Key Results

Event: Final Conference
Location: Brussels & Online
Date: 25/05/2022

LEVITATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

The short, medium and long-term impacts of CAVs

LEVITATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

Wolfgang Ponweiser,
AIT

Urban Freight

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Automated freight transport

Automated urban delivery • Semi-automated delivery • Fully-automated delivery
Automated consolidation • Consolidated delivery via white label city-hubs
Hub to hub automated transfer
Truck platooning • Effects of truck platooning on highway bridges

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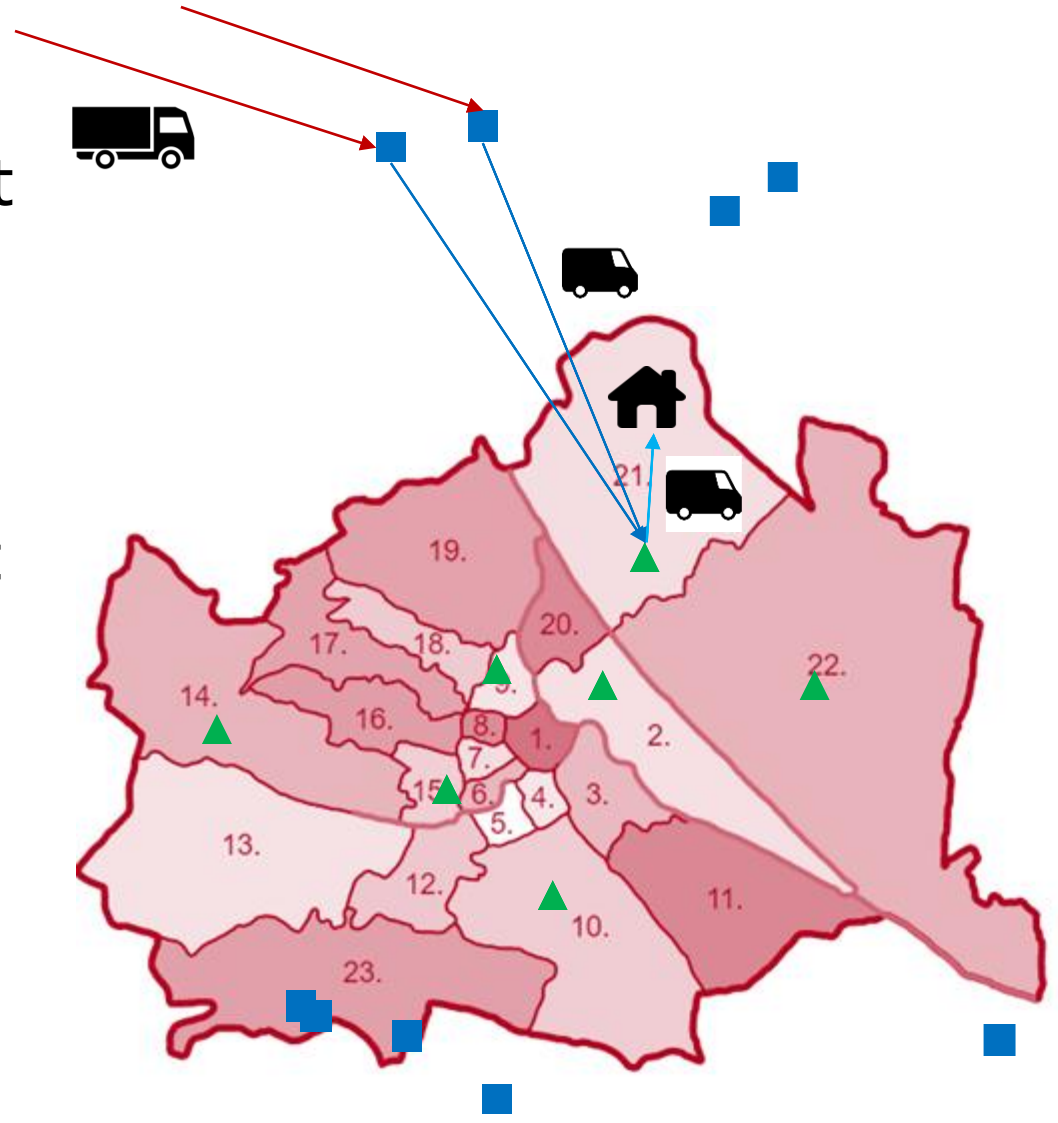
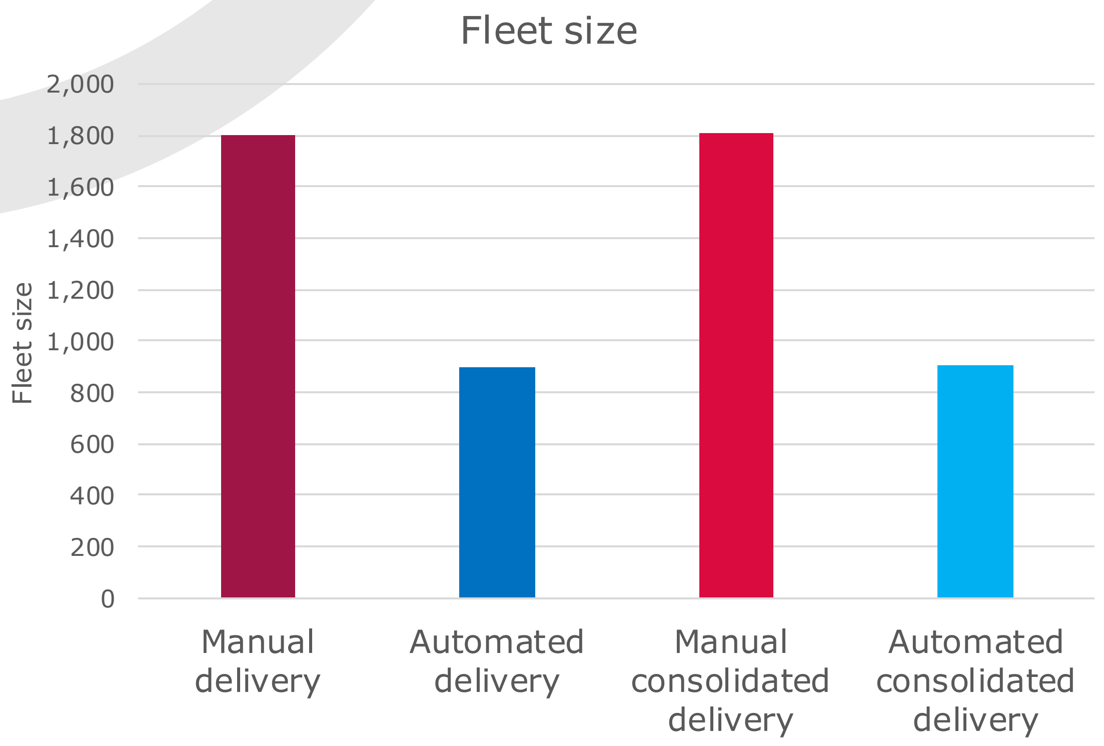
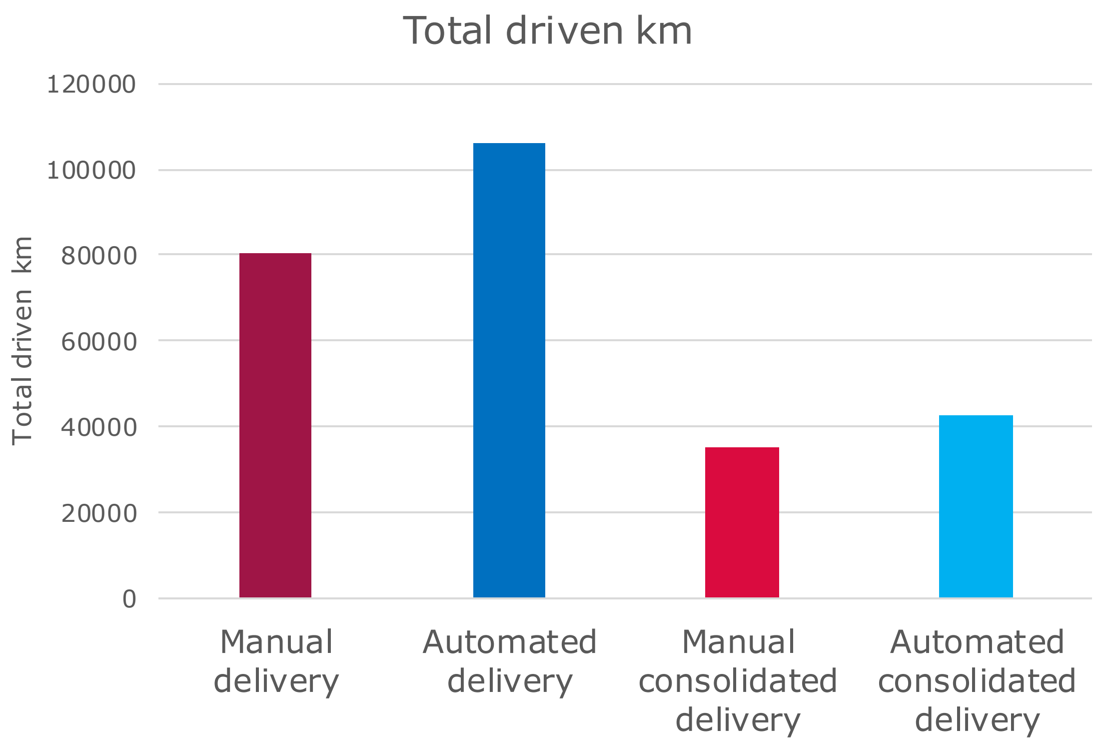
Automated delivery

- **Automated delivery:**
  - Robo-van as "mothership"
  - Small delivery robots for the last 200m
  - Delivery can be done during off peak hours and night
  - Smaller parcel capacity due to robots and additional equipment
- **Consolidated delivery**:
  - Trucks deliver parcels from Logistic centers to city-hubs
  - Vans deliver parcels from city-hubs to customers



Automated delivery – Fleet size and driven km





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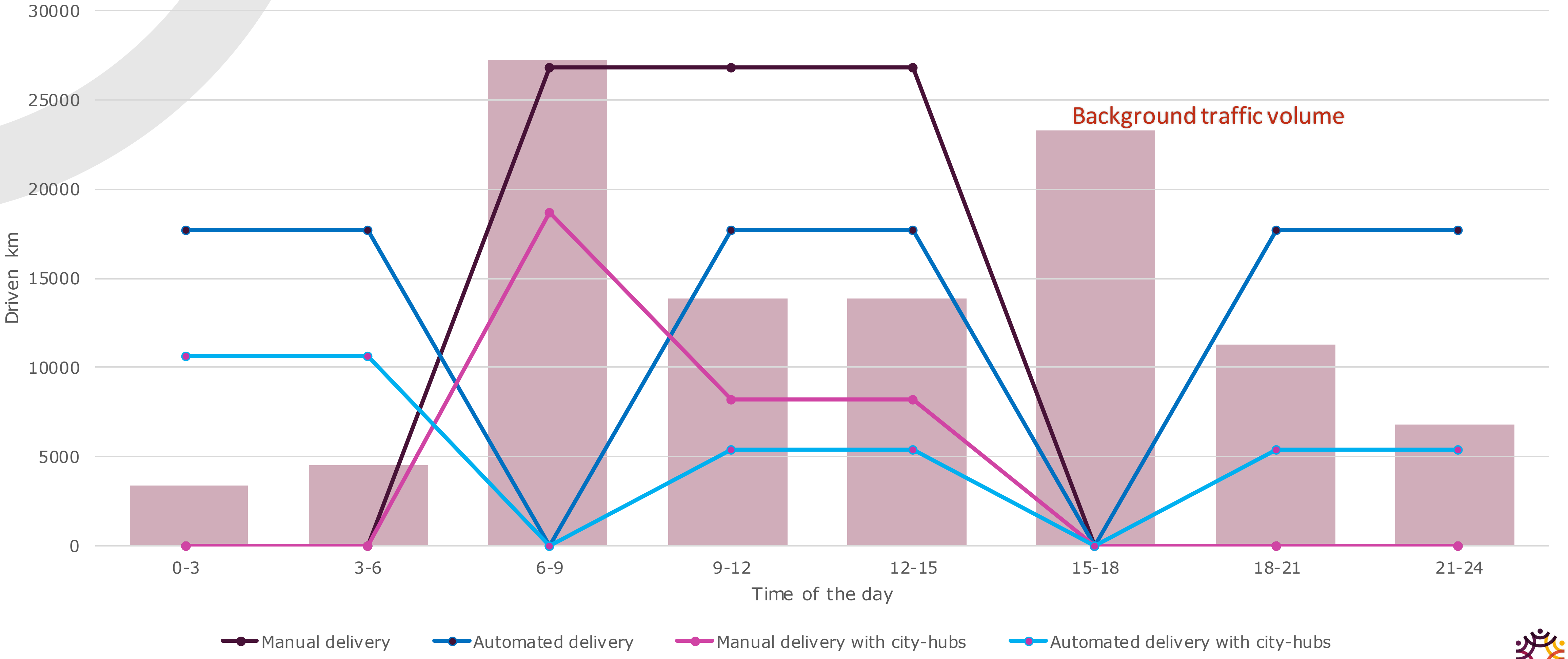
Automated delivery – Mileage and time of the day



