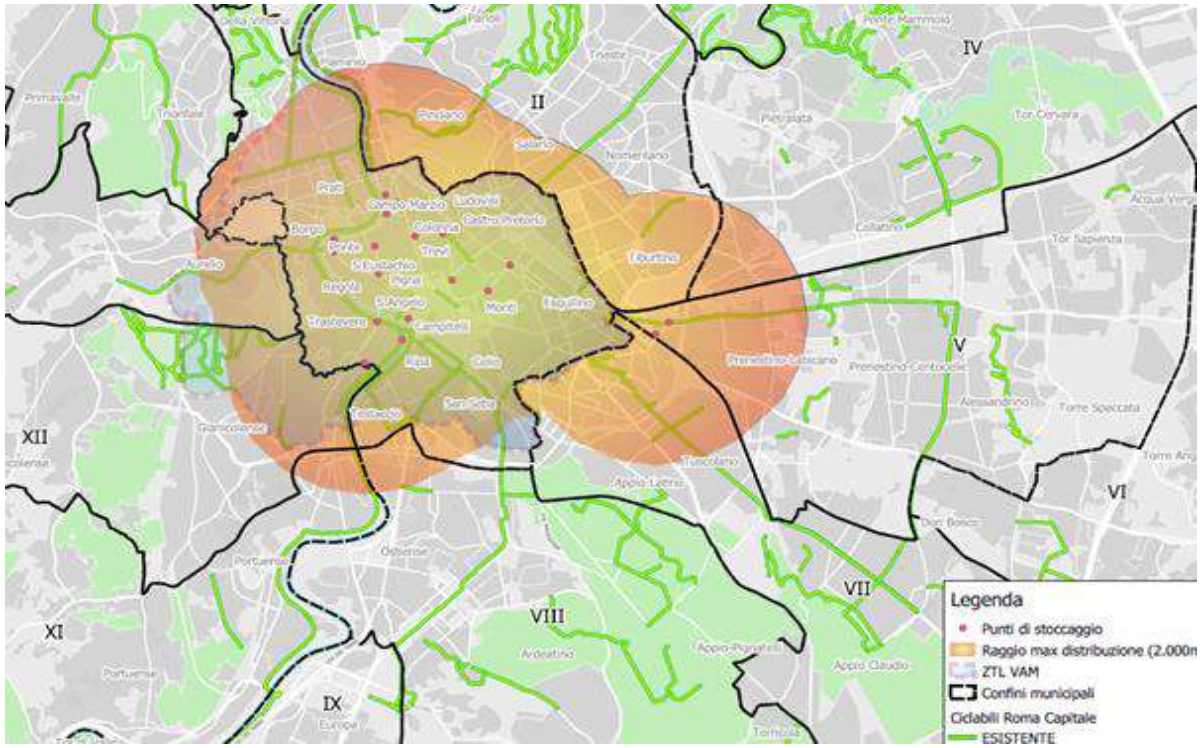
Key developments and actions taken

Participation event and dissemination ULaaDs

Key developments and actions taken

Participation event and dissemination ULaaDs

Key developments and actions taken



Cycle logistic incentivation

cargo-bike storage points and potentially served areas

Participation event and dissemination ULaaDs

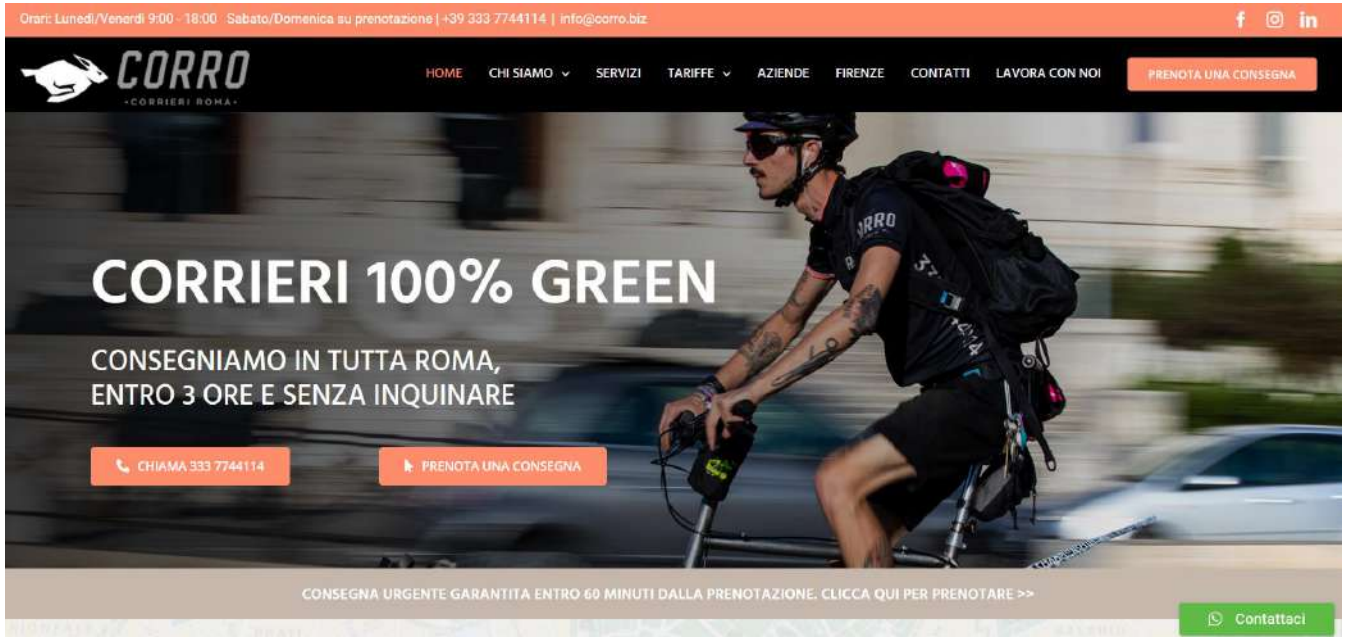
Key developments and actions taken

Installation of parcel lockers goes ahead

The installations were completed in early 2023: the service is available at **21 stations** on the three metro lines

The new lockers are capable of handling **over 2700 deliveries per day**

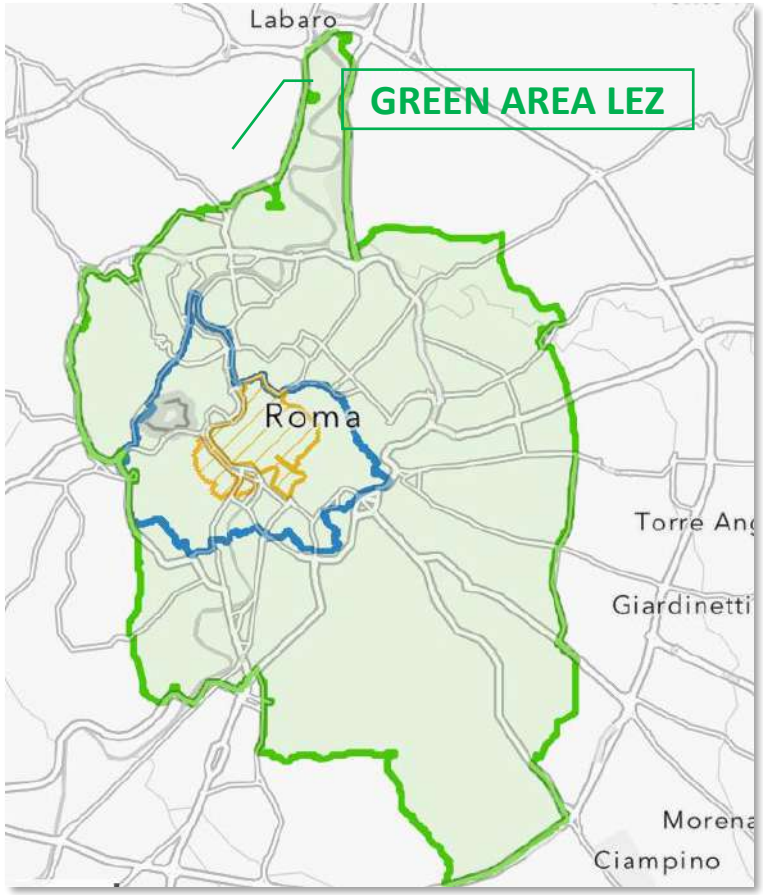
Key developments and actions taken



Collaboration with cargo bike operators

Cooperation with cargo bike operators to promote sustainable deliveries, mainly in city center or near pedestrian areas

Key developments and actions taken



Restrictions to private & freight fleets

Critical success factors

The aim is to implement policies for the Green Area LEZ with progressive restriction according to vehicle Euro categories (freight transport included)

A great discussion is arisen among citizens and local municipality about the limitation of free circulation in Rome:

- the limitation of free circulation in Rome must not affect the less well-off categories: this can slow down progress but not stop it
- Logistics and Transport operators must overcome their own interests and collaborate to join their efforts

Thank you!

Marco Surace

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Enjoy the lunch!

We will start again at 14:15

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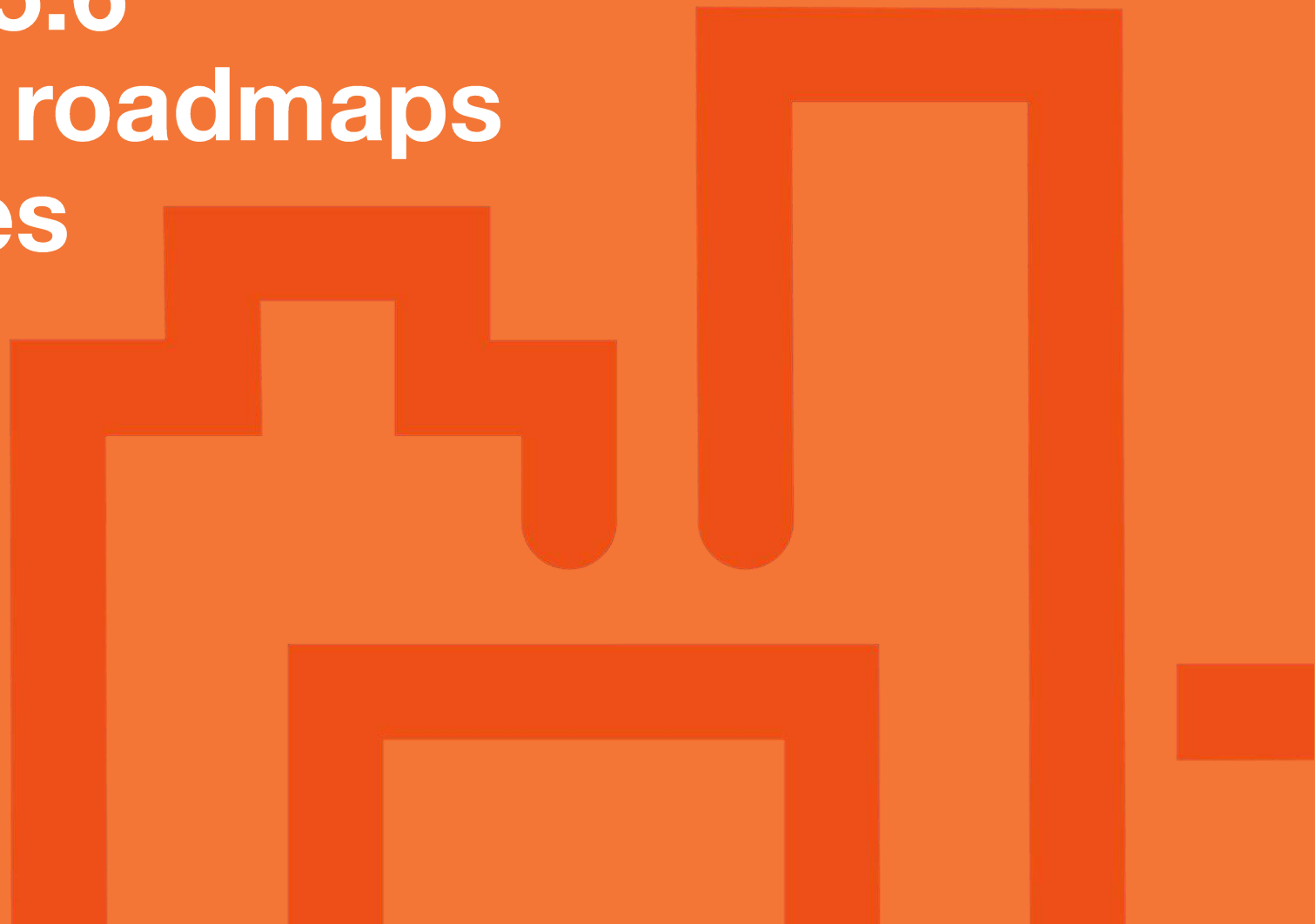
Interactive sessions 1: Getting things done

Preparing the D5.6 Implementation roadmaps for Satellite cities



D5.6 Implementation roadmaps

Text from the Grant Agreement:

Each of the Satellite Cities will develop an implementation roadmap in order to start deploying solutions and strategies, which will complement and reinforce the city's SUMP/SULP.

The Lighthouse Cities and experts will be available to direct and support the development of the implementation roadmaps under the coordination of Eurocities.

D5.6 Satellite cities input

1. Select the ULaaDS solutions / measures / methodologies that you would like to replicate
2. Assess their transferability potential
3. Describe potential bottlenecks
4. Outline the timeline and stakeholders for the implementation

Implementation roadmaps - Discussion

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- Two tables, one representative from Lighthouse city per group
- Satellite city can choose which group to join

- Objectives: Ask details on the implementation of the measures you would like to replicate, focusing on:

  - What were the main challenges in implementation?
  - How did you overcome them?
  - What would you do differently if you could start from scratch?

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Getting things done: Data in ULaaDS and trial assessments

Presenter: Howard Weir (TØI), Philip Mueller (IML)

Date: 15.11.2023

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 861833

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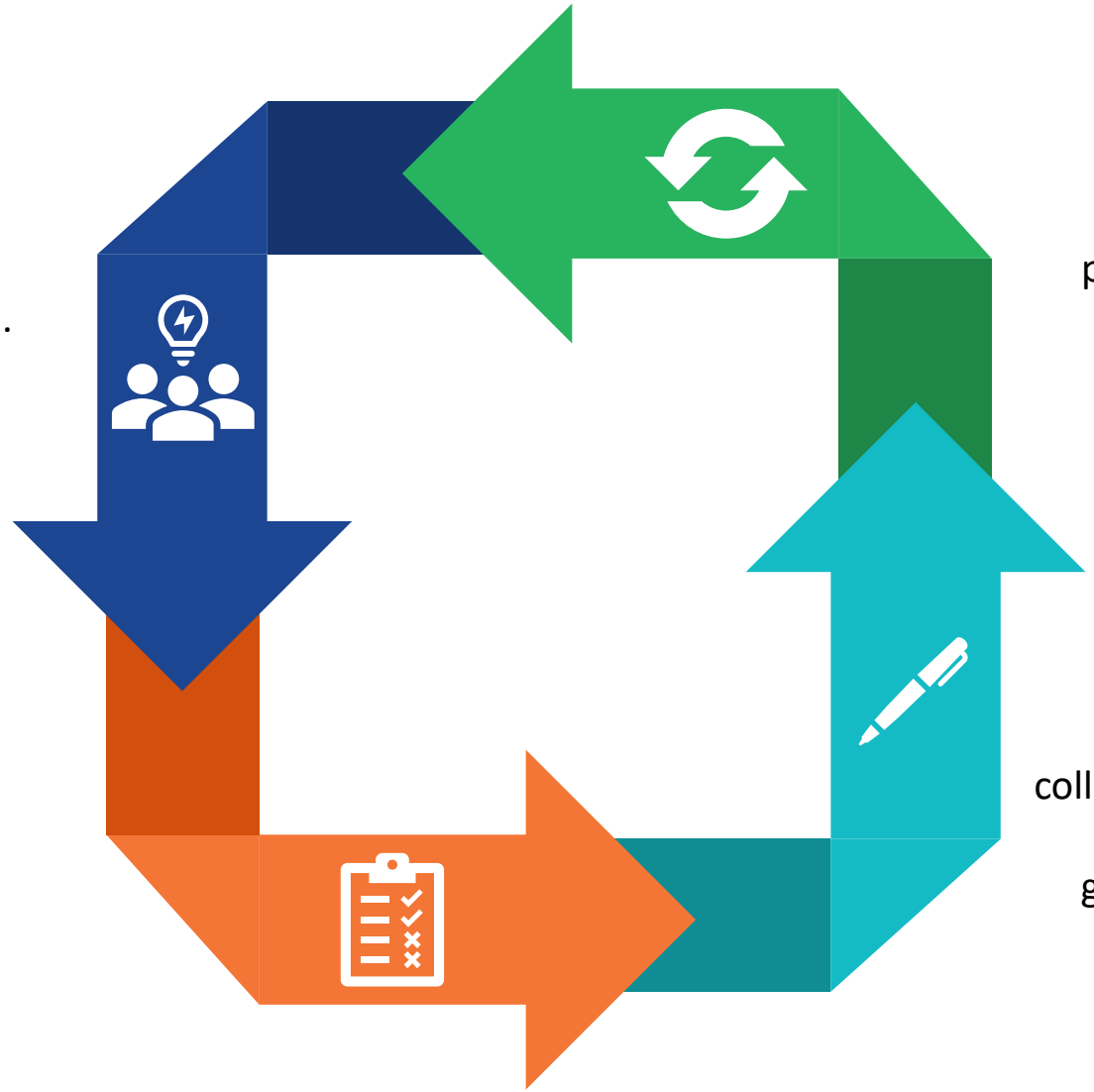
Activities and Achievements

Data Collection

1. Data Collection Procedures
Bilateral exchanges with local partners regarding KPI-lists in cooperation with TOI and Miebach.

2. KPIs – Potentials & Hurdles
Consolidation of information to identify potentials and hurdles regarding data collection and evaluation.



4. Evaluation & Comparison
Data evaluation based on KPI lists provided by TOI as well as possible adjustments of data collection.

3. Deliverable D4.2
Finalization D4.2 “ULaaDS data collection & monitoring architecture” to consolidate the knowledge gathered in ULaaDS regarding data collection procedures and derivations for future projects.

ULaaDs impact assessment approach

- Limited baseline
- Trials had differing scales, scopes and TRL levels
- Changes to trials
- Two-tiered assessment
- Qualitative assessment based on trial objective

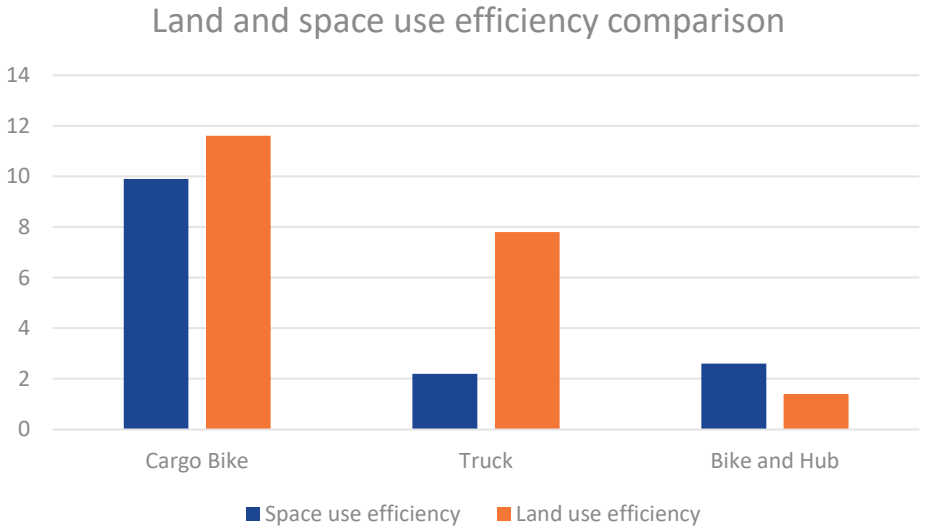
Trial objective	KPI	Assessment
AREA OF IMPACT		
Trial objective 1	KPI 1	p
	KPI 2	_
Trial objective 2	KPI 3	n
	KPI 4	_ / n
	KPI 5	p / n

	Bremen Trial 1	Bremen Trial 2	Bremen Trial 3	Groningen Trial 1	Groningen Trial 2	Mechelen Trial 1	Mechelen Trial 2
Tier 1: Full assessment	X	X		X			
Tier 2: Partial assessment			X		X		X

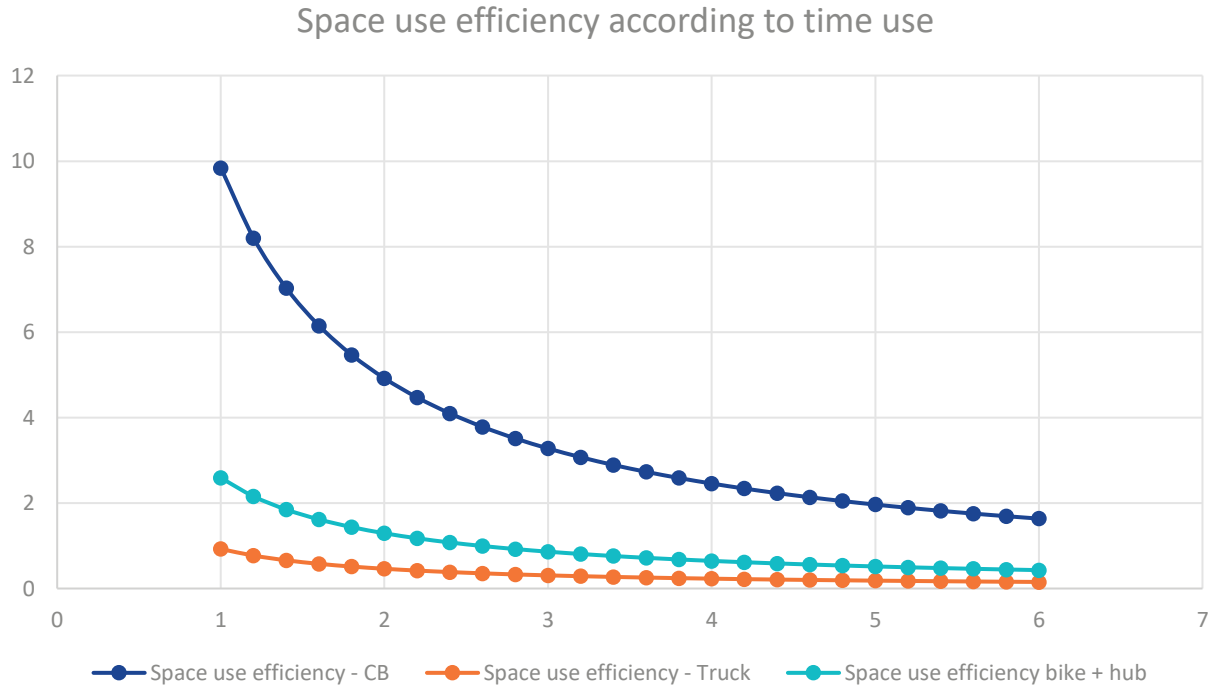
Land and space use efficiency

$$Land\ use\ efficiency = \frac{\sum_{v=1}^{v=V} cargo}{\sum_{v=1}^{v=V}(time\ use\ \times land\ use)}$$

$$Space\ use\ efficiency = \frac{\sum_{v=1}^{v=V} cargo}{\sum_{v=1}^{v=V}(time\ use\ \times space\ use)}$$



Space and land use efficiency of delivering 12 pallets assuming 1 pallet/hr for cargo bikes and 2,4 pallets/hr for Trucks



Bremen – Land Use, Environment Logistics Efficiency

	Tier	Land use	Environment	Logistics efficiency
Trial 1 	Full assessment	The use of the solution reduced space needed in busy areas	Smaller, more energy efficient vehicles replaced truck operations	Potential gains in load factor. Unable to reach bike's potential.
Trial 2 	Full assessment	By avoiding car trips, the solution saved space in traffic	The solution avoided car trips reducing GHG and local emissions	Long bookings limited use of vehicles
Trial 2B 	Partial assessment	Potentially reduces the number of vehicles needed to transport people and cargo	Potential to slightly reduce emissions, but could also induce trips	Potential for utilizing extra capacity shown, service levels can impact routing decisions

Bremen – Economic and Social impacts

	Tier	Economic field	Social field
Trial 1 	Full assessment	↘ Costs covered by city / company More volume would help to be self-supporting	↗ Positive feedback from all stakeholder groups as truck is substituted by bikes
Trial 2 	Full assessment	↗ Change in rental scheme + small fee would make trial self-supporting	↗ Widens the offers of private logistics via a sustainable medium
Trial 2B 	Partial assessment	→ Not always feasible, theoretical makes sense but in practice very challenging	Not assessed

Groningen - Land Use, Environment Logistics Efficiency

	Tier	Land use	Logistics Efficiency	Environment
Trial 1 	Full assessment	The use of the solution reduced space needed in busy areas	Some vehicles not used. Free model encourage more driving, vehicles often booked	Increased use and knowledge of electric vehicles, but potentially increased use of larger vehicles
Trial 2 	Partial assessment	Potential to reduce space used in traffic, some space required for lockers	Can enable shorter routes requiring fewer vans and drivers	Can avoid car trips related to delivery and pick up of packages

Groningen – Economic and Social impacts

		Tier	Economic field	Social field
Trial 1		Full assessment	Positive business case, including a profit for service provider	Option for shopkeeper to access inner city despite city's regulations
Trial 2		Not assessed – parcel locker not yet implemented		

Mechelen - Land Use, Environment Logistics Efficiency

	Tier	Land use	Logistics efficiency	Environment
Trial 1	Not assessed			
Trial 2 	Partial assessment	Potential to reduce vehicle movements related to parcel lockers	Potential method for combining passengers and freight in a cargo-hitching scenario	Electric vehicle and reduction of number of vehicles positive

Mechelen – Economic and Social Impacts

	Tier	Economic field	Social field
Trial 1	Not assessed		
Trial 2 	Partial assessment	Not assessed, level of TIC low	Awareness and acceptance increased, but service level challenging

Lessons Learned

Impact Assessment

- ULaaDS trials had positive impacts on land and space use, the environment and social acceptance
- Logistics efficiency and economic impacts were more mixed, but the beneficial effects are difficult to measure
- Many positive impacts were more intangible and related to the cooperation and learnings from conducting the trials
- Trials have contributed to ongoing work and innovation on urban logistics in all cities, both in organizing logistics differently as well as regulatory considerations related to topics such as autonomous vehicles and white label solutions.

Lessons Learned

Data Collection

Expectation Management

Data Governance and Compliance

Security Issues

Trust & Collaboration

Data Quality and Integrity

Interoperability and Data (In-)Compatibility

Dependency on (Manual) Legacy Systems

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Thank you!