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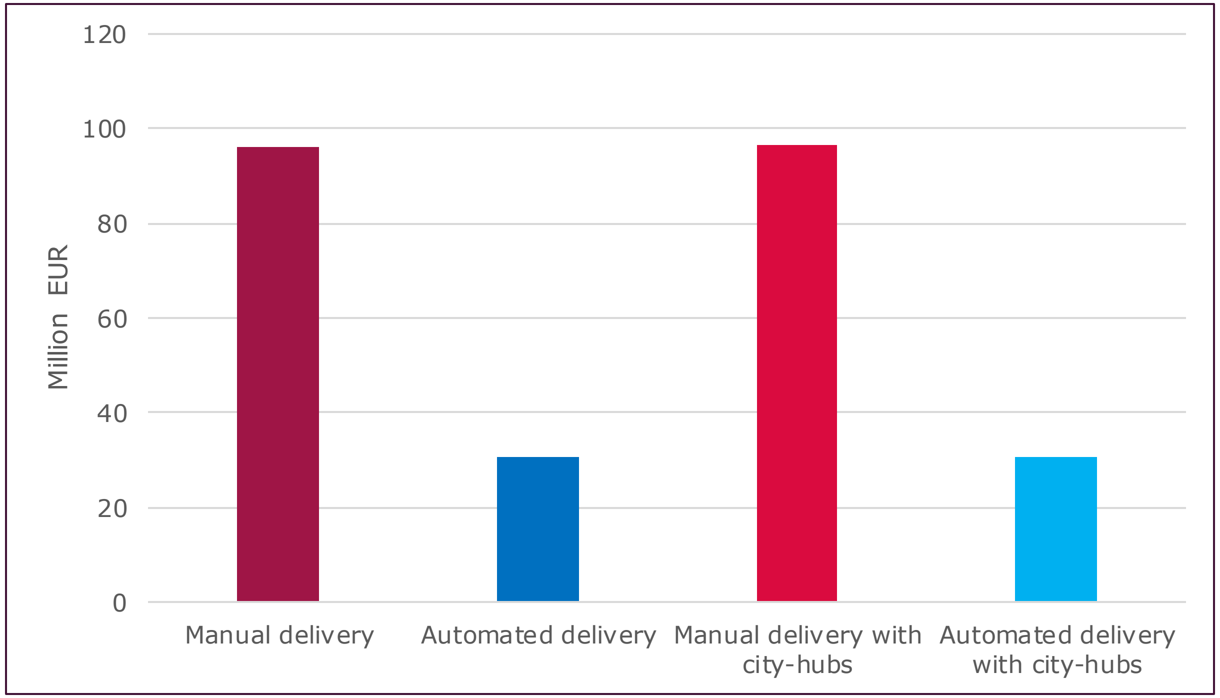
Automated delivery – Fleet operating costs

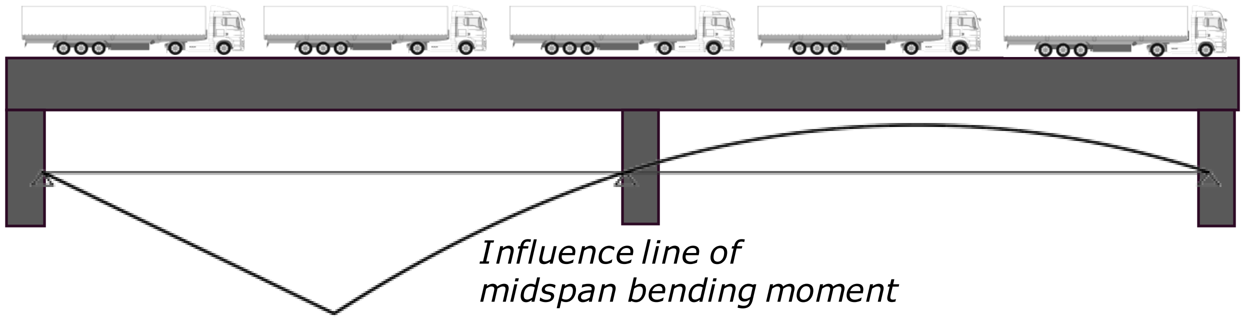
Robo-van system:

+ Higher acquisition cost
+ Costs for delivery robots
- Cheaper insurance and upkeep
- No driver cost
+ Costs for monitoring personnel
- Less vehicles required for the same delivery capacity

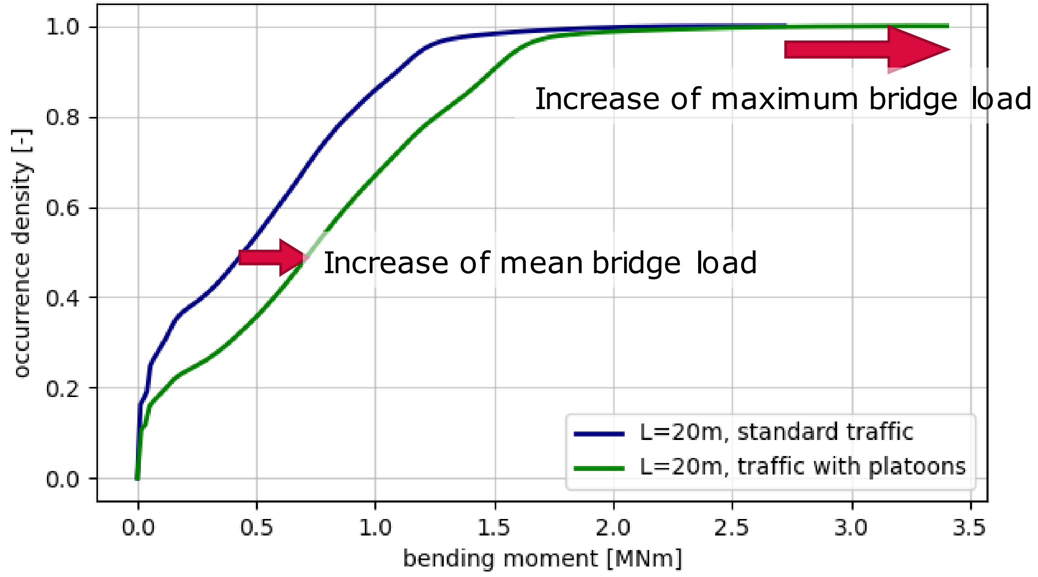


Platooning on urban highway bridges

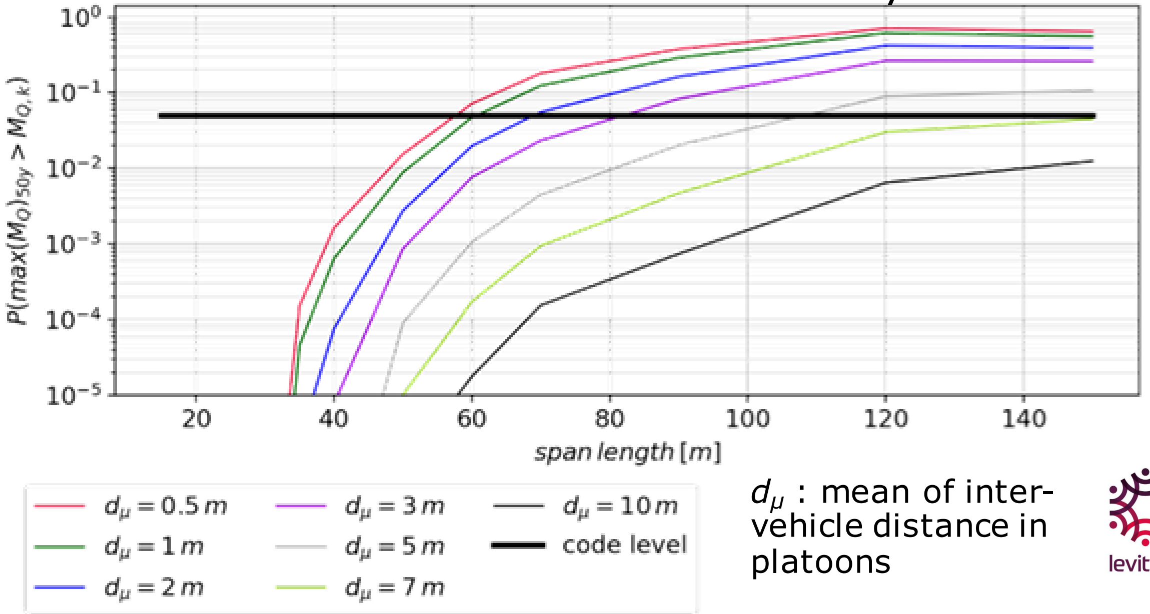
- Impact of truck platoons on highway bridges
- Fault probability due to
  - concentrated vertical forces
  - synchronized horizontal forces
- Structural reinforcement vs. intelligent access control – costs and benefits



Bridge length = 20 m



Bending moment exceedance probability
traffic model: inter-city



d_μ : mean of inter-vehicle distance in platoons

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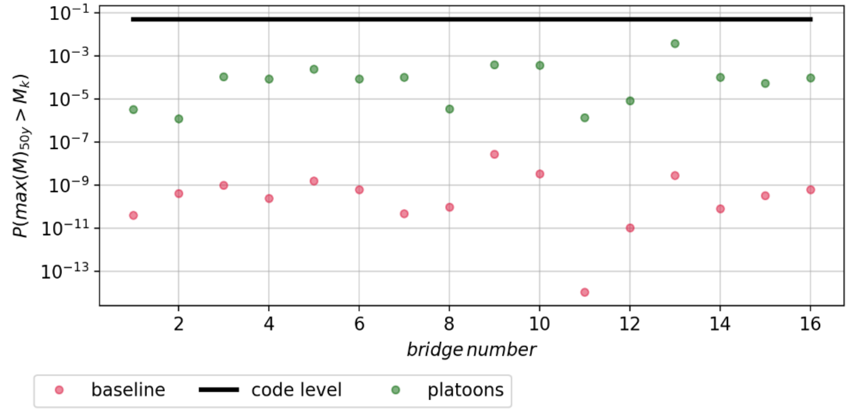
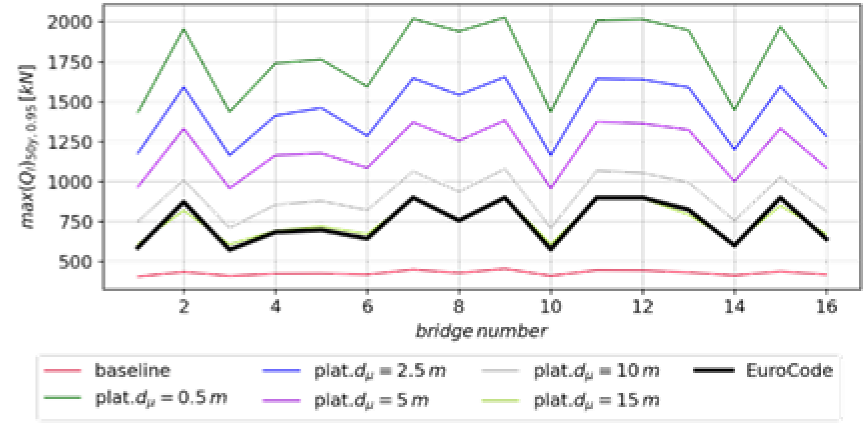
Truck platooning on bridges

Bridge	Cross-section sketch	Height [m]
1		1.4
2		0.9
3		1.3
4		2.0
5		1.3
6		1.8
7		1.8
8		2.7
9		1.0
10		2.0
11		7.0
12		2.5
13		1.5
14		1.6
15		2.3
16		1.75