Howard T. Weir, Anna Keim, Philip Muller

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ULaaDS Final Event
Toolbox Session

Presenter: Fraunhofer IML

Date: 15.11.2023

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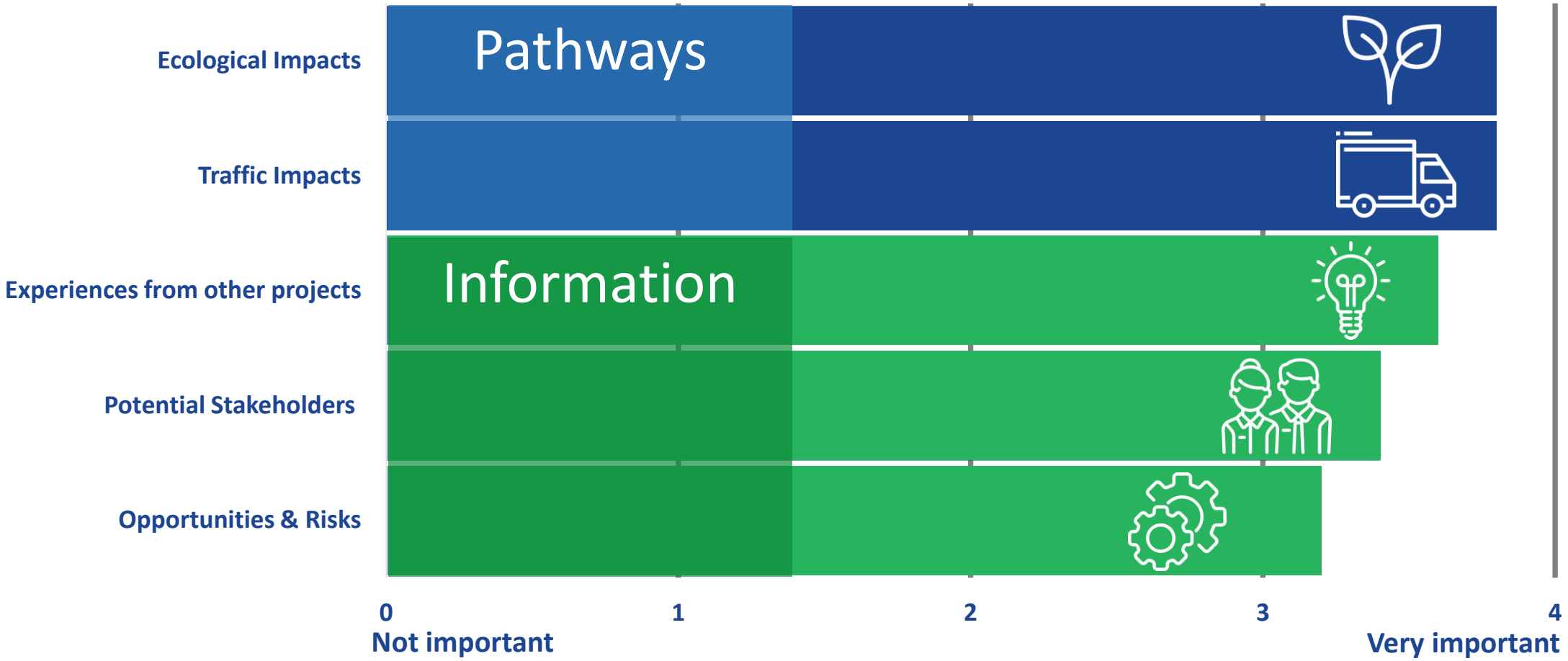
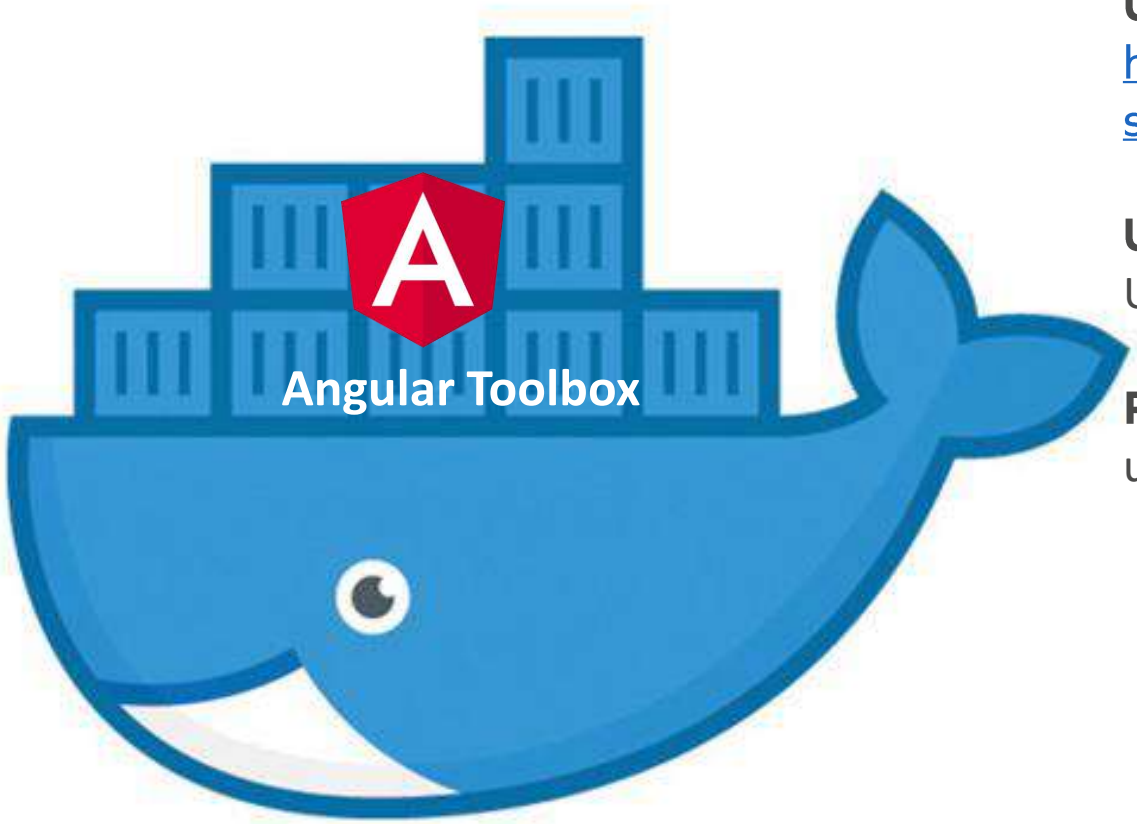
Questionnaire Evaluation (Q1/2021)

Purposes of the “Decision Support Toolbox”



Technical Realisation
ULaaDS Toolbox



Docker Container

URL:
https://ulaads-demo.vlog-services.iml.fraunhofer.de/start/toolbox

Username:
ULaaDSPartners

Password:
ul44dS1*23

Thank you!

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Philipp Müller

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Enjoy the coffee!

We will start again at 16:15

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Interactive session 2: Framework(s) for parcel lockers

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Framework(s) for parcel lockers

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Focus on parcel lockers

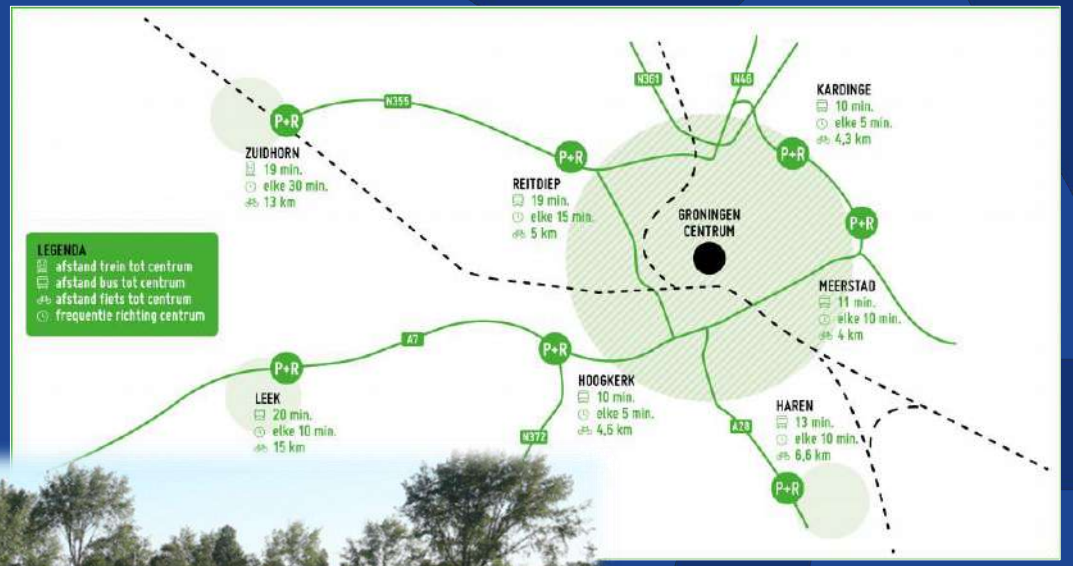
1. What was the plan in Groningen's ULaaDS trial and what has actually happened? – Sjouke
2. How do parcel locker frameworks and practices vary across the world? – Lorena
3. Where should parcel lockers be placed in Groningen? – Victor
4. What factors do decision makers consider when evaluating requests for parcel locker placement? – Paul

- Interactive break outs
- Best practices for implementation

What was the plan in Groningen's ULaaDS trial and what has actually happened?

Sjouke

ULaaDS Trial 2:
Urban logistics as a service for commuters at park & ride



Initial setup

- Trial 2 was intended to add a logistics service to a P+R area on the outskirts of Groningen. Many commuters travel to the P+Rs around Groningen every day. The aim of this was to develop an attractive service for commuters and to make logistics more sustainable by reducing and replacing the driven transport kilometres.

Permits, agreements and requests

- Spatial integration
  - Presure on public space is growing
- Land use agreement
  - Very strict rules for using public space. So a policy framework is needed for a land use agreement
- Electricity connection request
  - Long waiting period to get your requested connection

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Trialing…

Policy framework

- The municipality is in the lead for lockers in public space
- All companies should use the same lockers
- The appearance of the lockers should be tailord to the location
- Parcel lockers can only be placed at specific locations (in public space)
  - Mobility hubs
  - Community hubs
- On private land permission by land owner is needed (+ meeting the municipal zoning plan and aesthetic policy)

Location study

Within the ULaaDS project, BAX & COMPANY carried out a location study for the municipality of Groningen.

This study investigated suitable locations for parcel lockers.

The results of the research form an important part of the policy framework.

Next steps

- The policy framework will be submitted to the city council for adoption in December.
- Part of the framework is a concession for gaining an agreement to operate parcel lockers in public space (for 1 operator).
- At least 3 companies will be asked to make an offer.
- The municipality of Groningen currently assumes a minimum of 10 and a maximum of 20 parcel lockers in public spaces. This can still be deviated from during the concession granting process.
- The concession period is 5 years.

Next steps

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- The concession period is 5 years.

How do parcel locker frameworks and practices vary across the world?

Lorena

Benchmarking worldwide practices

- Austria
- Norway
- UK
- Singapore
- US

Main themes (1/3)

Overall regulation approach:

Proactive (ex-ante)

Reactive (ex-post)

Business and operational models

Open networks

Closed networks

Location

Public space

Private grounds

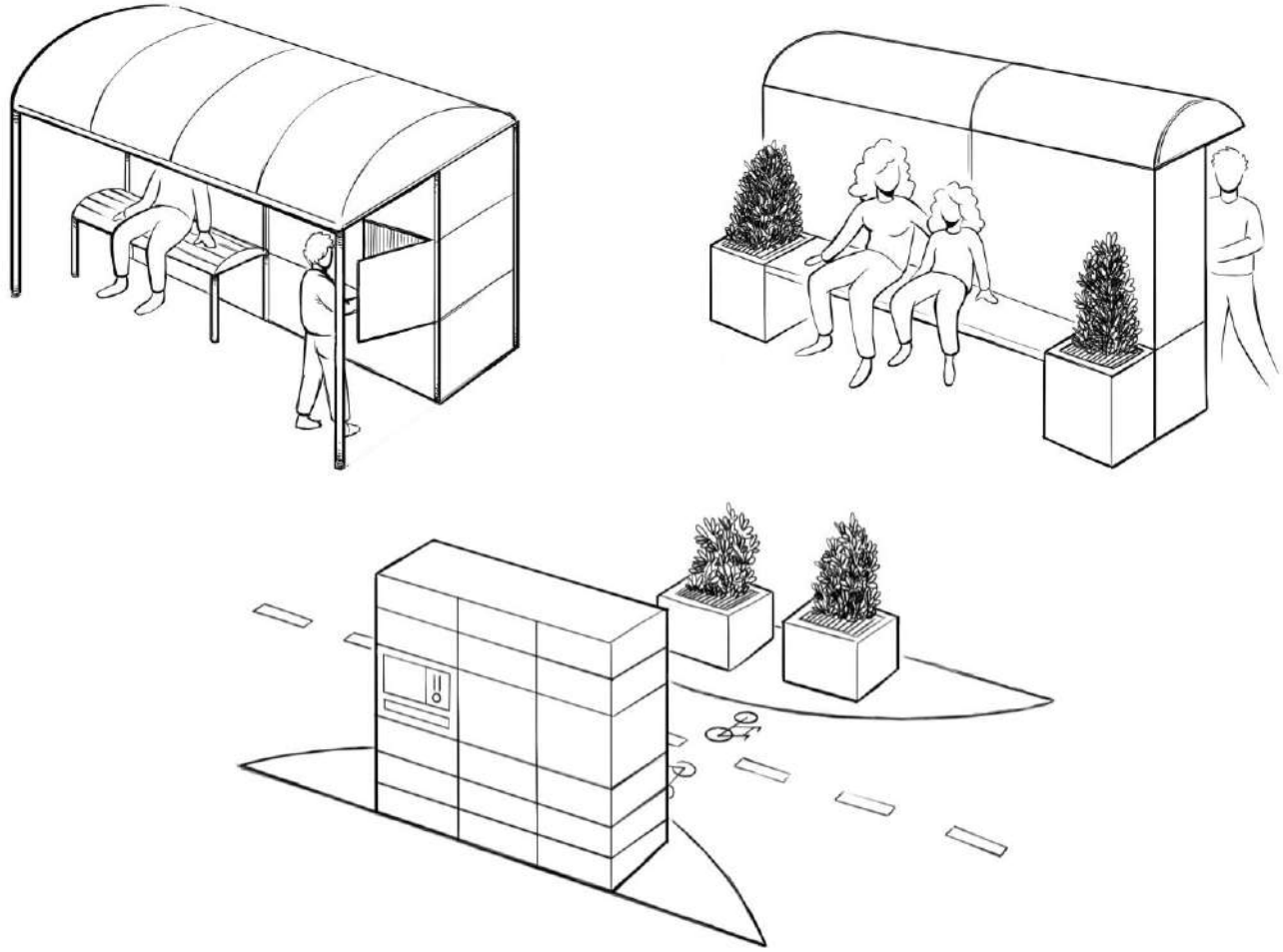
Functions and users

Potential functions	Pick-up / drop-off
	Web shop
	Returns (packaging)
	Returns (products)
	Locker / short term storage
Potential users	Courier express parcel services
	Local businesses
	Other service providers
	Online shops / marketplaces
	Private individuals (P2P)

Main themes (2/3)

Infrastructure requirements:

- Energy/power supply
- Security features (e.g., cameras)
- Safety features (e.g., light)
- Aesthetics
- Place integration



Parcel locker integration in public space

Visual inspired by Millie Mitchell / Centre for London

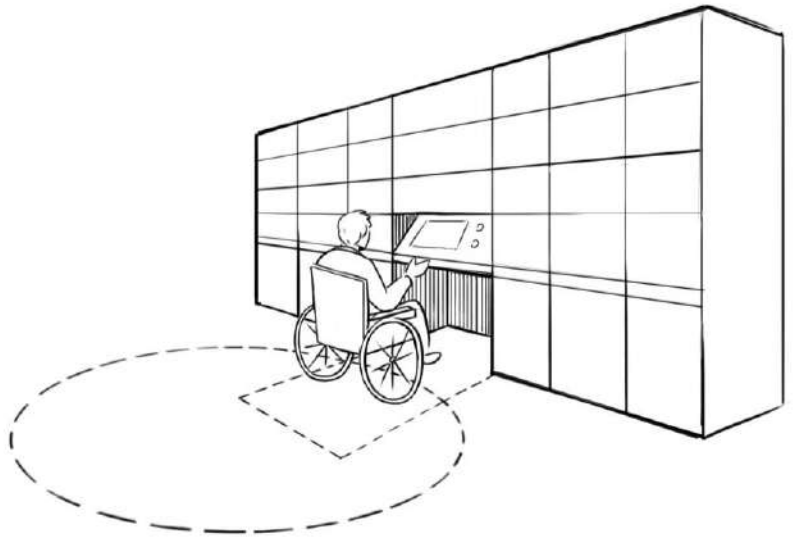
Main themes (3/3)

Accessibility

- parking, exits and manoeuvring areas
- responsibility for cleaning, snow removal, site maintenance
- year-round operation and work in all weather conditions

Data reporting

- Types of vehicles used
- Average number of deliveries & packages/delivery
- Time of delivery & average delivery time (how long the vehicle is parked at the time of delivery)



Barrier-free design of the installation site
Visual inspired by Bernhard Hrsuka / Architecture B4

Where should parcel lockers be placed in Groningen?

Víctor

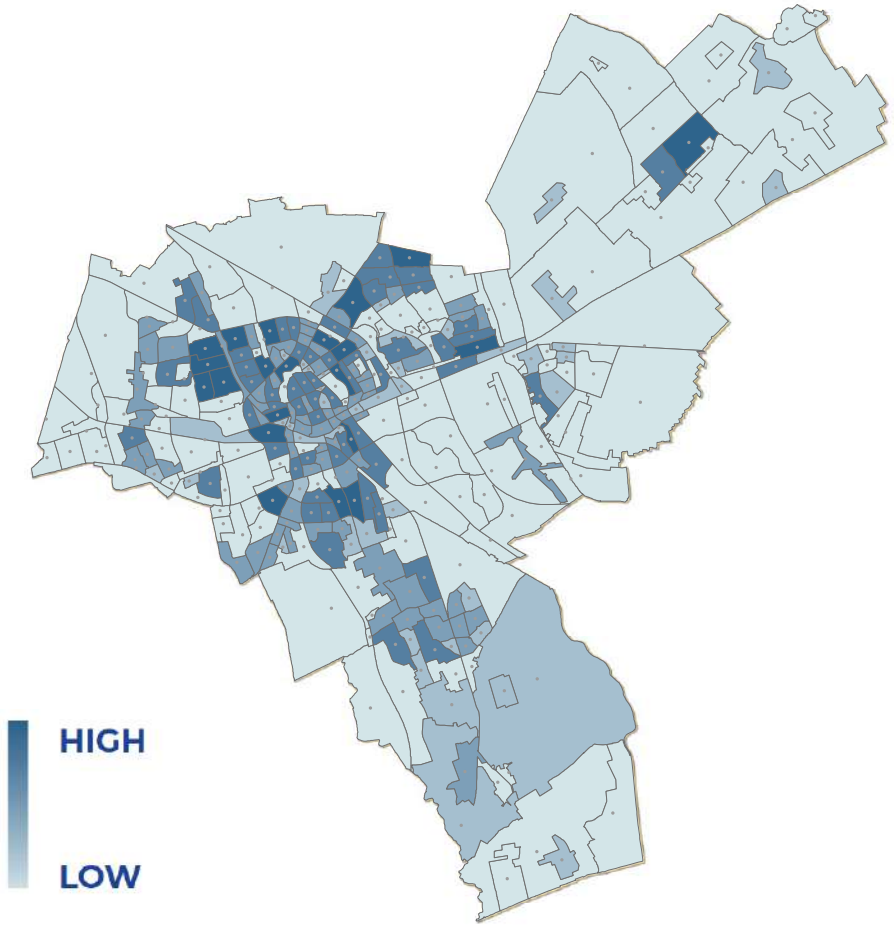
Data provided

Neighbourhoods in Groningen:
“Subbuurtindeling”,

- 320 neighbourhoods.

Density of inhabitants in each neighbourhood.

- The population of each neighbourhood is used as the demand in the analysis.



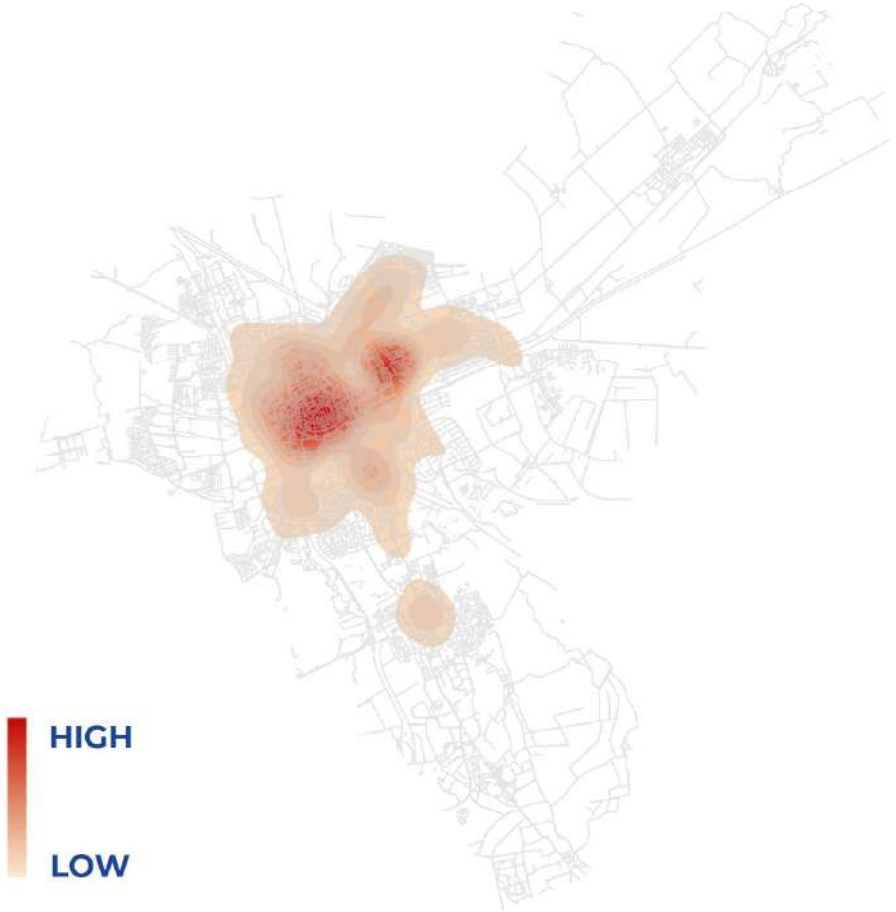
Space syntax: betweennness

Space Syntax: betweenness centrality shows the segments of the network that are most used by bicycles;

- Central streets as well as streets that connect different neighbourhoods tend to have high centrality values, which means that by the spatial configuration of the network would carry more flux of users as it connects faster different origins and destinations within a radius of 10km

Kernel density of the betweenness centrality visually shows where the higher densities of the most used segments of the network are located in the city.

- The highest values cover the central area of the city, as well as the area near the canals, because traffic is concentrated on fewer roads, especially near bridges.

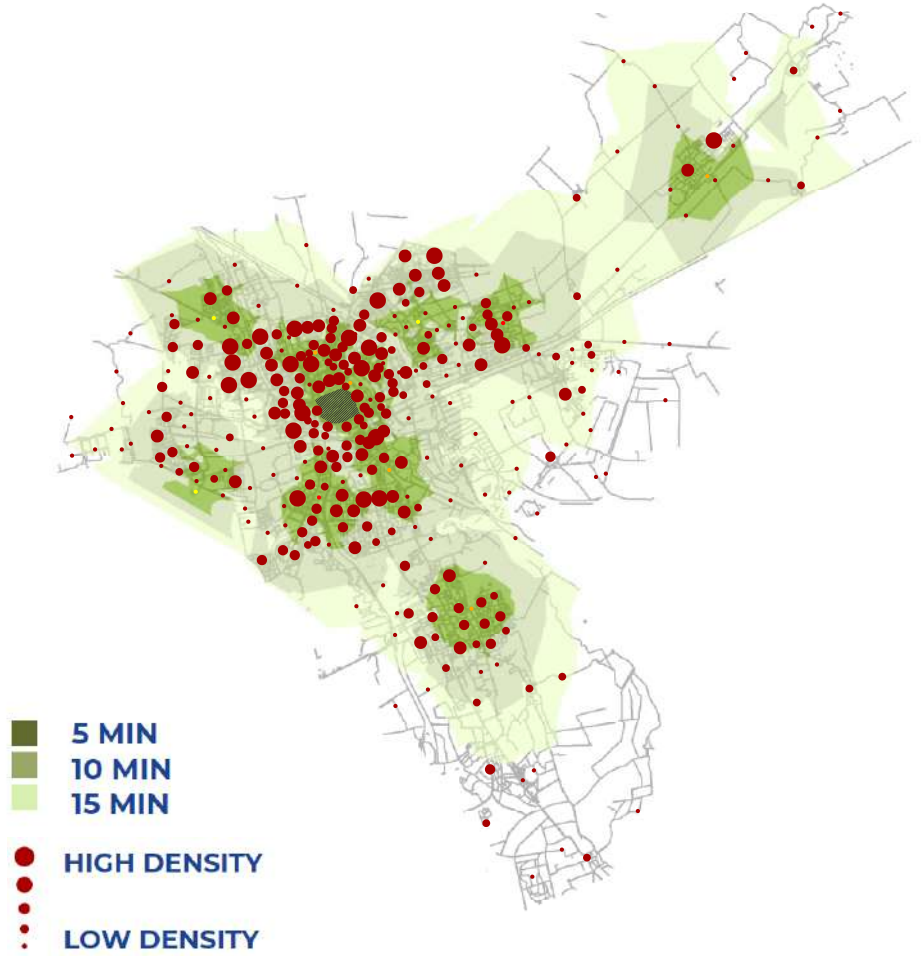


Optimal location of 10 potential parcel lockers

Minimum Impedance (also known as the P-Median Problem) is the problem used to locate facilities so that the sum of all weighted travel times or distances between demand points and solution facilities is minimised.

Visualisation of the coverage of these 10 selected lockers at 5-minutes intervals **cycling**.

Most densely populated neighbourhoods are covered by these optimal locations.