- Probability that 50-year-extreme of bending moment exceeds the characteristic traffic load effects, traffic model: urban



- 95%-quantiles of 50-year-extremes of horizontal braking force, traffic model: urban



d_μ : mean of inter-vehicle distance in platoons

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Julia Roussou, NTUA

Automated Urban Transport Services

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Use Cases

WP 5
Use Case 1
Automated Urban Transport (NTUA)
M6-32

WP 6
Use Case 2
Passenger cars (LOUGH)
M6-32

WP 7
Use Case 3
Freight Transport and Logistics (AIT)
M6-32

WP5 steps in LEVITATE

Goal	Method	Explanation
1. Exploration for the sub-use cases to study and the impacts to quantify	Literature review	Existing literature on CCAM/CAVs/ADAS
	Stakeholder reference group (SRG) workshop	A group of key stakeholders – international/ twinning partners, international organisations, road user groups, actors from industry, insurances and health sector support the project and participated in workshops.
2. Quantification	Traffic microscopic simulation	AIMSUN microsimulation of traffic at the city-district level (based on modelling individual vehicles)
	Traffic mesoscopic simulation	MATsim modelling of behaviours and choices of individuals (based on groups or streams of vehicles) at the city level
	System dynamics	A modelling technique where the whole system is modelled at an abstract level by modelling the sub-systems at component level and aggregating the combined output.
	Delphi study	The Delphi method was used to determine those impacts that cannot be defined by the other quantitative methods
3. Synthesis & discussion	Synthesis	Major impacts summarized for the policy areas Environment, Mobility and Society/ Economy/ Safety
	Policy considerations	Recommendations & considerations for policymakers based on the wider literature

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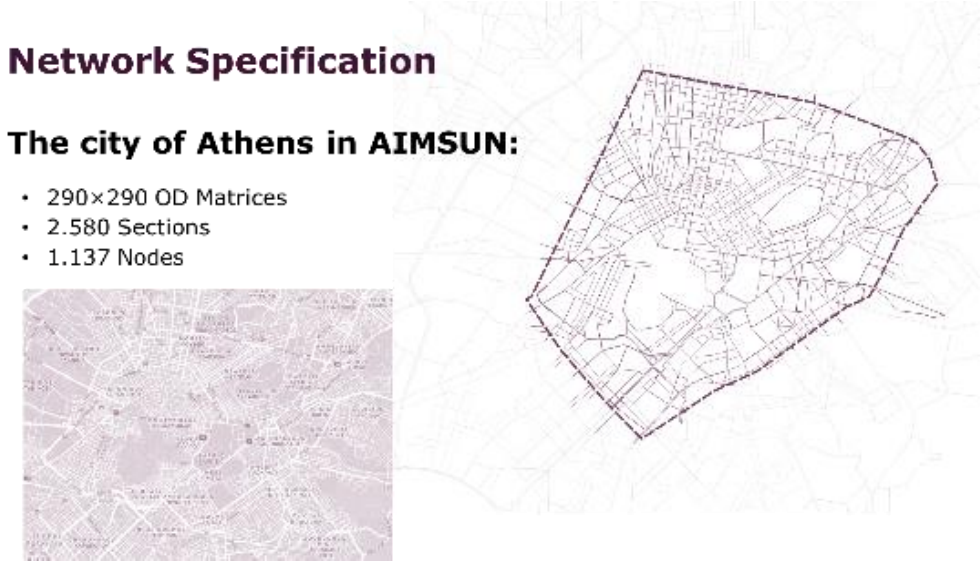
Automated Urban Transport Sub-use Cases

1. **Point to Point automated urban shuttle service (AUSS)**: automated urban shuttles travelling between fixed stations, complementing existing urban transport
   a) Point-to-point AUSS connecting two modes of transport
   b) Point-to-point AUSS in a large-scale network

2. **Autonomous mobility on-demand**: flexible on-demand automated shuttle bus service that includes anywhere-to-anywhere AUSS, last-mile AUSS and e-hailing, complementing existing urban transport



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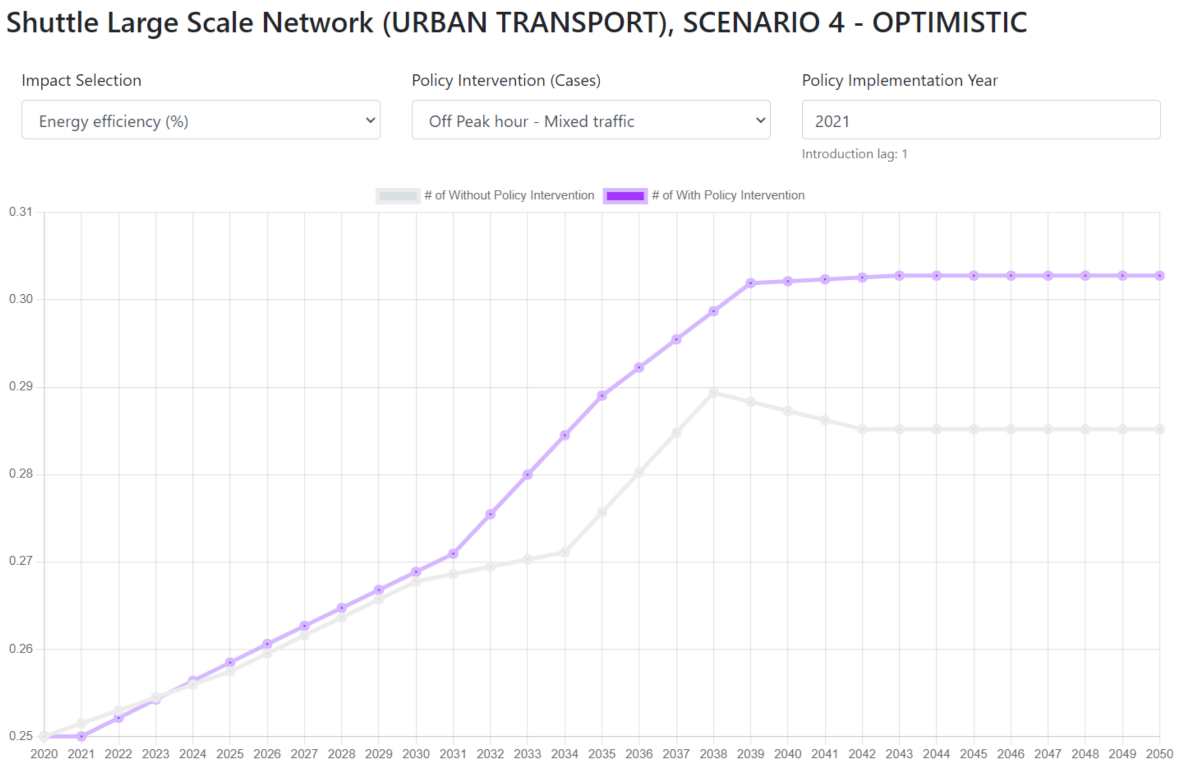
Impacts on the environment

- Microsimulation results indicated that the **introduction of AVs** in the urban environment will significantly **reduce CO2 emissions**

- The introduction of **Automated Urban Shuttle Services** will lead to a **similar emissions reduction** as the baseline scenario

- The Delphi results indicated that all sub-use cases will **increase energy efficiency**.

- **Point-to-point AUSS** will lead to the largest energy efficiency increase in the long-term



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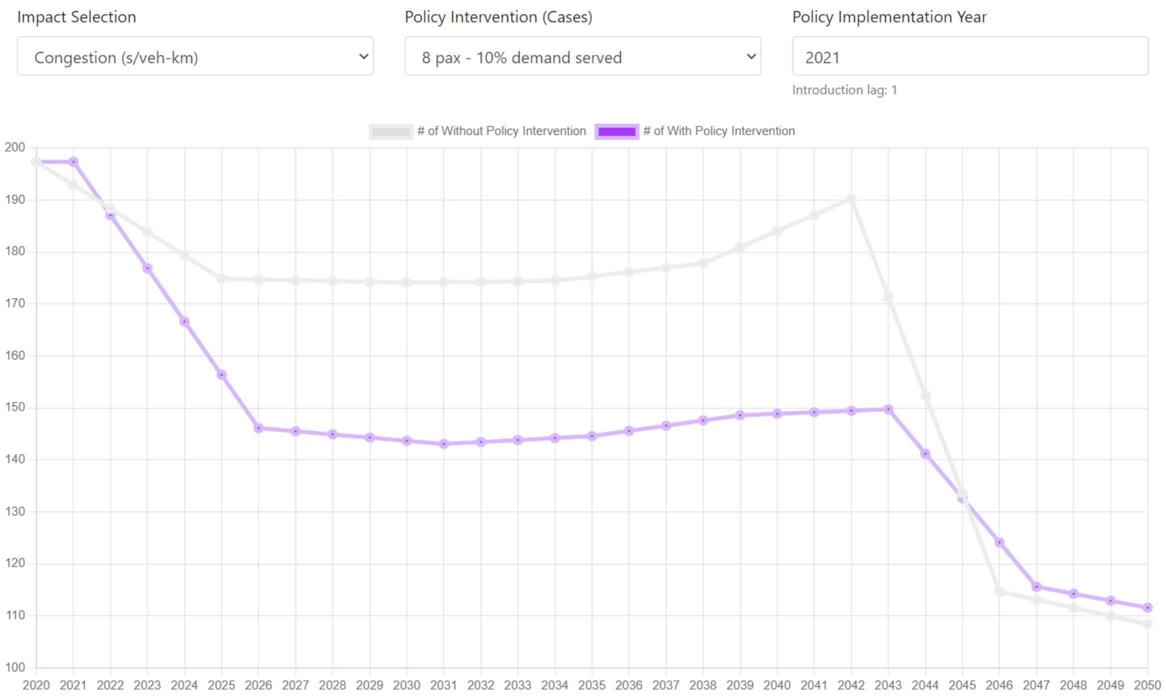
Impacts on mobility (1/2)

- According to experts **access to travel** will be **increased** by the introduction of all AUSSs.
- Kilometers travelled and congestion levels depend on the CAVs market penetration rates. During the **transition phase** when conventional and mixed levels of first and second-generation CAVs share the urban roads **congestion levels** are **increased**.
- **Anywhere-to-anywhere AUSS** lead to the largest **reduction in travel time**

On Demand Shuttle Bus Service (URBAN TRANSPORT), SCENARIO 4 - OPTIMISTIC



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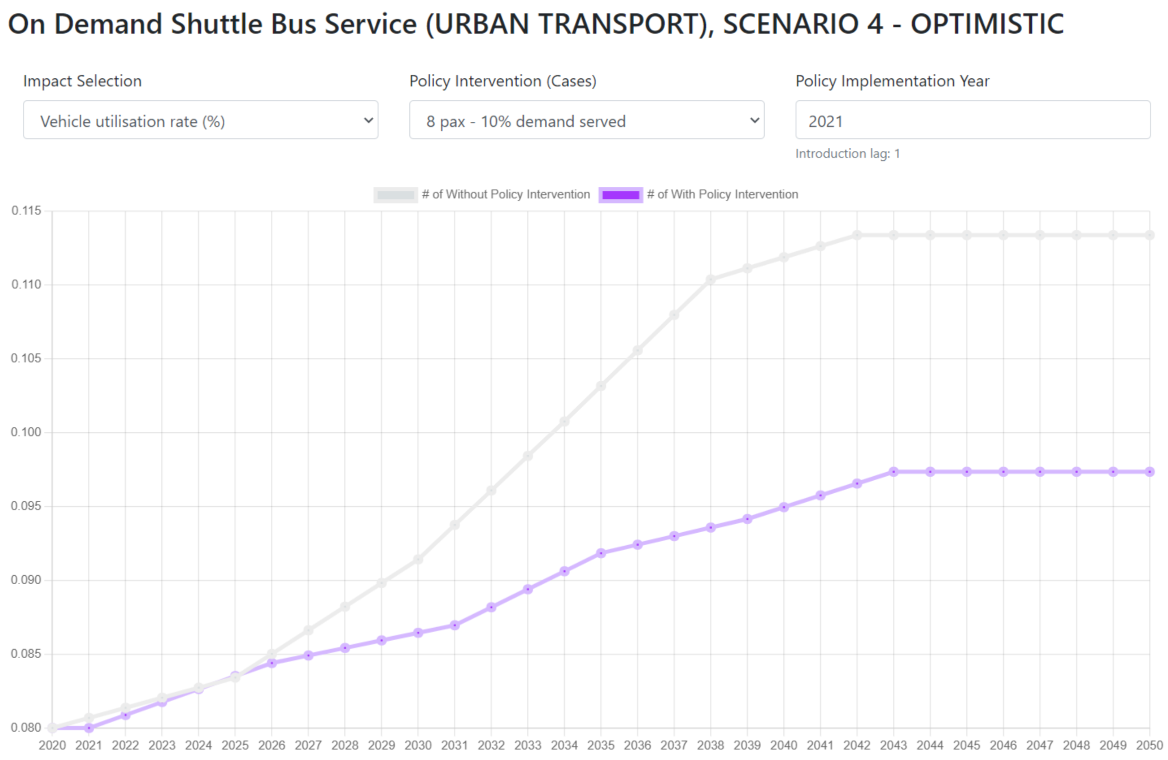
Impacts on mobility (2/2)

- **Modal split using public transport** will be mostly affected by the introduction of CAVs. **Modal split using active travel** will be less affected.