Current PUDO providers, locations & type

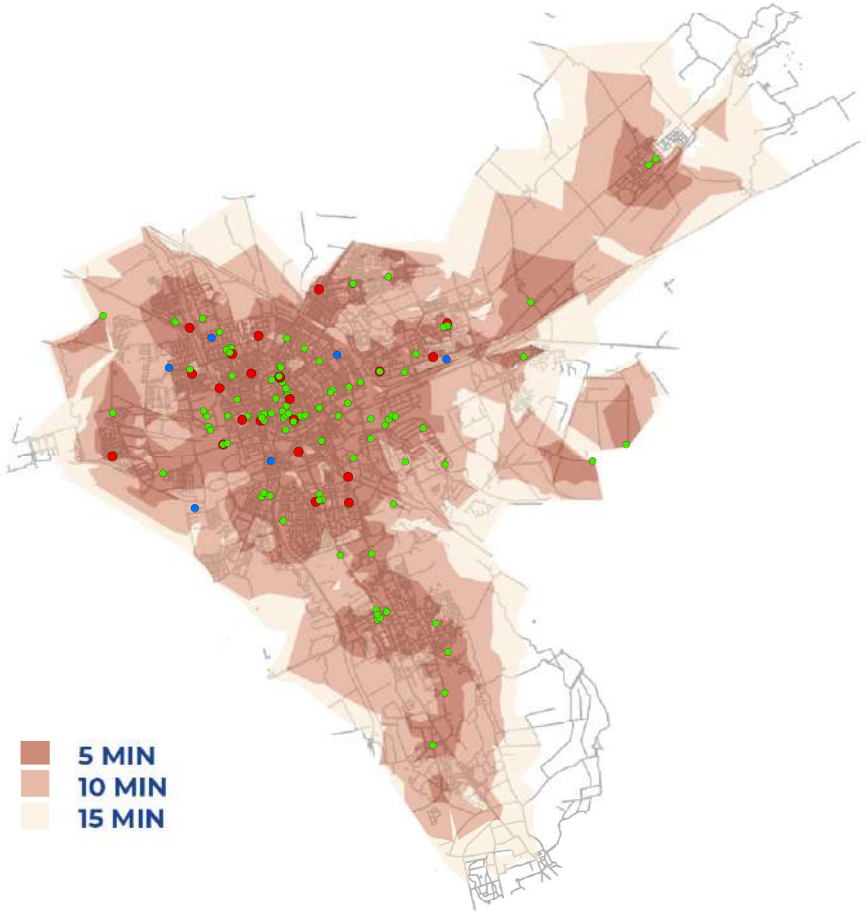
Current PUDOs by brand

- Most popular brands: PostNL and DHL

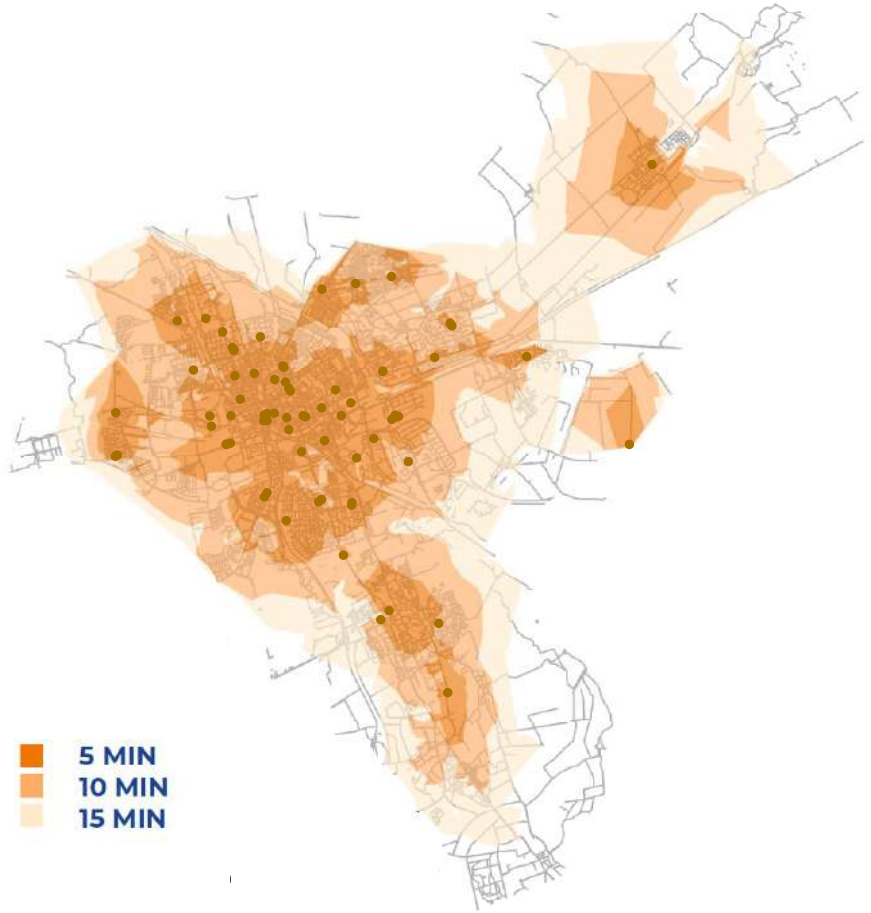
Current PUDOs by type, 3 types:

- At home
- In shop
- Parcel locker

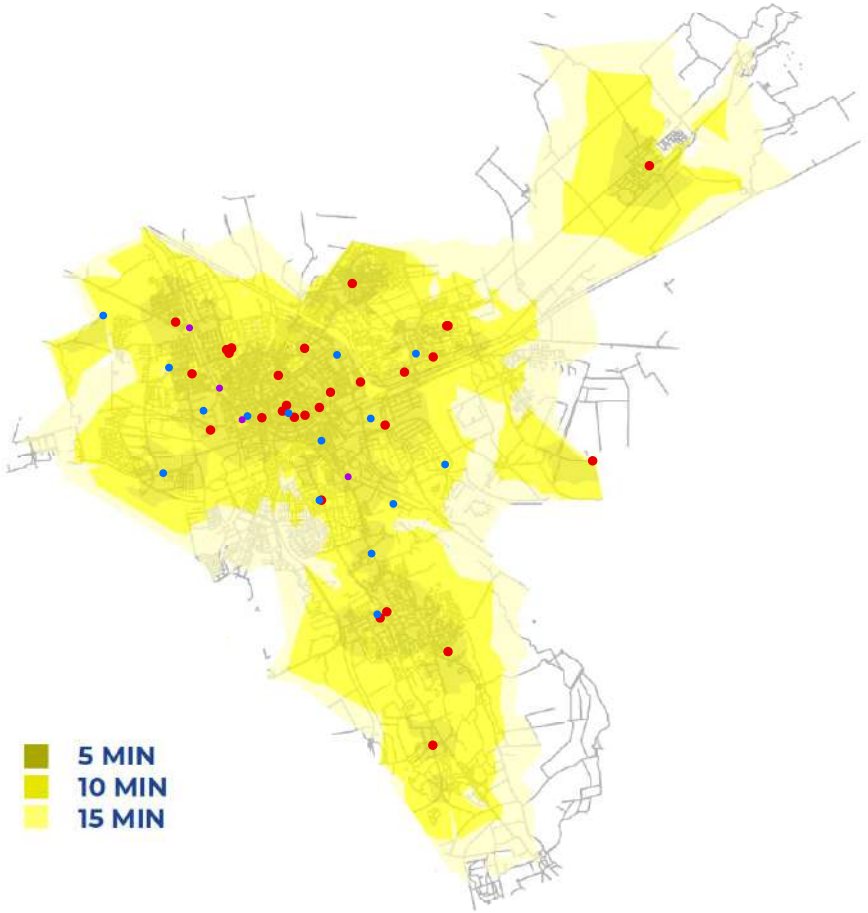
Coverage of all PUDOs by bike shows that the city is well covered when cycling



PostNL & DHL bike coverage

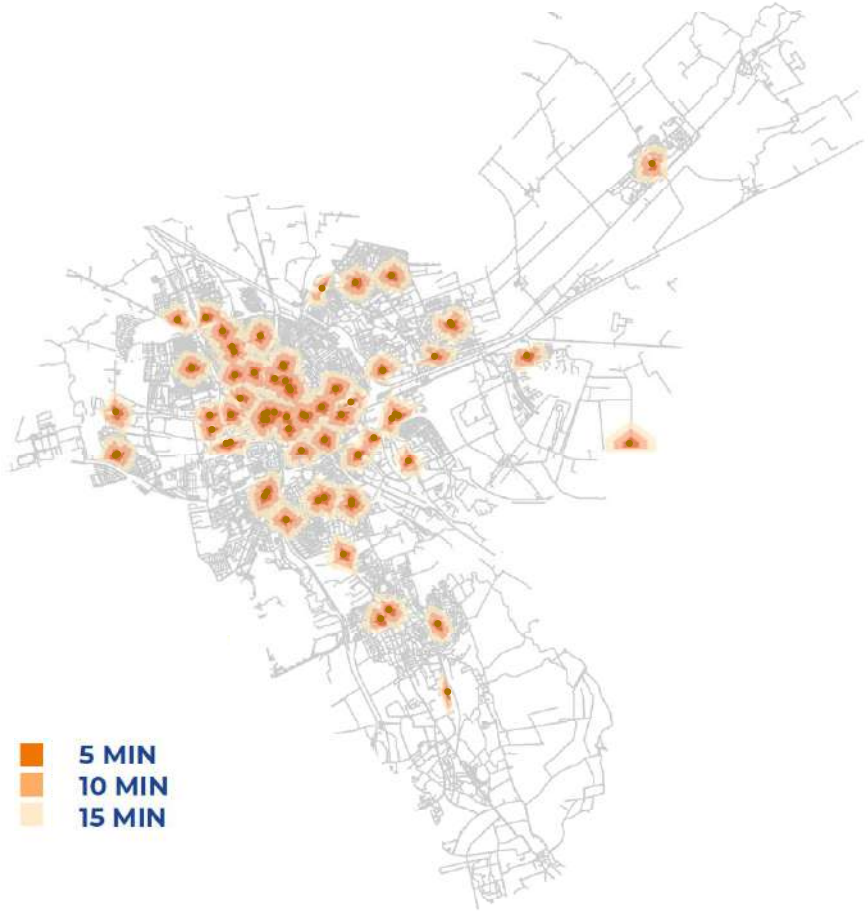


All PostNL facilities

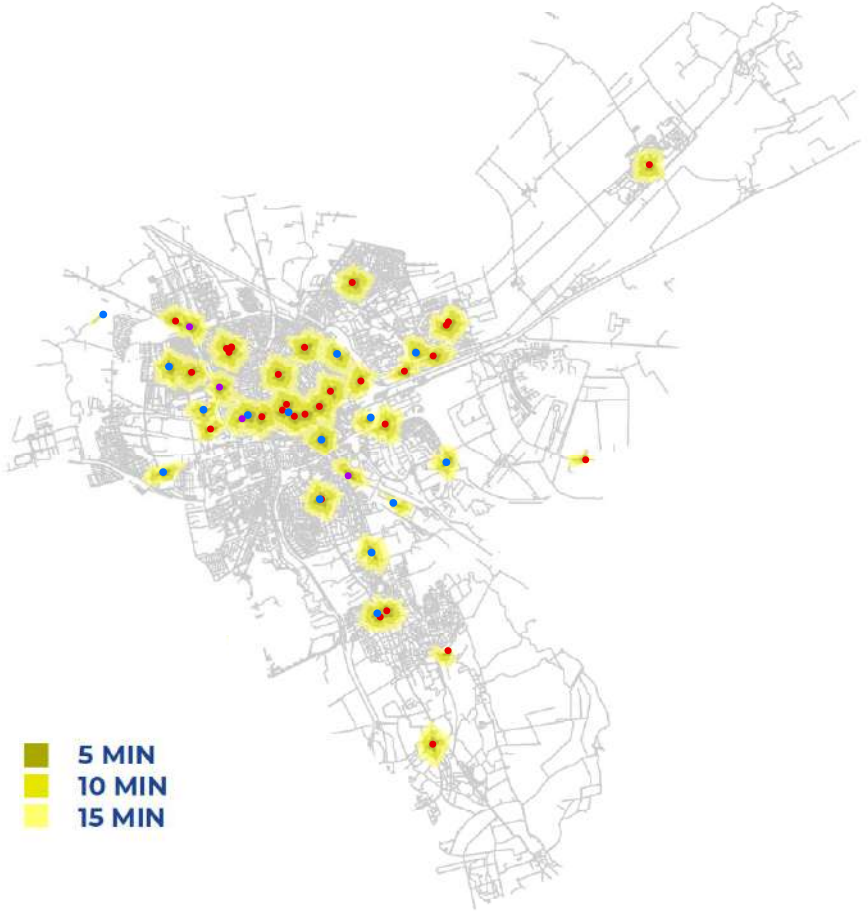


All DHL facilities
- Red: DHL
- Blue: shared shops
- Purple: shared PL

PostNL & DHL pedestrian coverage

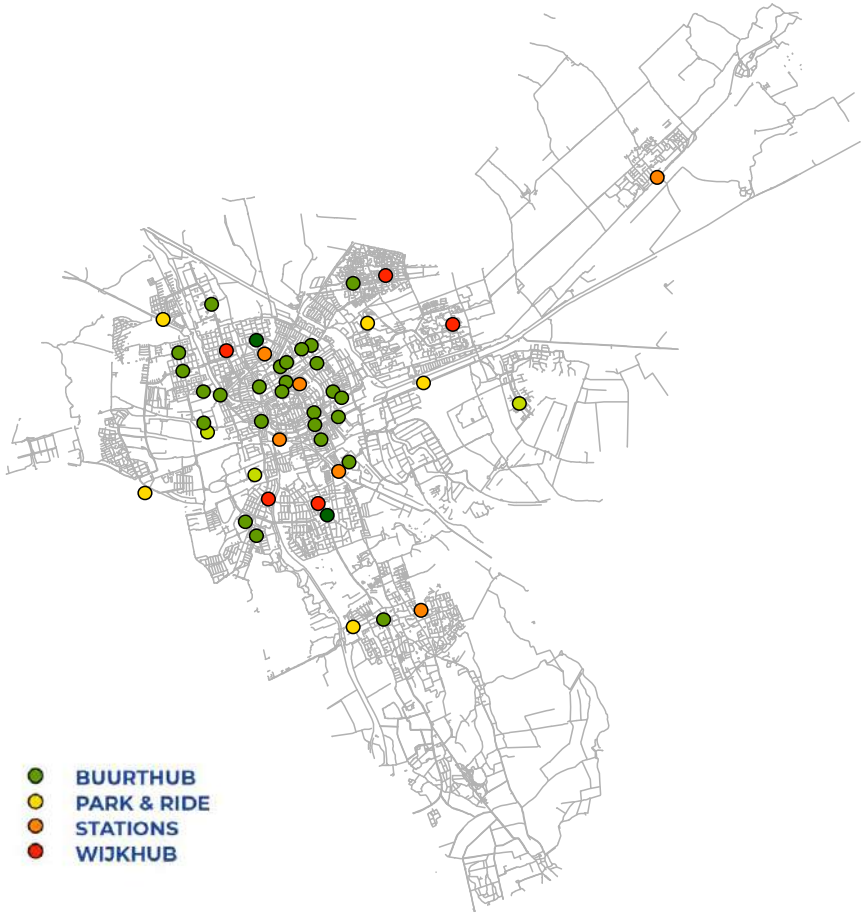


200m/400m/600m PostNL by foot network coverage



200m/400m/600m DHL by foot network coverage

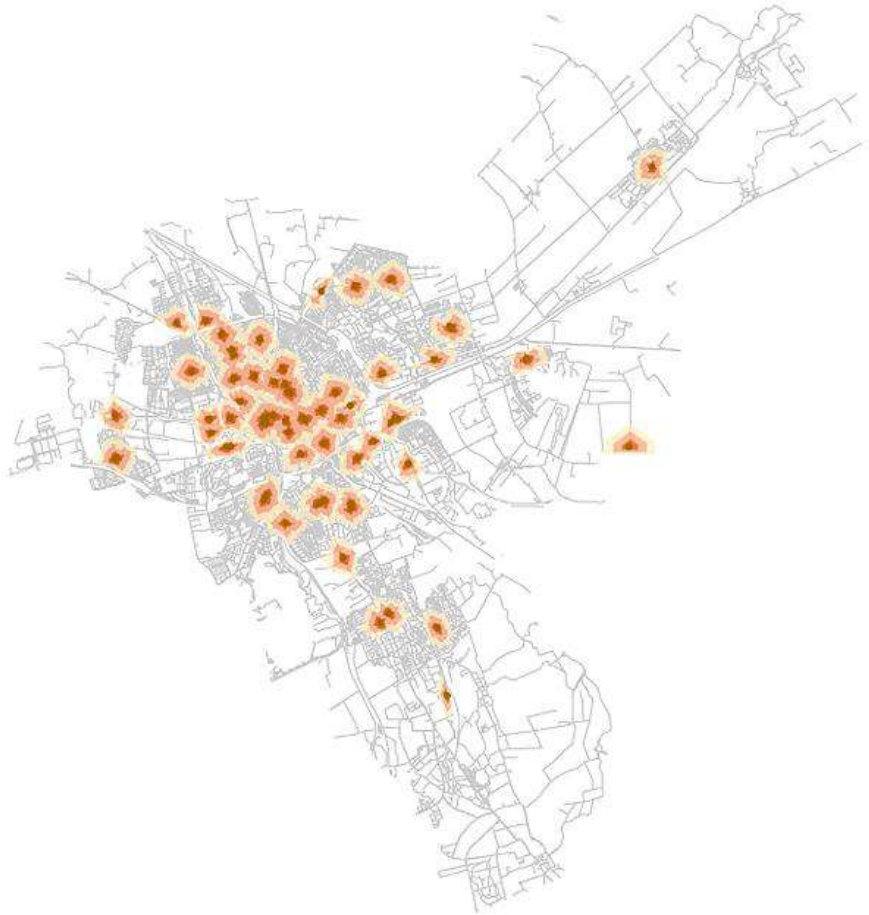
Possible locations and coverage

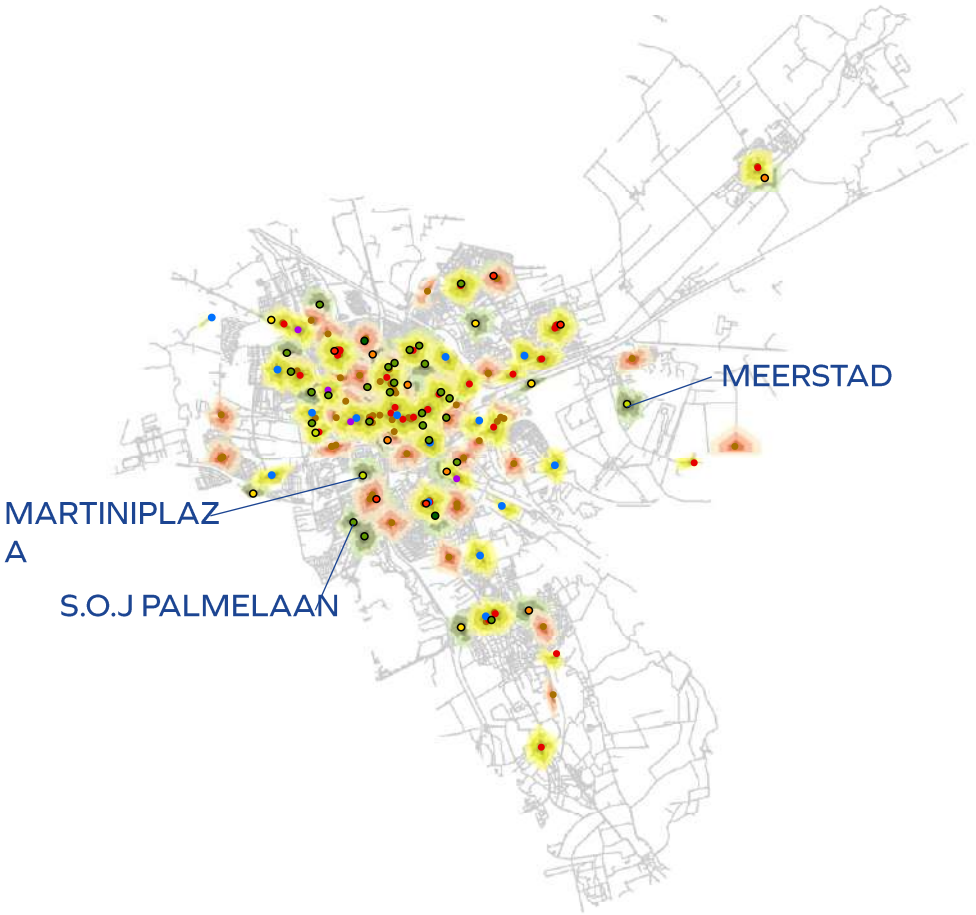


Possible PL locations

All possible locations' pedestrian coverage (200-400-600m)

Current and possible new locations coverage





PostNL & DHL pedestrian coverage + possible new locations (green)

Conclusions

- This study provides the city of Groningen with information on where to locate parcel lockers, taking into account various factors. Throughout the analysis process, various inputs and priorities have emerged and shaped the study.
- Starting with the spatial configuration of the city's streets, space syntax (betweenness centrality) gives us an insight into where citizens move, and we can have a general understanding of the flows of people and where it would make more sense to locate public services.
- Secondly, the use of models to optimise the distribution of parcel lockers to meet the needs of the population shows us 10 optimal locations, distributed to cover the most populated areas of the city.
- Finally, the current distribution of PUDOs is taken into account and the new parcel lockers have the function of complementing it. Here we see which of the possible locations fill an empty area of population.
- This last step is a key element if the new parcel lockers are to be managed by one of the brands. However, if a particular new brand is interested, or if the city wants to create a parallel independent network of parcel lockers, then the second analysis (location-allocation) would be more appropriate.

What factors do decision makers consider when evaluating requests for parcel locker placement?

Paul

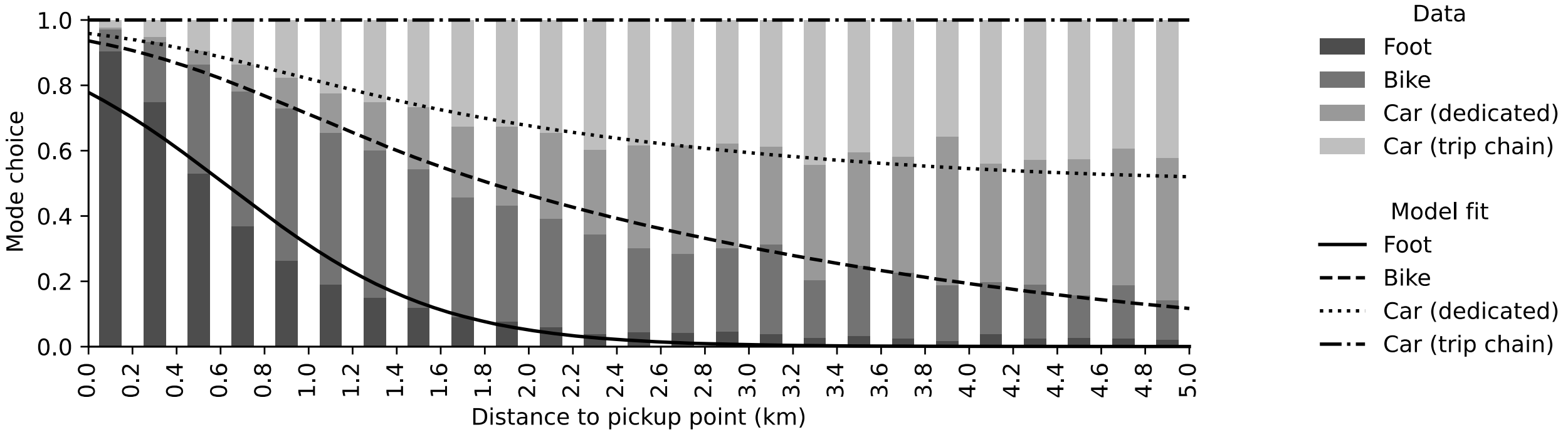
Local authority perspective

- Perceived room for societal impact:
  - Emissions
  - Nuisances by delivery vehicle
  - Nuisances at locker
  - Customer Preferences
  - Innovation
  - Pull effect

Local authority perspective

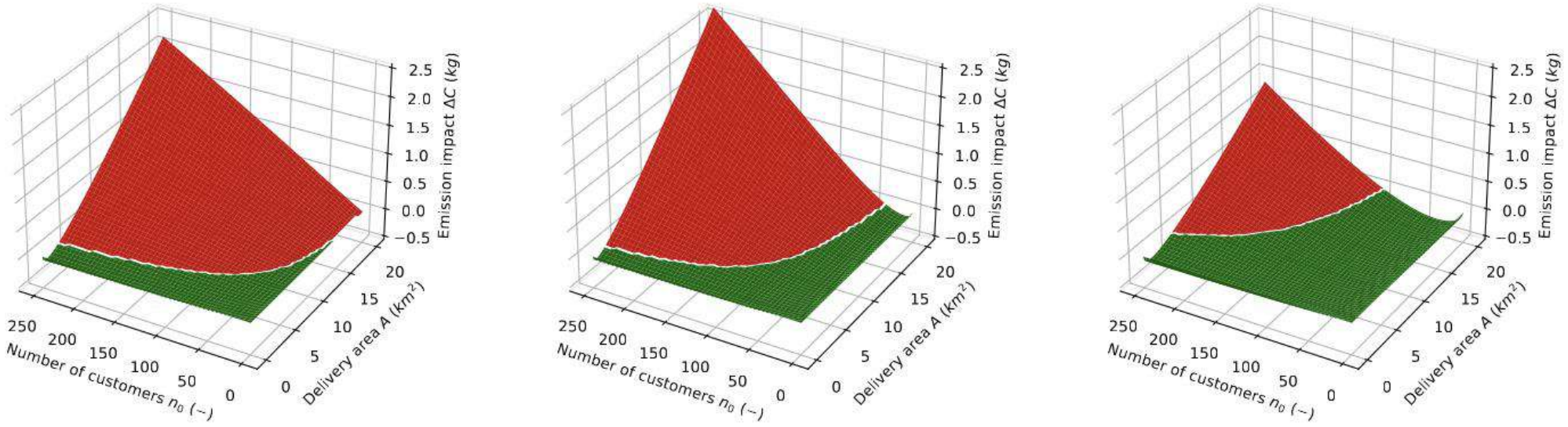
City	Emissions	Nuisances by vehicle	Nuisances at locker	Customer preferences	Innovation	Pull effect
City A	25	10	25	25	10	5
City B	10	40	30	10	0	10
City C	20	25	10	15	10	20
City D	35	35	15	15	0	0
City E	21	30	21	11	6	11
City F	25	30	10	20	5	10
City G	0	20	30	20	15	15
City H_1	30	30	30	0	10	0
City H_2	20	20	20	20	20	0
City J	0	60	25	5	5	5
City K	33	34	33	0	0	0
City L_1	10	40	10	30	5	5
City L_2	30	20	20	30	0	0
City M	0	0	100	0	0	0

Local authority perspective



Niemeijer, Rudy and Buijs, Paul, A Greener Last Mile: Analyzing the Carbon Emission Impact of Pickup Points in Last-Mile Parcel Delivery (April 23, 2023). Available at SSRN: https://ssrn.com/abstract=4169737

Local authority perspective



(a) Rural

(b) Suburban

(c) Urban

Niemeijer, Rudy and Buijs, Paul, A Greener Last Mile: Analyzing the Carbon Emission Impact of Pickup Points in Last-Mile Parcel Delivery (April 23, 2023). Available at SSRN: https://ssrn.com/abstract=4169737

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URBAN LOGISTICS AS AN ON-DEMAND SERVICE

Q&A

Thank you!