- **Vehicle utilization rate** will be **reduced** after the introduction of AUSS compared to the baseline scenario

- **Vehicle occupancy** will be **reduced** after the introduction of on-demand AUSS



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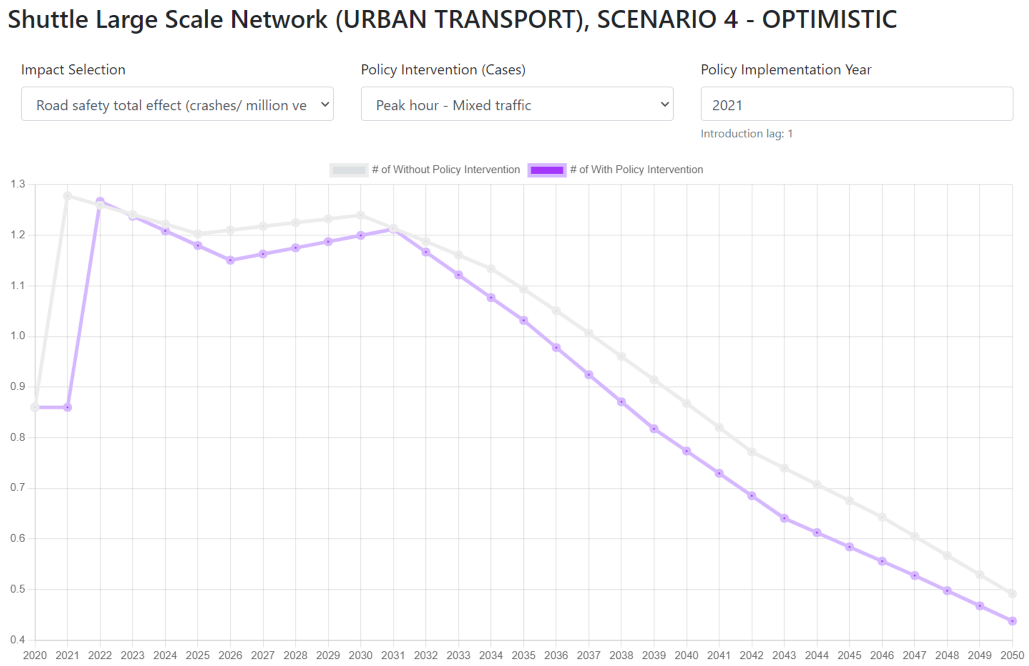
Impacts on society, safety and economy

- **Road safety will be significantly increased** after the introduction of CAVs and AUSSs in the urban environment. At larger shares of second generation vehicles (60-100%) the **crash rate** of urban transport vehicles can reach a **reduction** of up to 50%-69%.

- The Delphi results indicated that all AUSSs will **improve accessibility in transport**.

- **Point-to-point AUSS** is expected to deliver extra **benefits** for the city in terms of vehicle operating **costs**, less **parking** space required and better public **health**.



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Final remarks

- The **LEVITATE** impact assessment results for Automated Urban transform **confirm** the results of other studies
- **Positive impacts** on environment, economy, society and safety are to be expected with larger shares of first- and second-generation CCAM vehicles are introduced in the traffic system.
- **Benefits** (higher energy efficiency, better access to travel, improvement public health, and lower vehicle operating costs) have been estimated from the introduction of **point-to-point AUSS** and, to a lesser degree, from on-demand AUSS.
- After the **necessary transferability** studies, results have been integrated in the **LEVITATE PST**, providing findings to all interested parties

Amna Chaudry,
Loughborough university

Passenger cars

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Sub-Use Cases and Analysis Scenarios

Sub-Use Case	Analysis Scenarios				
Road Use Pricing	Dynamic Toll	Static Toll			
Dedicated Lanes (DL)	DL on A Road and motorway (left most lane placement)	DL on Motorway (left most lane placement)	DL on A road with right most placement	DL on A road with left most lane placement	
Parking Price	Enter, drop-off passengers and return to origin	Enter, drop-off passengers and return to outside parking	Enter, drop-off and drive around while waiting for the passenger		
Parking Space Regulations	Removal of parking spaces to 50%	Conversion to driving lanes	Conversion to cycle lanes	Replacement with pick-up/drop-off spaces	Conversion to public spaces
Automated Ride Sharing	5% demand with varying WTS (20-100%)	10% demand with varying WTS (20-100%)	20% demand with varying WTS (20-100%)		
GLOSA	Implementation on 1 intersection	Implementation on 2 intersections	Implementation on 3 intersections		

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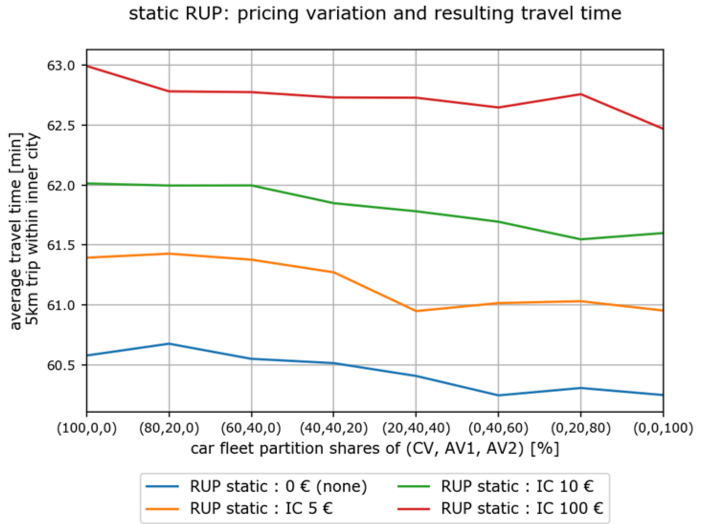
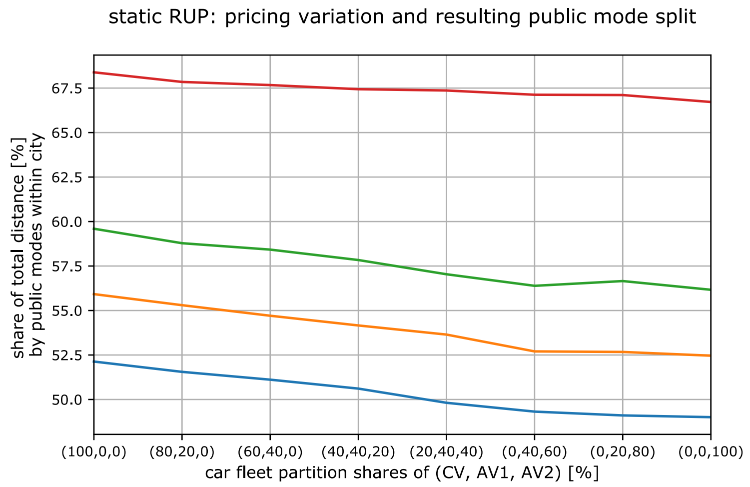
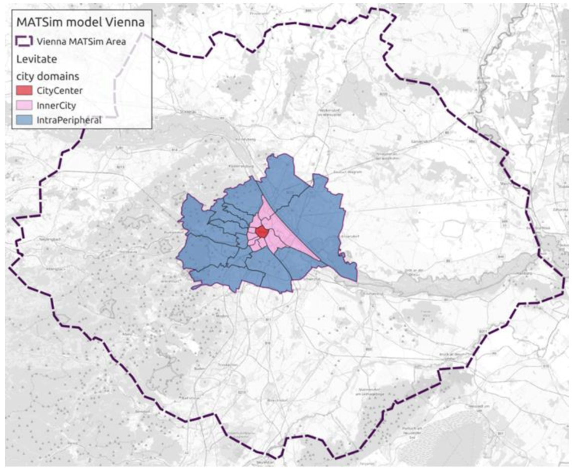
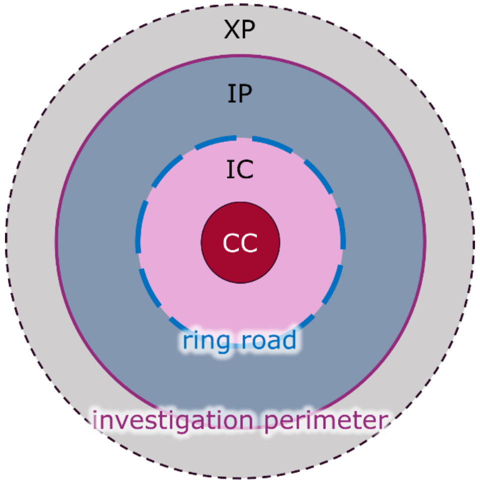
Impact Assessment Results —Road Use Pricing

Static Toll

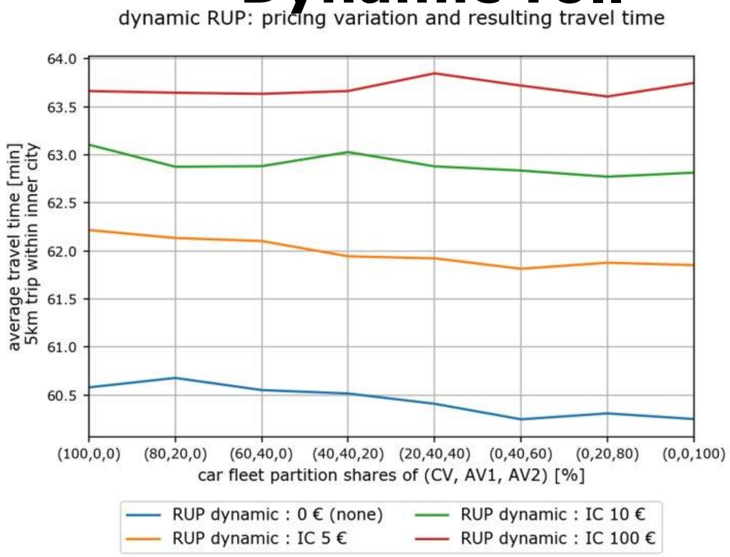


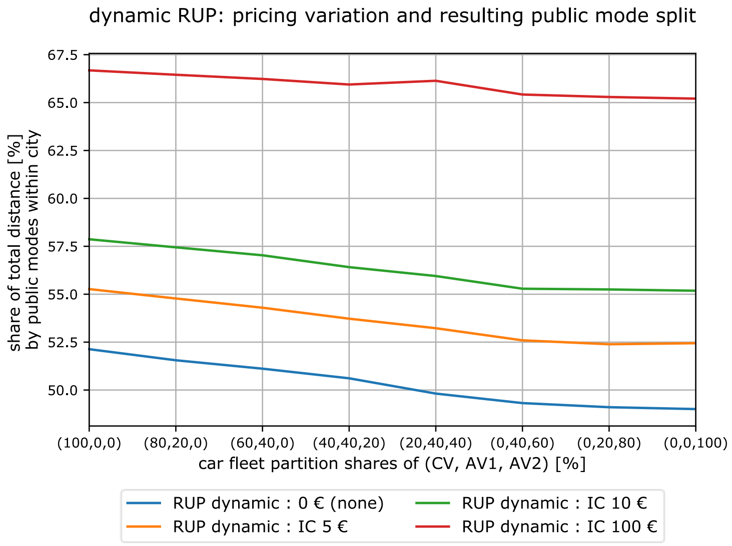






Dynamic Toll





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Key Conclusions on Road Use Pricing