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Víctor Ferran v.ferran@baxcompany.com

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BAX & COMPANY

VALUE FROM SCIENCE AND TECHNOLOGY

Cargo Hitching On-Demand

Via virtual trial

November 2023

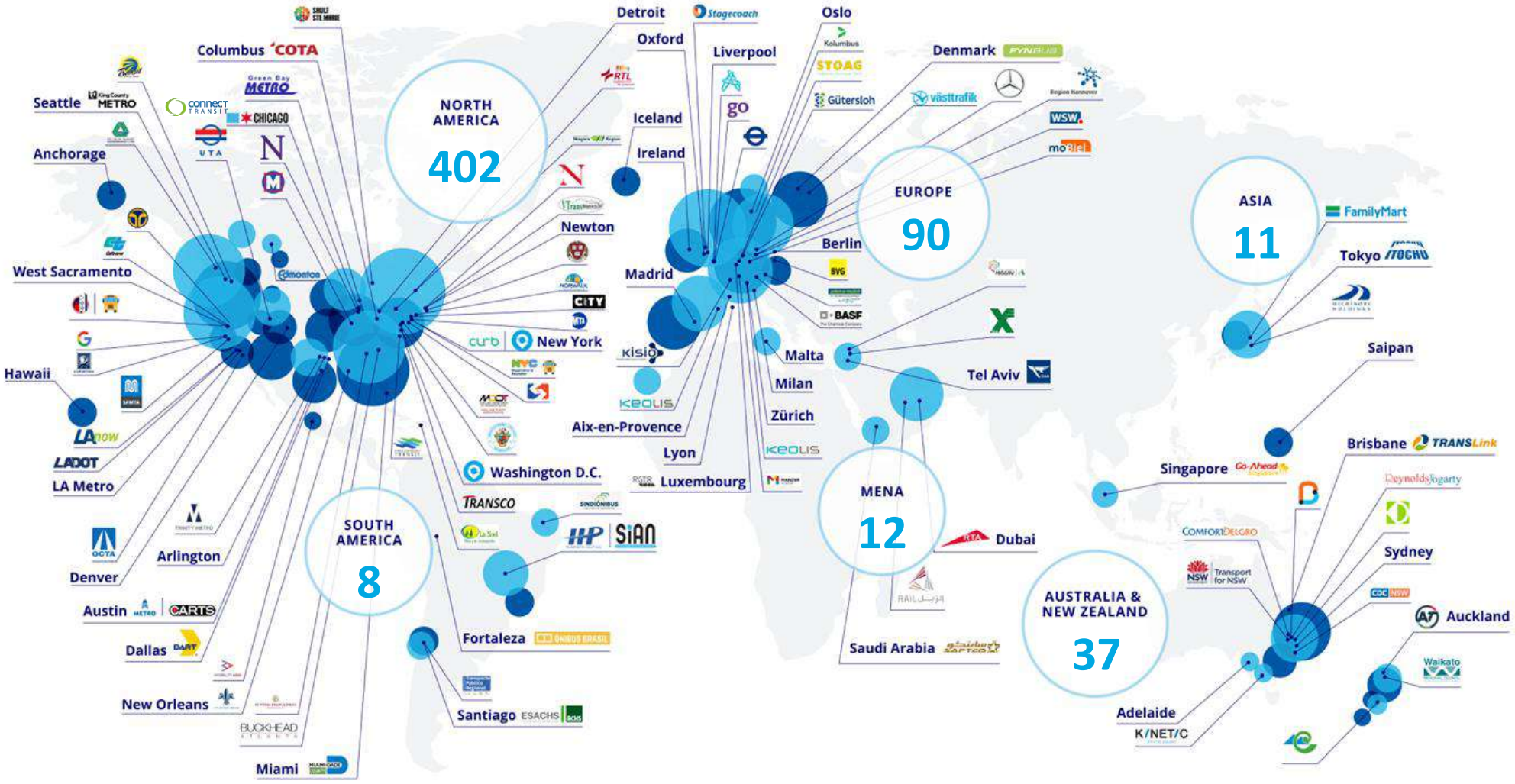
Via operates on a global scale, delivering impact for thousands of communities as a leader in the TransitTech space.

650+
Partnerships

40
Countries

250+
Microtransit deployments

115M+
Trips

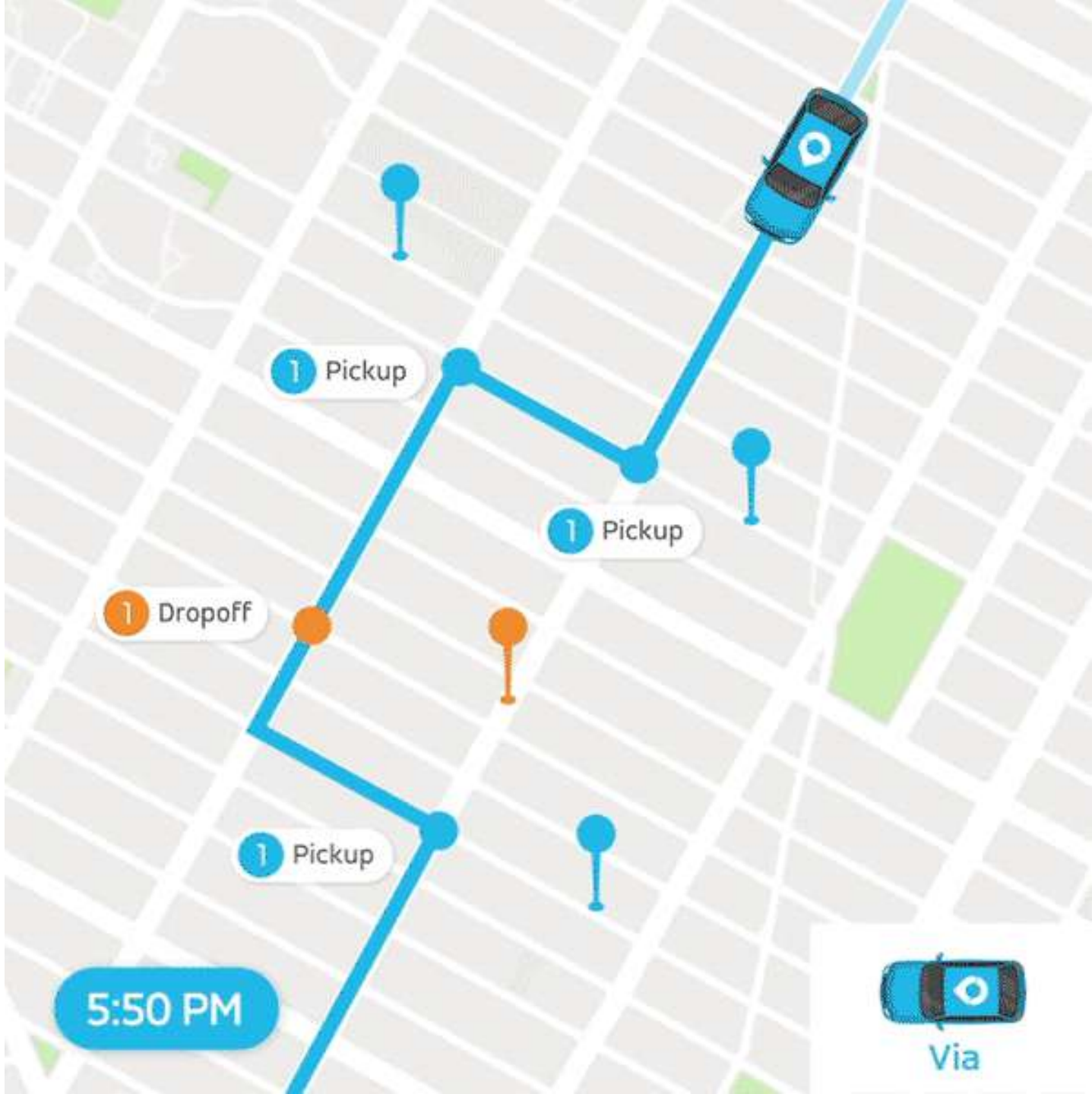


Via's experience with on-demand was the basis for our ULaaDS work.

Via provides technology for and operates on-demand passenger transit services across the world, including many deployments in Europe.

Our system assigns virtual stops for pickups and dropoffs, which minimizes detours and optimizes routes.

Passengers walk a short distance to their vehicle, making for more seamless and smooth rides.



Via Strategies

Via Strategies is an innovation-driven transportation planning and consulting team that draws on Via's expertise as the world's leading developer and operator of advanced public mobility systems. Our advisory services help transit agencies, cities, operators and other clients develop, optimize, and innovate on multimodal transportation networks.

- Transit feasibility studies
- Transit hub/infrastructure planning
- Cost-benefit analysis
- Transit innovation studies
- Paratransit studies
- EV transition planning
- Comprehensive network redesigns
- Public Engagement
- Implementation/funding strategies

Today's Agenda

1. **Goals + history of the virtual trial**
2. Key decisions and assumptions
3. Digital pilot and findings

Goal:

Demonstrate the potential operations and impact of a cargo hitching pilot in Bremen

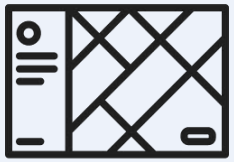
History of the virtual trial

Originally planned as a real-world trial

- Set at a local plant in Bremen
- Aimed to evaluate operations outcomes of combined human and freight transport within a controlled environment.

Trial determined not possible during pre-trial setup work

- Logistics flow at the plant had already been optimized
- Operational issues such as driver ability to handle packages
- Other real-world alternatives determined not possible due to operational complexity



Updated approach: digital pilot

- Simulate a comparison city and Bremen - allows for flexibility in selecting zone and cargo models
- Via has best-in-class simulation and modeling technology
- Via has ability to use existing passenger data in comp city, and create/adapt passenger and cargo data for Bremen based on 600+ global deployments

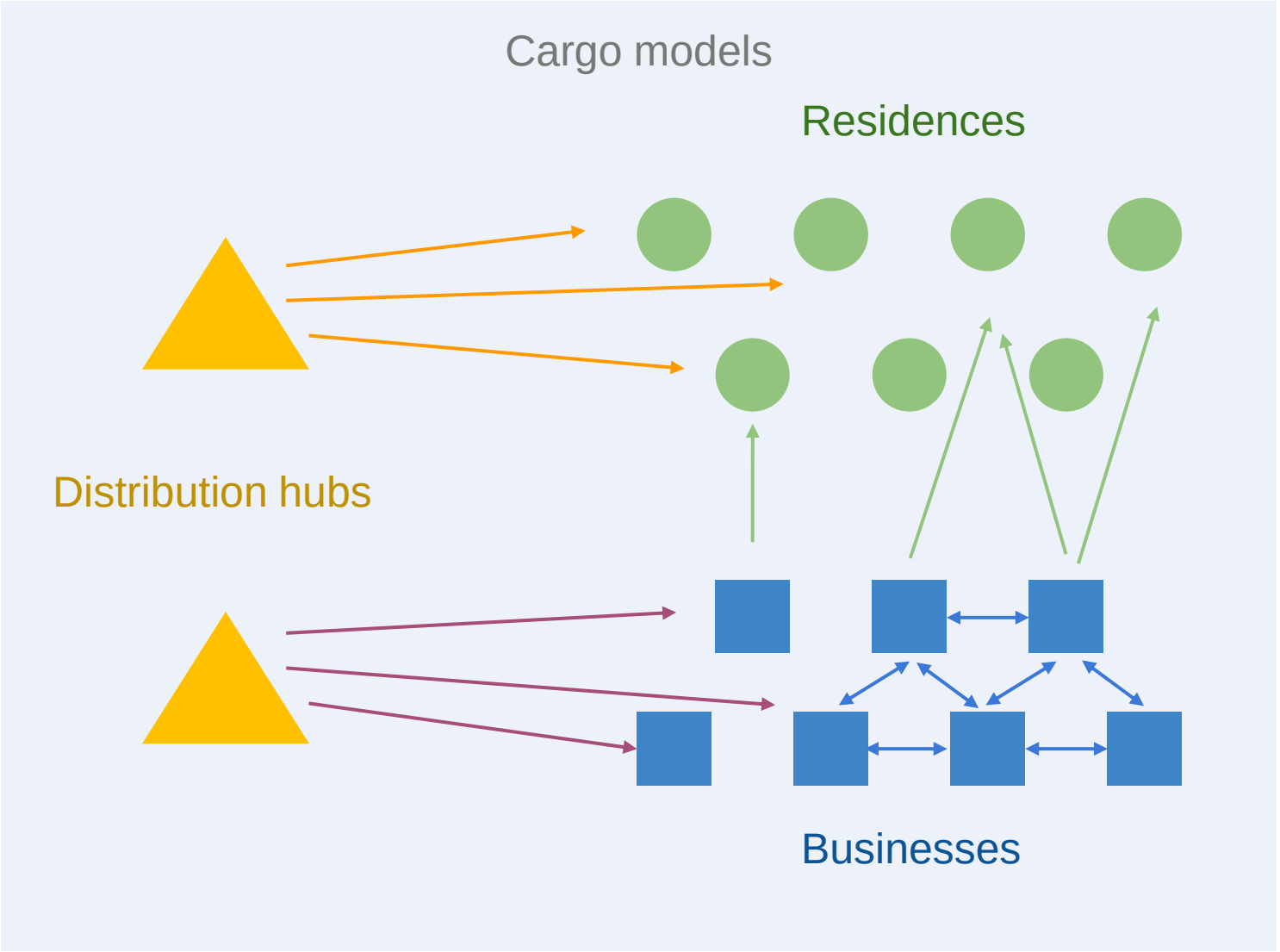
Today's Agenda

1. Goals + history of the virtual trial
2. **Key decisions and assumptions**
    - Project approach
    - Commingling model and decisions
    - Types of service areas
    - Types of simulation
3. Digital pilot and findings