- **Travel time average**
  - Increasing automation brings about slight reductions
  - Tolerable increases of time average for high level tolling (i.e. level of 10 €)
- **Travel distance average**
  - Small reduction of distance on increased automation but at decreasing rate
  - With RUP implementation: Tendency to choose shorter, congested trips at cost of more time
- **Active mode distance share**
  - Minor losses with increased automation
- **Passive mode distance share**
  - Small losses with increased automation
- **Dynamic vs. Static RUP**
  - Dynamic implementation <u>less predictable</u>, more <u>likely</u> to produce <u>unwanted rebounds</u>
  - Static implementation seems <u>better fit to reduce actual passenger car (any type) use</u>

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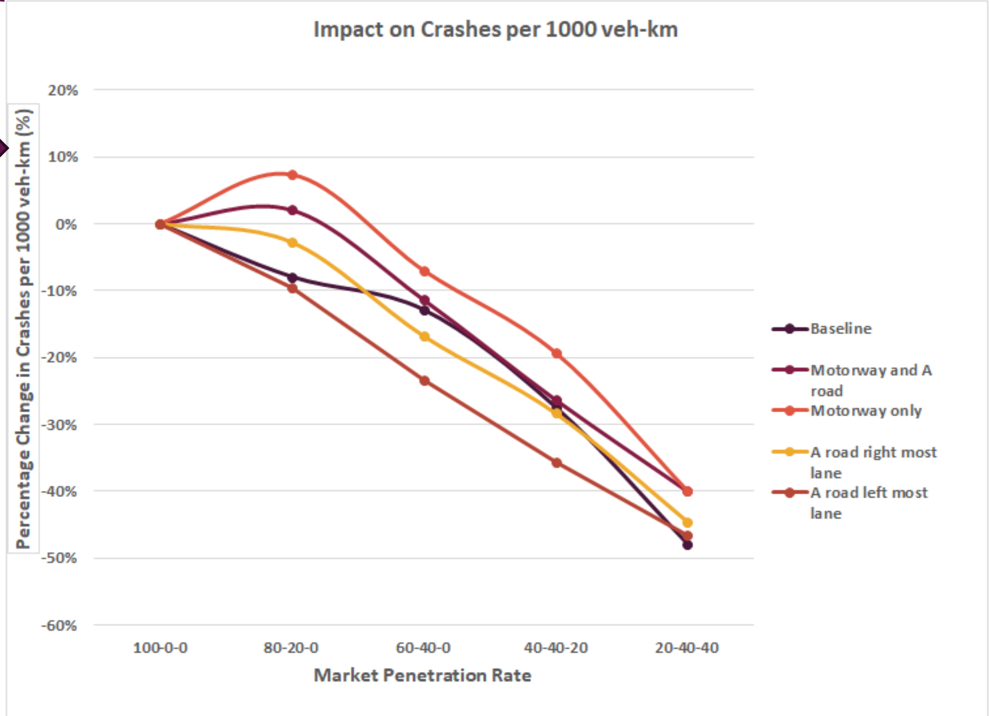
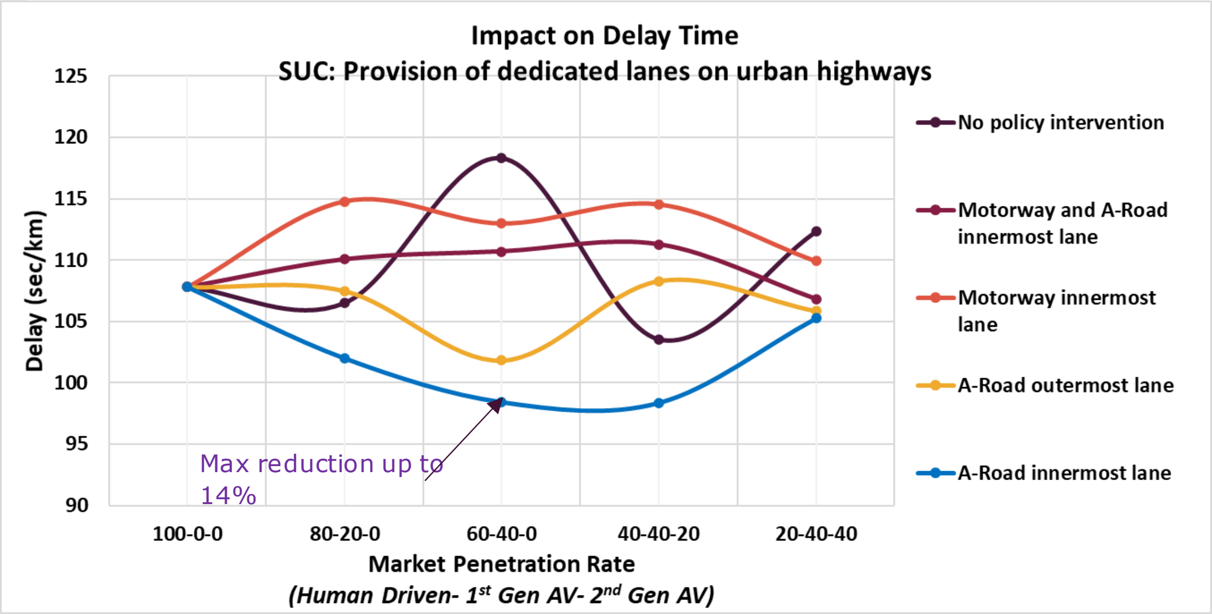
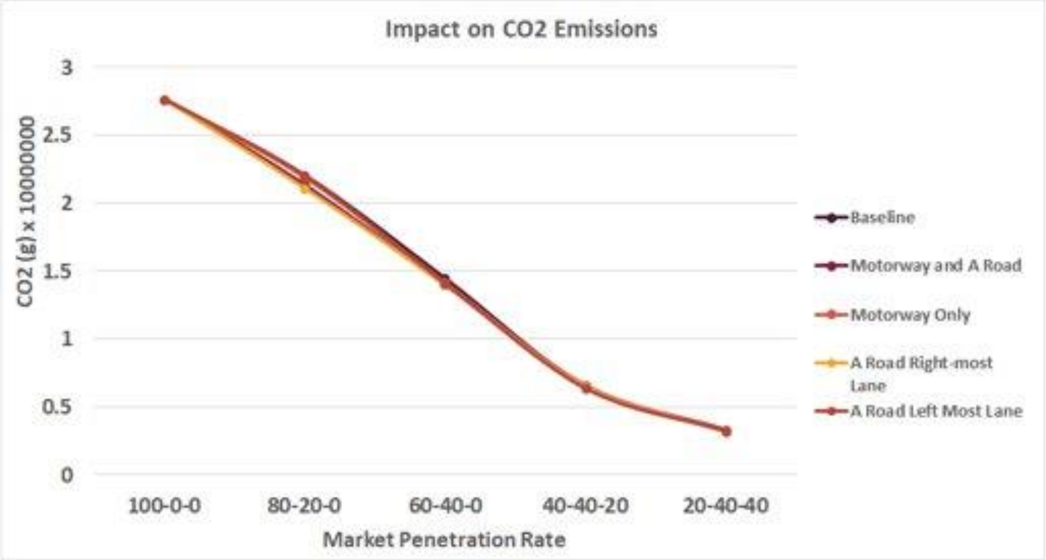
Impact Assessment Results—Dedicated Lanes SUC

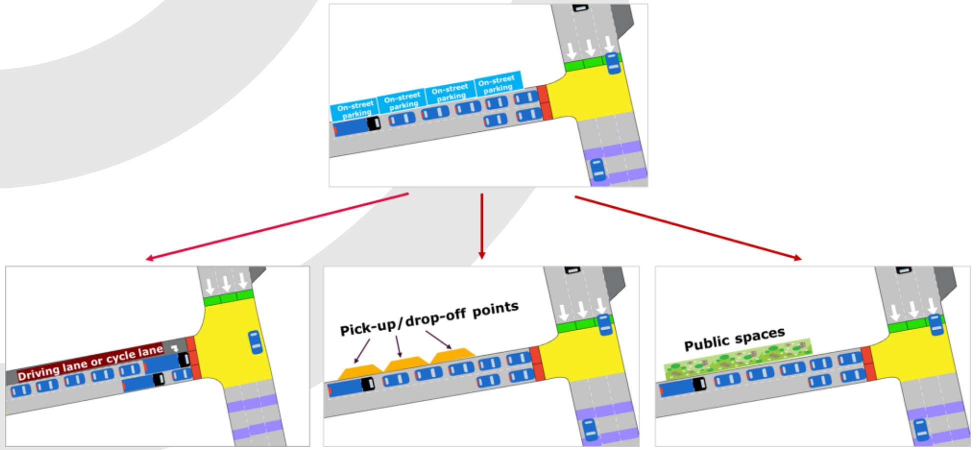
Estimation of Crashes from Conflicts obtained through Surrogate Safety Assessment

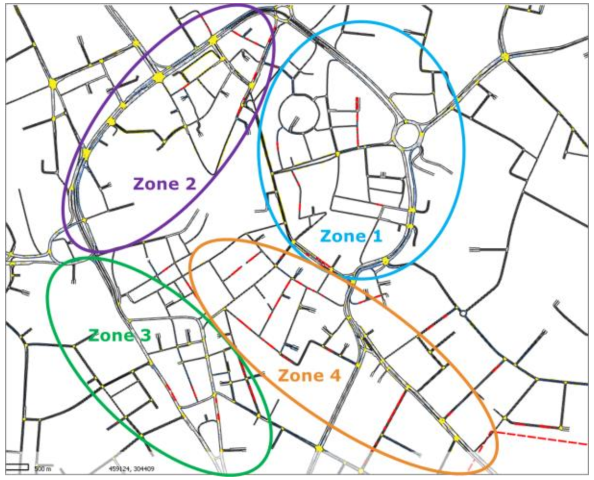


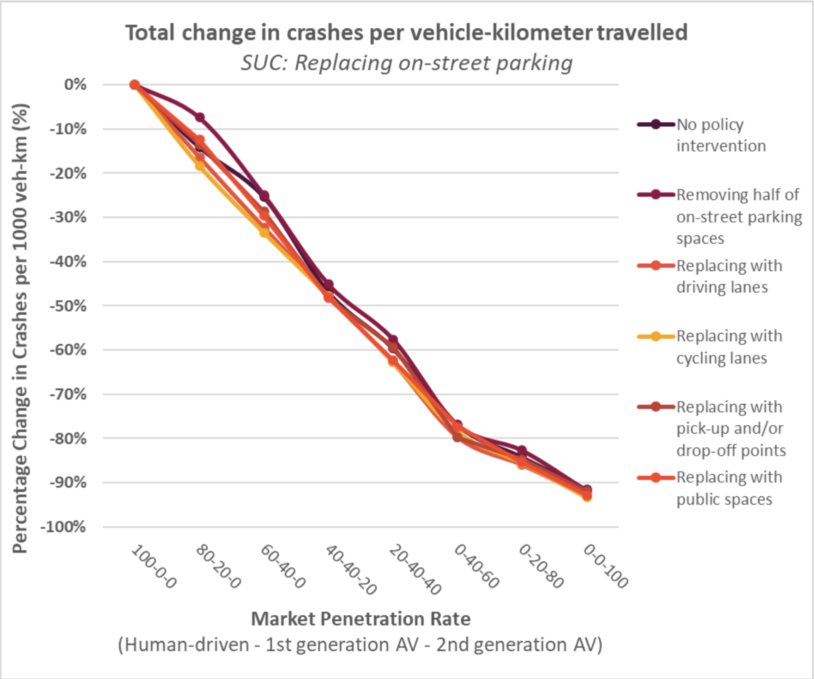


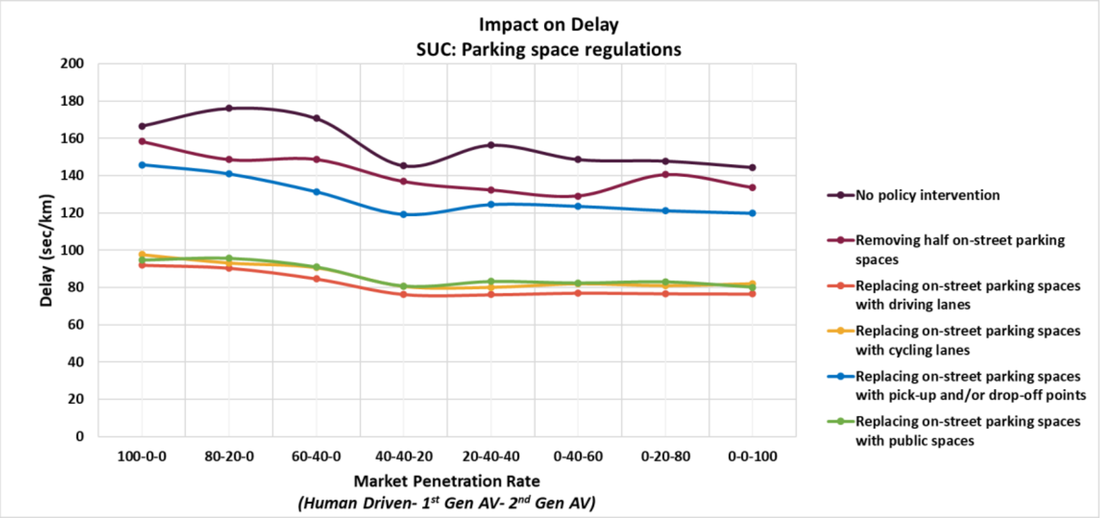


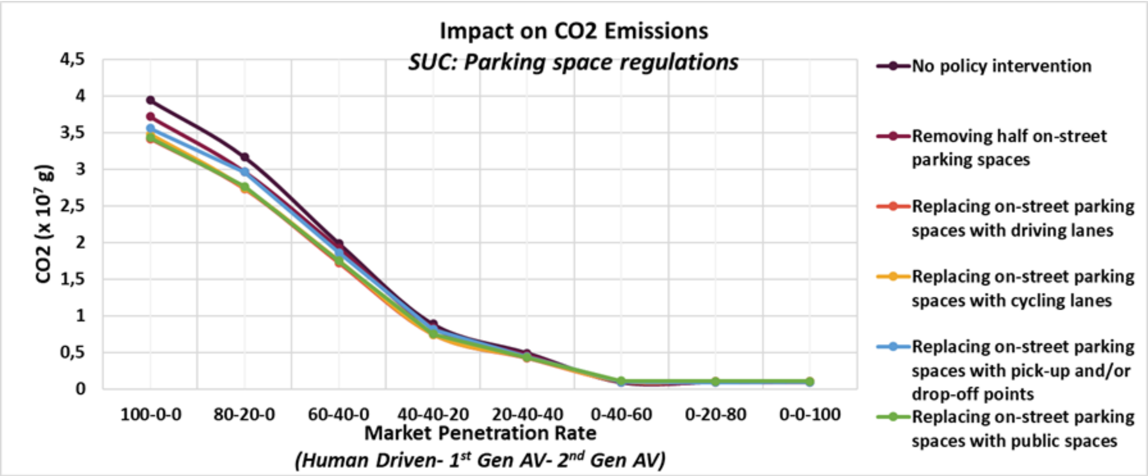
Impact Assessment Results—Parking Space Regulation











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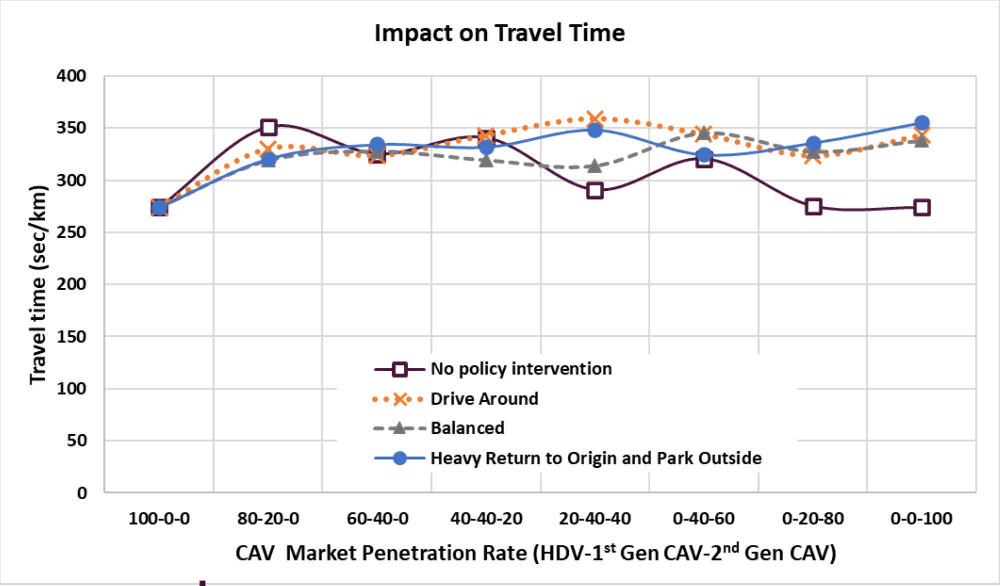
Impact Assessment Results—Parking Price Policies

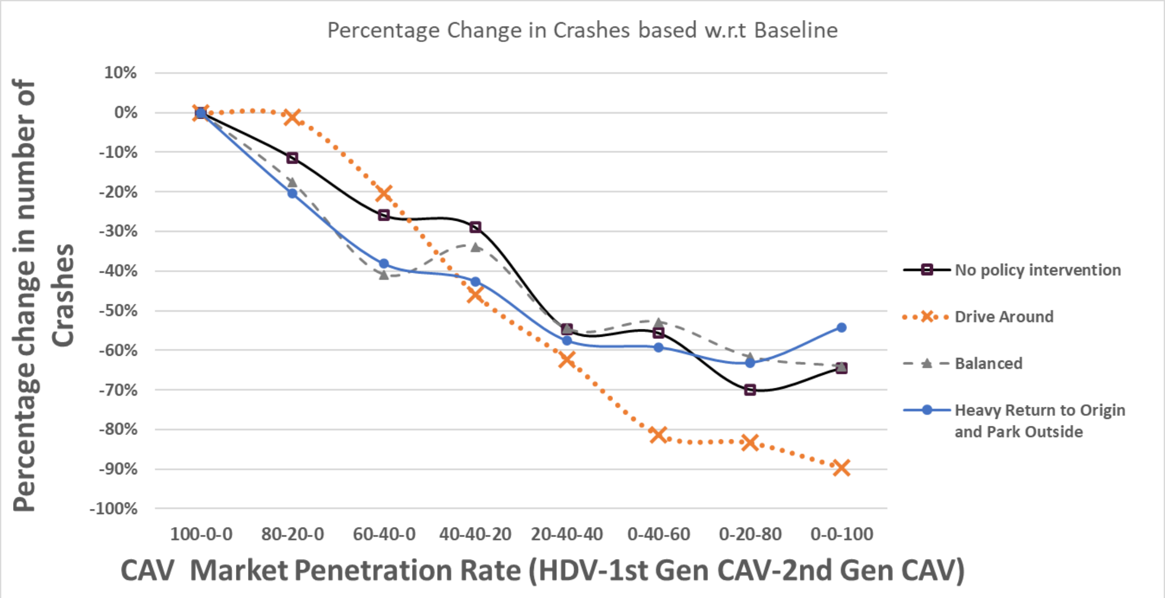


Enter and park inside the area

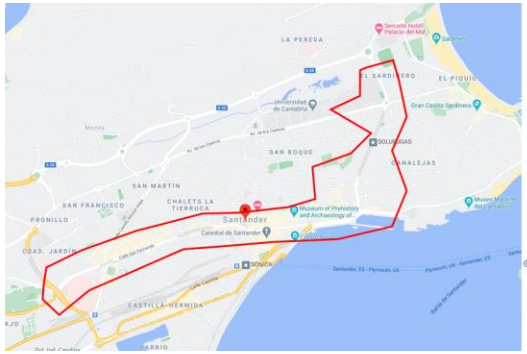
Enter, drop off (30 seconds) and return to origin to park

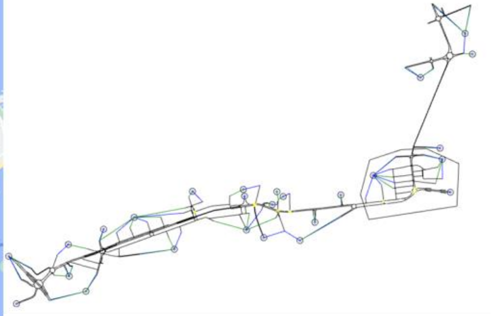
Enter, drop off and return to outside parking to park

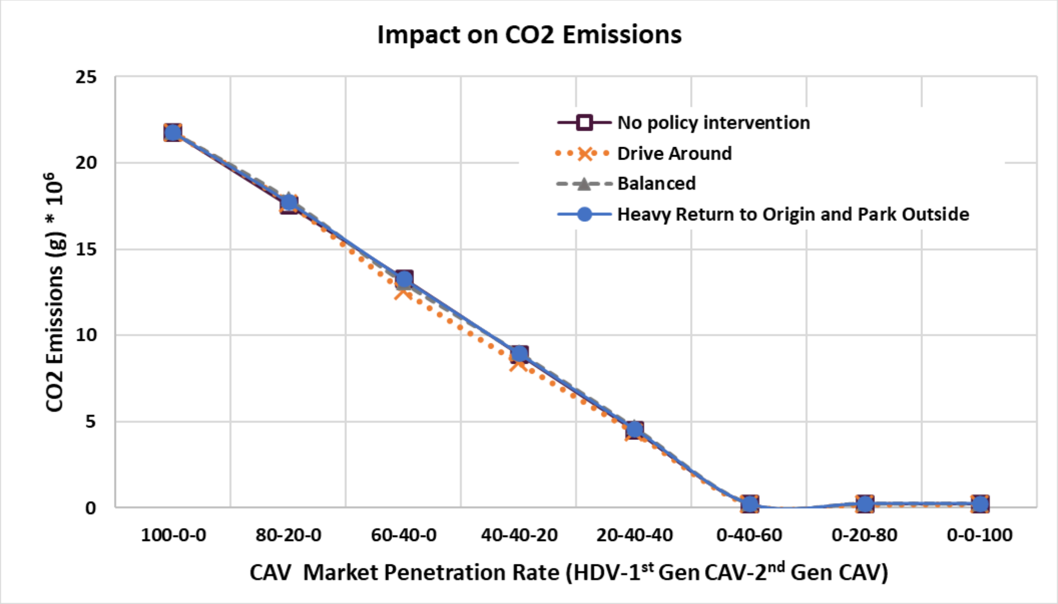
Enter and drive around (short stay)