Cargo model - four options

Four potential cargo models:

- **Orange:** Hub-and-spoke from distribution centers in communities to residential areas
- **Purple:** Hub-and-spoke from distribution centers in industrial areas to businesses
- **Green:** Businesses to residential areas (e.g. grocery delivery)
- **Blue:** Delivery between businesses



Cargo model - selection of two models

Four potential cargo models:

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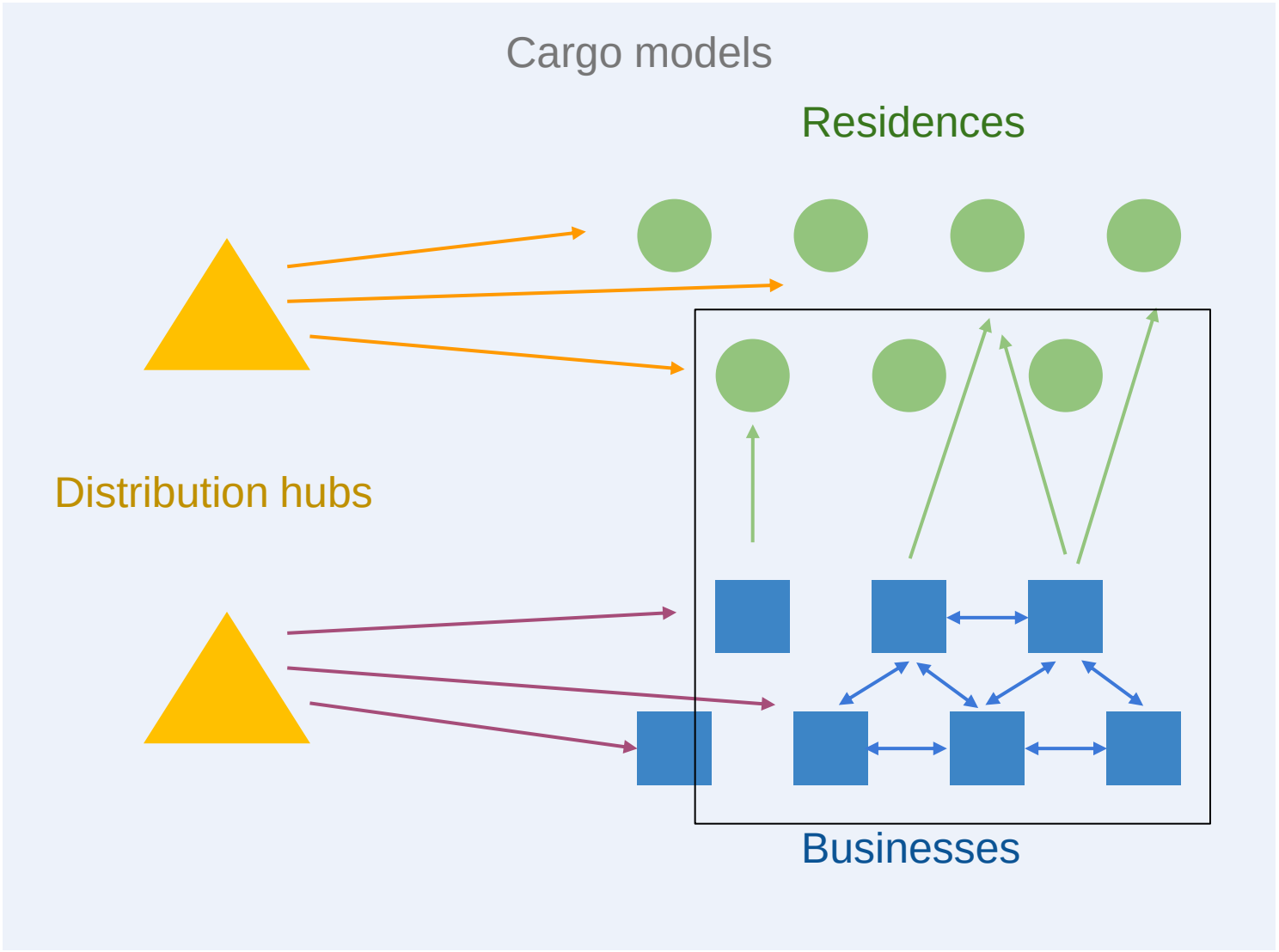


Commingling decisions based on Via lessons learned from logistics operating experience + expert interviews

- **Focus on small scale deliveries from local businesses**
  - On-demand needs for goods are limited to grocery stores, pharmacies, restaurants, and similar local businesses. Via has less experience with deliveries from distribution hubs, which tend to be pre-scheduled rather than on-demand.
  - With larger packages, there are issues with inaccurate labels on packages regarding size or other key information.

- **Limit vehicles to having either passengers or packages at one time**
  - Some “commingled” services use the same fleet but focus on one type of delivery at a time - e.g. passengers are transported morning/evening peaks, and goods are transported during daytime lull.
  - Hot food can have odors which are not desirable for passengers.

- **Account for friction caused by package pickup/dropoff**
  - Major point of inefficiency - hard to predict duration, recipient may not be present, etc.
  - Driver should not leave passengers in the vehicle while picking up or delivering packages.
  - Picking up multiple orders from one location can take a longer period of time. Batching = more complexity.

Service area type evaluation

Commingling approach: Time separated

- Passengers will be transported during peak hours, packages during off-peak daytime hours
- Separate parameters for goods and passengers

Determination: Do not proceed

- Limited need for mobility throughout the village during the day; frequent bus service sufficient for most use cases

Commingling approach: Schrodinger's van

- Each vehicle can transport both goods and passengers, but only either one at a time
- Separate parameters for goods and passengers

Determination: Proceed

- Sufficient anticipated demand for both passenger and package transport in a medium density area

Two modules: (1) Comparable City and (2) Bremen

Module 1: Comparable city simulation

- **Goal: Prepare the model**
- **Select a German comp city** where Via has existing passenger operations
- **Model real-world passenger demand** pattern to establish simulation baseline
- **Run cargo-only and passenger + cargo simulations** (cargo data adapted/created based on Via experience)

Module 2: Bremen simulation

- **Goal: Apply model to Bremen**
- **Model passenger-only, cargo-only, and passenger + cargo simulations**

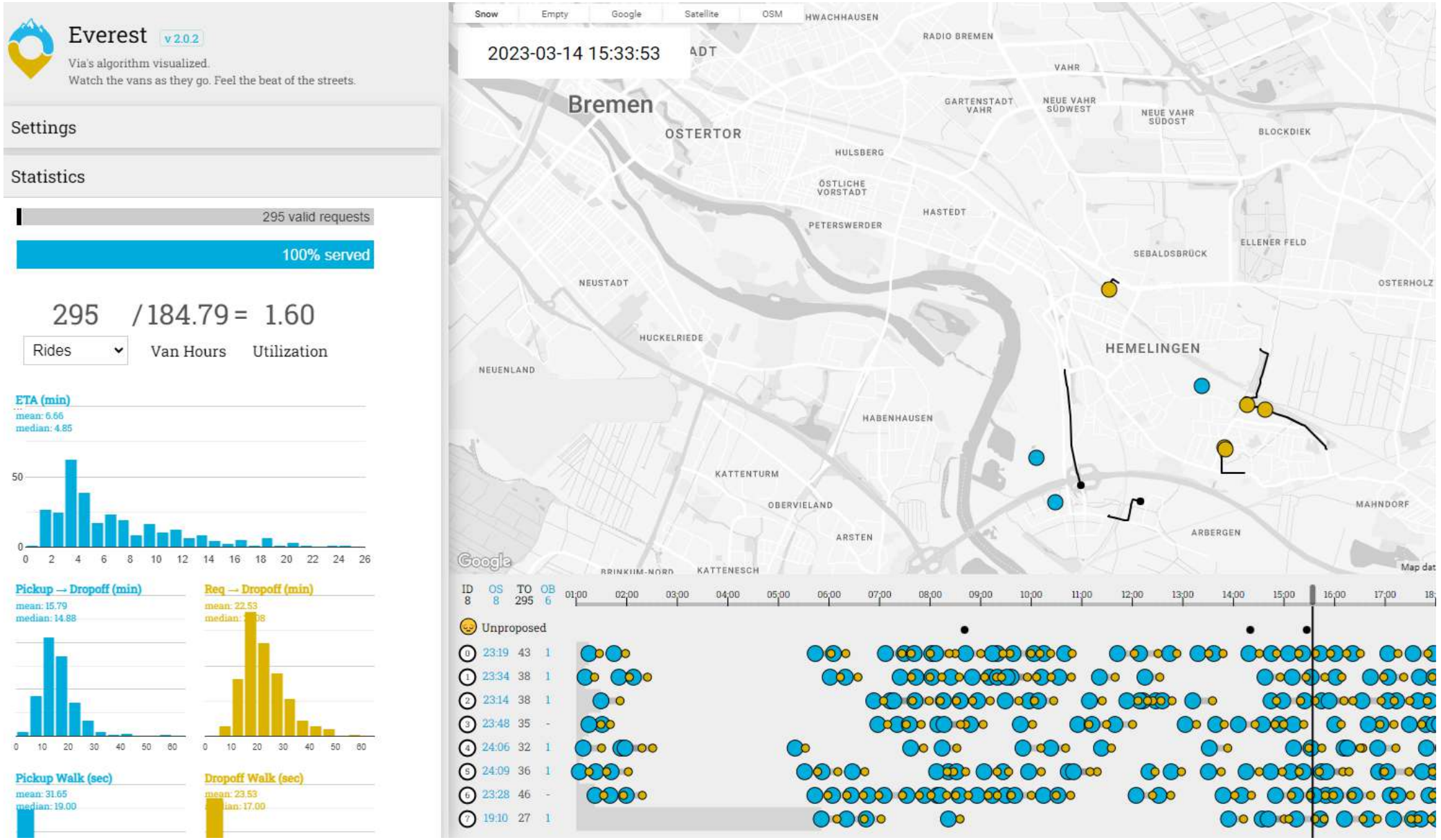
Four types of simulations: illustrative

Today's Agenda

1. Goals + history of the virtual trial
2. Key decisions and assumptions
3. **Digital Pilot and Findings**

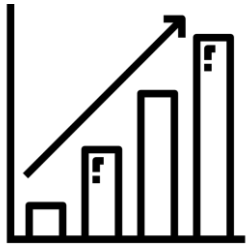
Bremen service zone - based on demand and geography

Bremen simulations - same algorithm as live services



Bremen simulation outputs

Findings: Digital trial outcomes

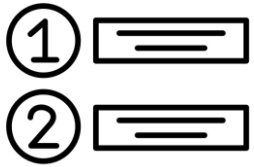


Cargo hitching increases the efficiency of both passenger-only and cargo-only on-demand services - but this efficiency is largely due to a greater total number of trips rather than an inherent benefit of cargo hitching.

The details of the cargo hitching model can have a meaningful impact on service finances. Only the cargo hitching model where package delivery occurs during off-peak hours of a passenger service can yield a meaningful cost reduction compared to running both services separately.

Cargo hitching yields a reduction in greenhouse gas emissions, but the reduction can be limited to less than one ton of CO2 depending on the service model and size of the service. The larger the volume of passengers and packages, the greater the reduction in emissions.

Findings: Process and service design



It is difficult to optimize for both passenger and cargo transport; usually one will need to be prioritized. Optimizing would be most effective if packages and passengers have peak demands at different times, or if packages can be delivered at any time during the course of the day.

It is vital to conduct due diligence on location and potential demand prior to implementation, especially in environments that an operator is less familiar with. The zone needs sufficient demand for both passenger trips and package delivery at scale in order to be successful.

Pickup and dropoff are the biggest points of friction. Difficulties for passengers and drivers can lead to variable and unpredictable pickup and dropoff times that may affect timing of future trips/deliveries.

Passengers and cargo sharing a vehicle may not always be viable. A service will most likely not want to pick up or drop off cargo while a passenger is in the vehicle, and some types of cargo may not be suitable to be in a vehicle with a passenger.

ULaDS

URBAN LOGISTICS AS AN ON-DEMAND SERVICE

Q&A

Thank you!

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