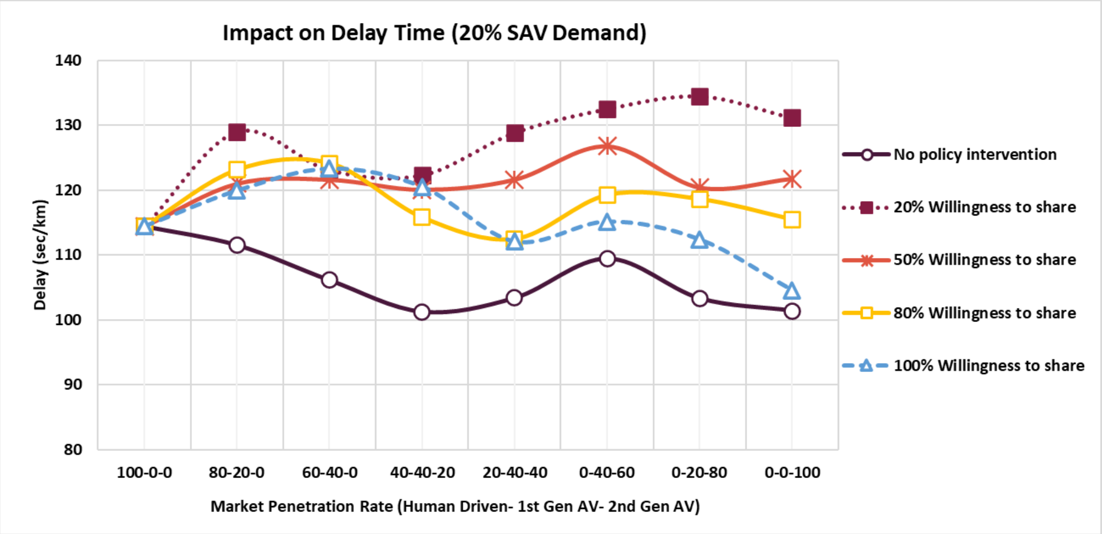
Santander, Spain

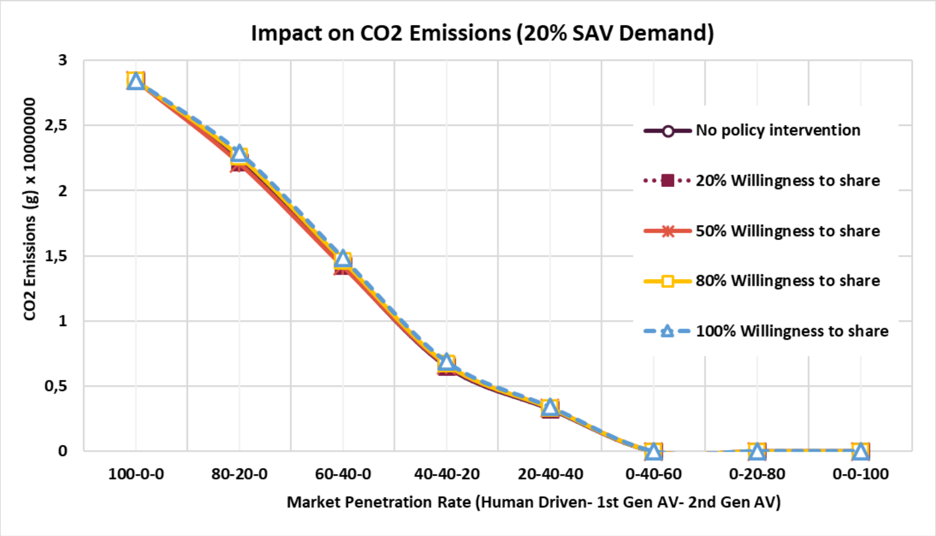




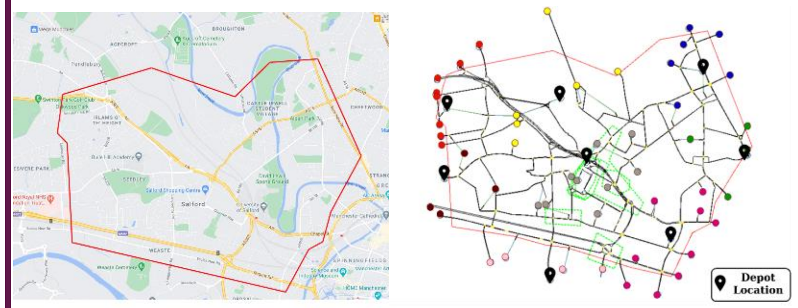


Impact Assessment Results—Automated Ridesharing



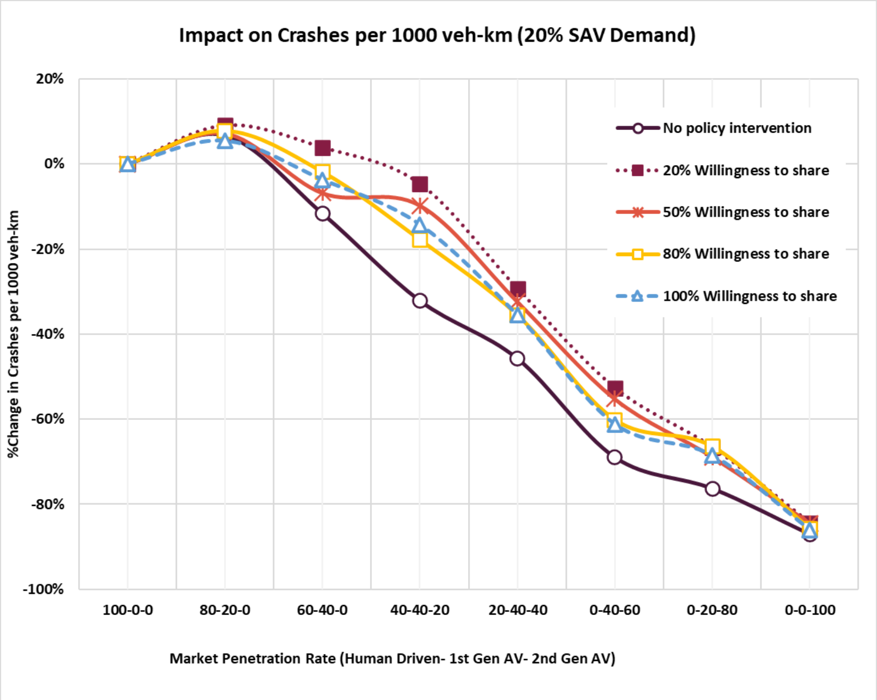


Manchester Network



Area: 13km²
Nodes: 308
Sections: 732

Traffic Characteristics:
- Car: 23226 trips
- LGV: 1867 trips
- HGV: 63 trips



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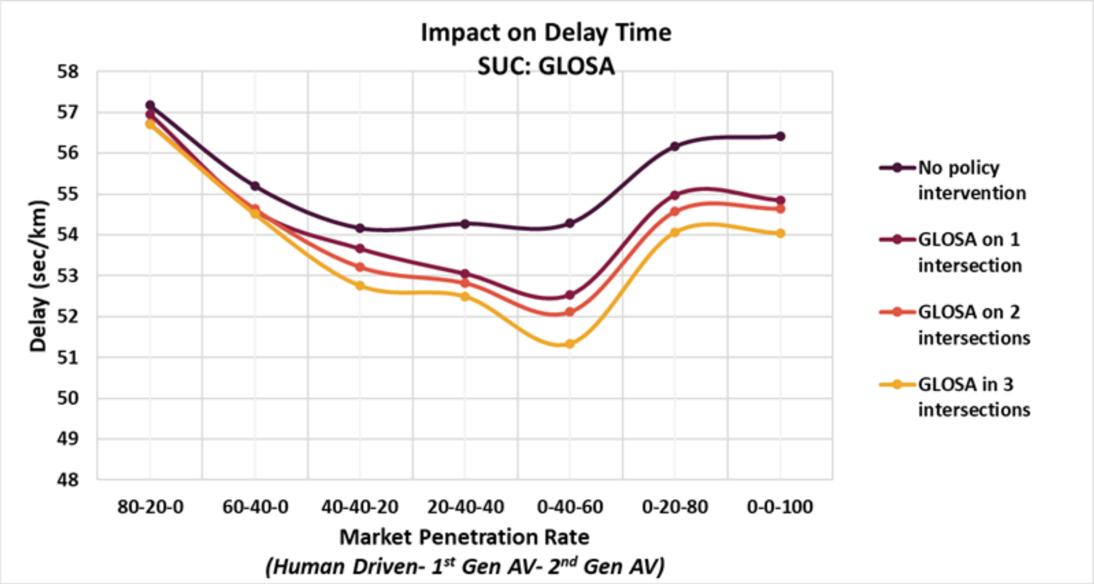
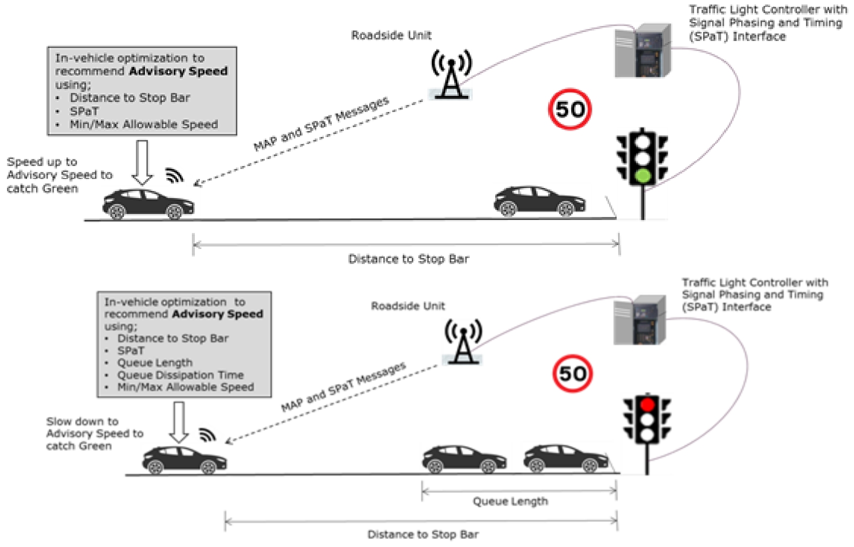
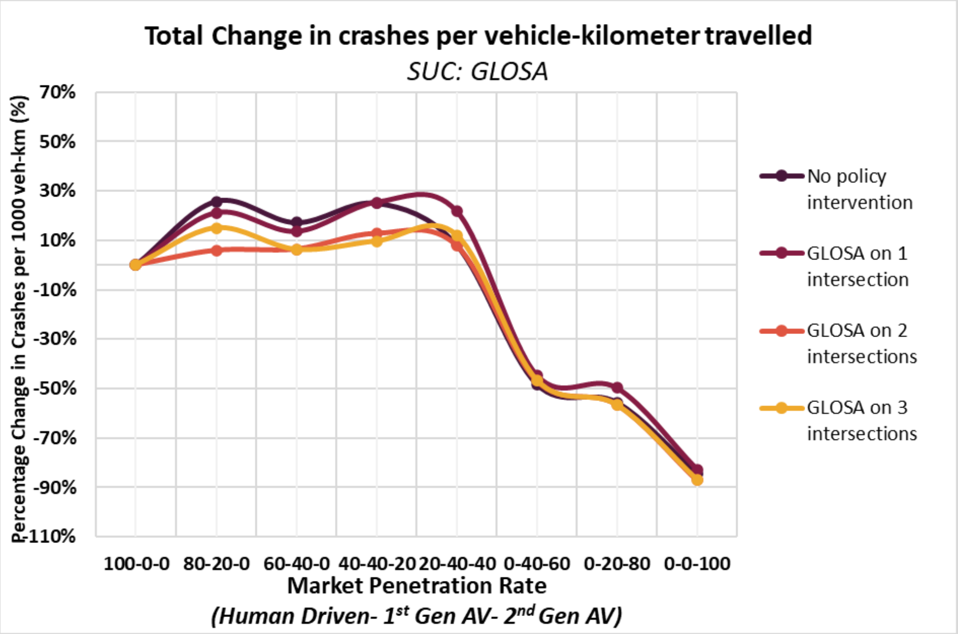
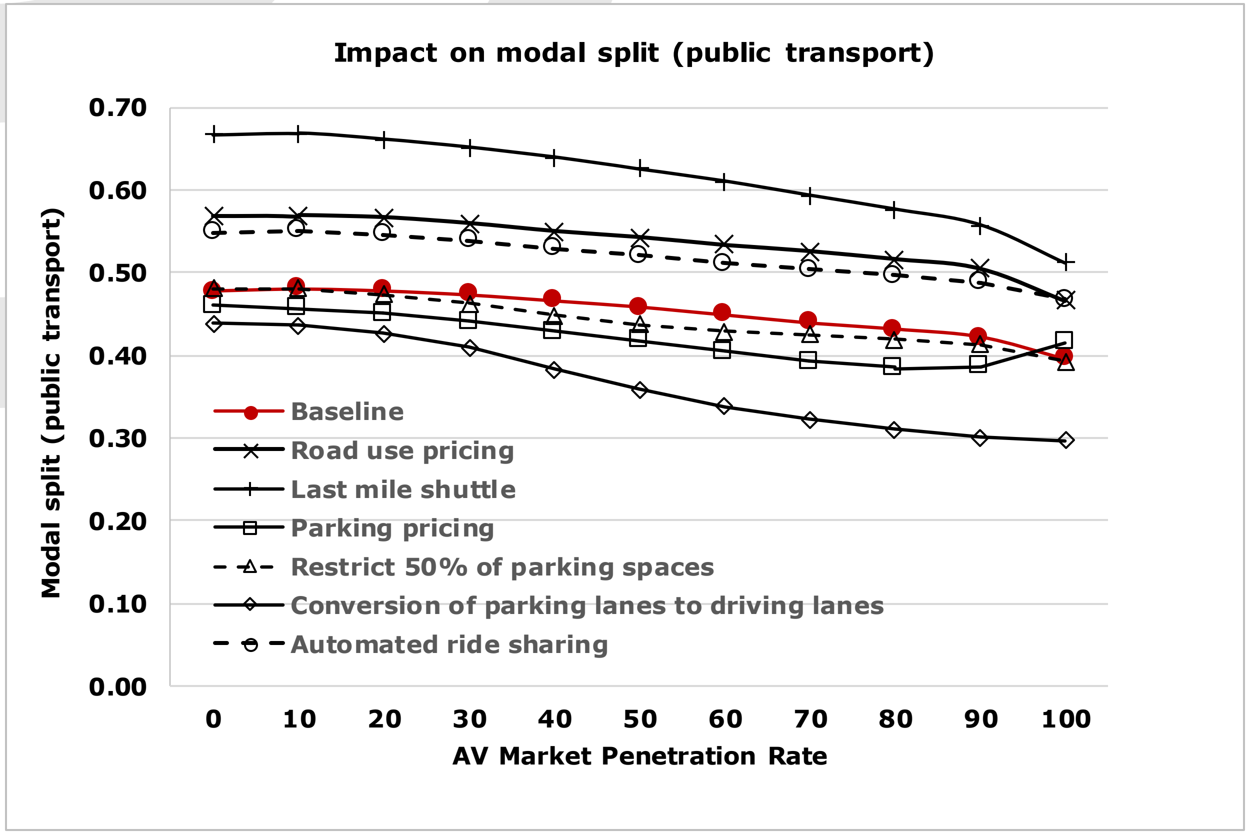
Impact Assessment Results— GLOSA

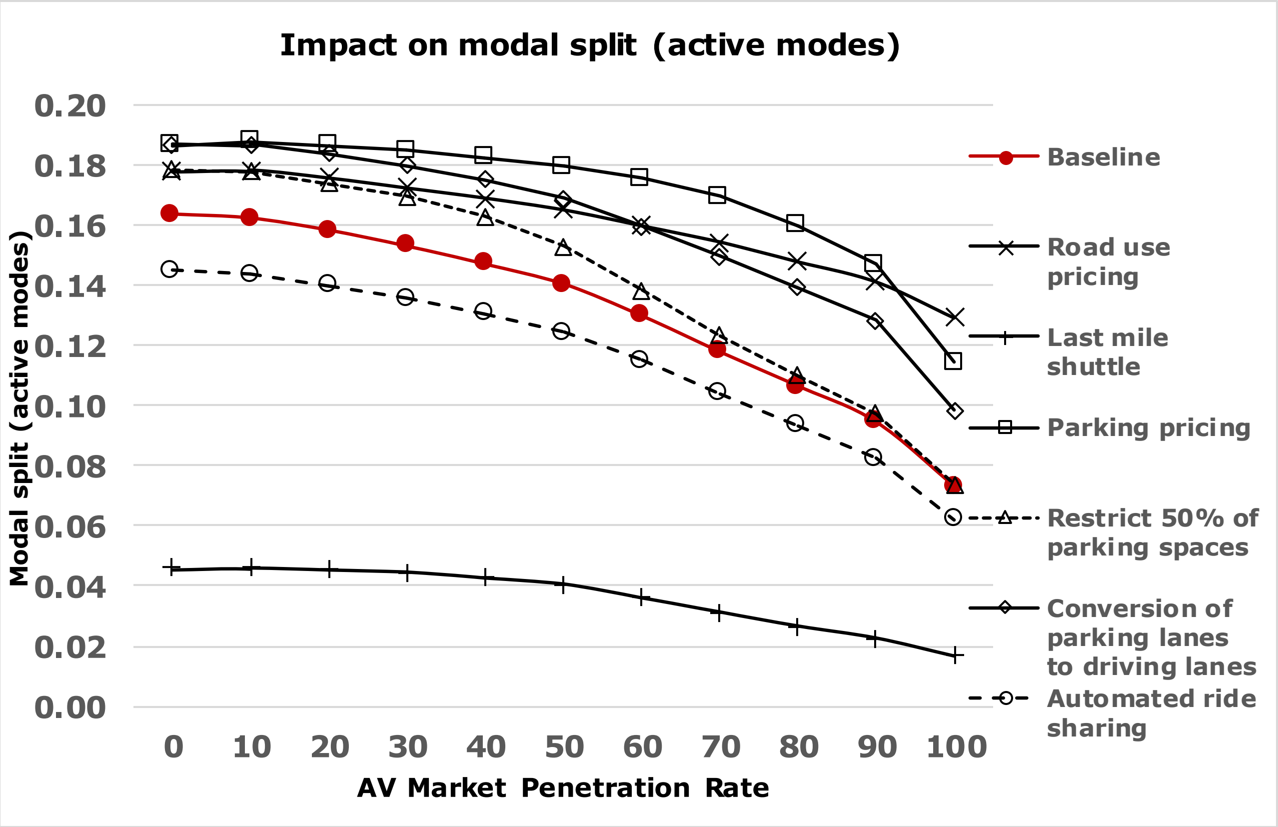






System Dynamics – wider impacts





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Approach for Impact Identification and Upscaling

Motivation and Objective

- Develop a **generic** and **transferable** methodology for assessing **network-wide impacts** of connected and autonomous transport systems (public transport, freight, passenger cars) in urban networks
- Model and quantify (C)AV impacts on **network performance** through microscopic simulation analysis
- **Upscale** the identified impacts to a macroscopic (network-wide) level

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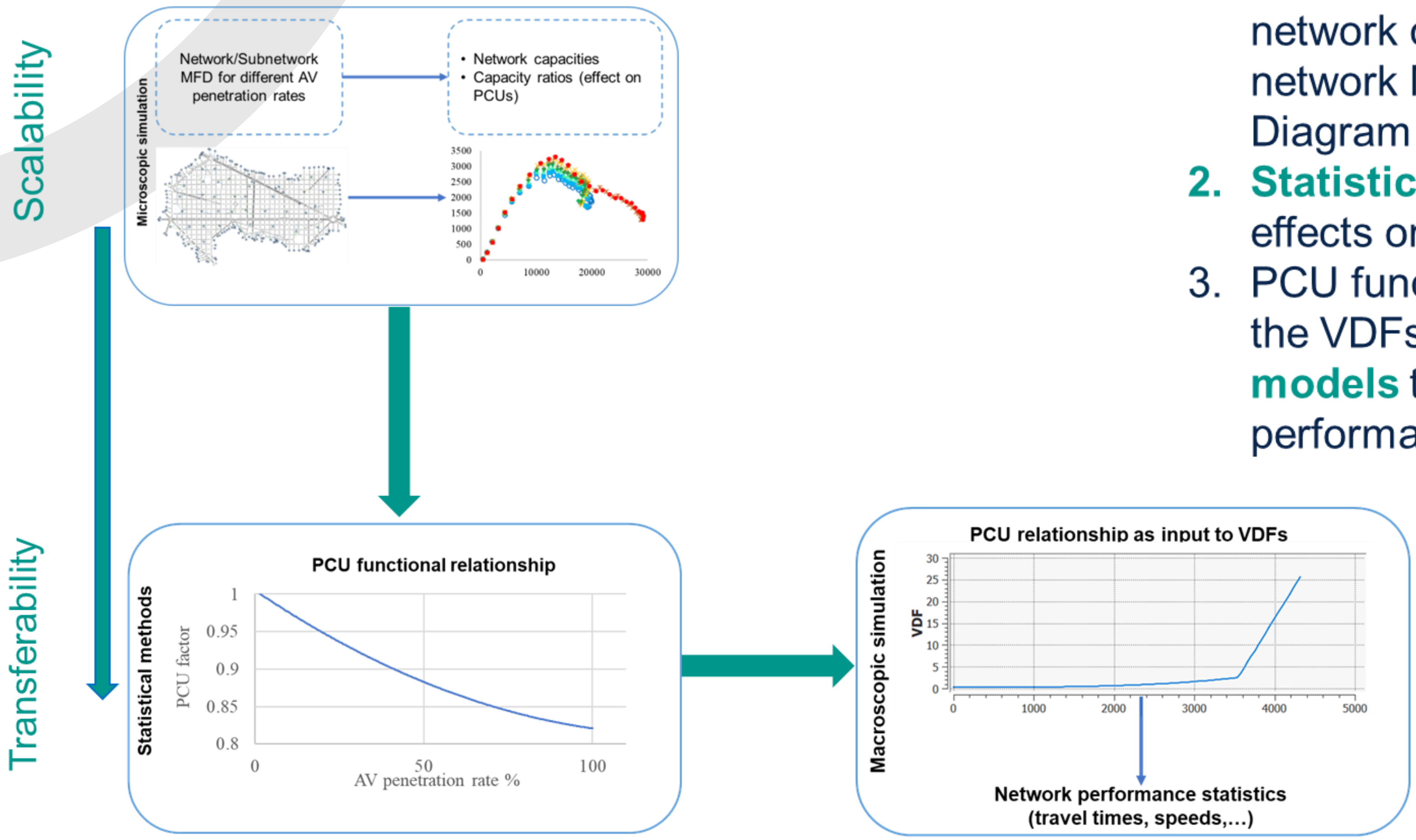
Framework for CAV Impact Analysis

Framework for CAV impact analysis



1. **Microscopic simulation-based** experiments to derive the network capacities through the network Macroscopic Fundamental Diagram (MFD).
2. **Statistical analysis** to identify the effects on Passenger Car Units.
3. PCU functional relationship as input to the VDFs of **macroscopic demand models** to forecast impacts on network performance.

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Selected Case Studies

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Gerald Richter, AIT

The interaction of CAV deployment and road use pricing in Vienna

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Road use pricing

Policy measure **implementation**

- Static and dynamic tolling schemes
- Toll pricing levels

Potential rebound effects

- On traffic in surroundings

Resident toll **exemption**

- Practicability & Acceptance

Road-class based **toll levels**

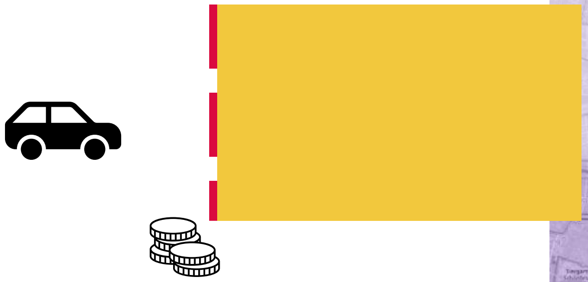
- Accuracy & Augmentation

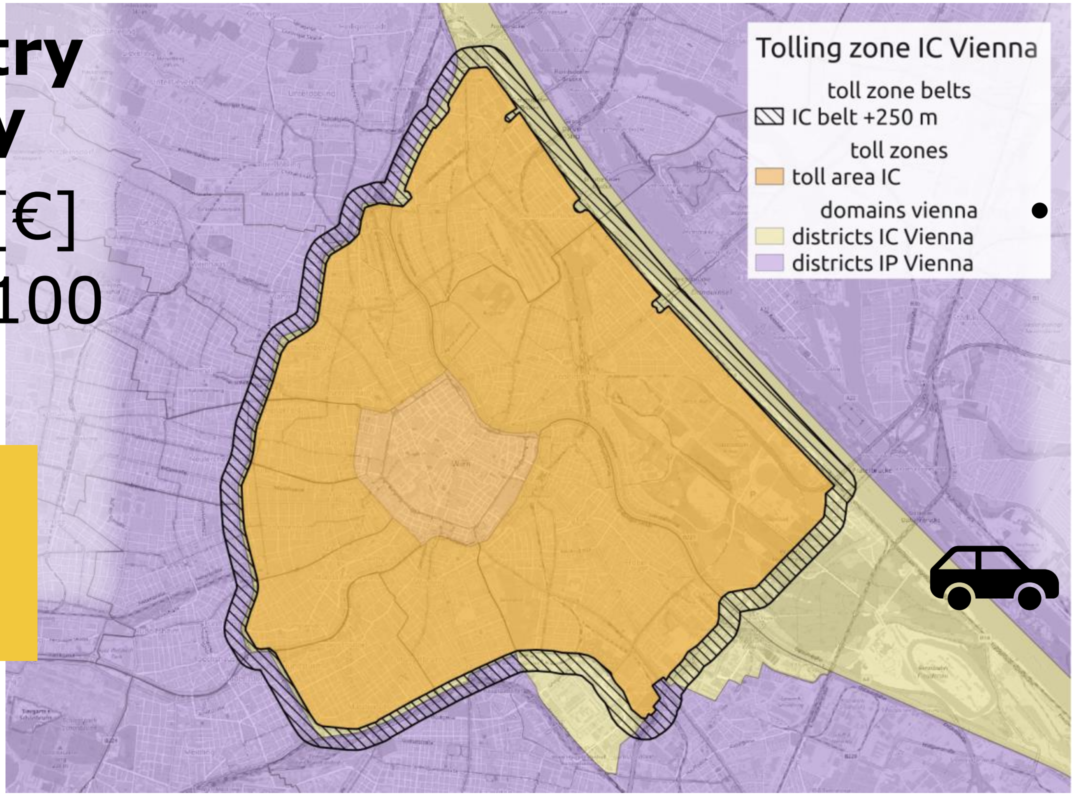
Plausible application

Topology & implementation

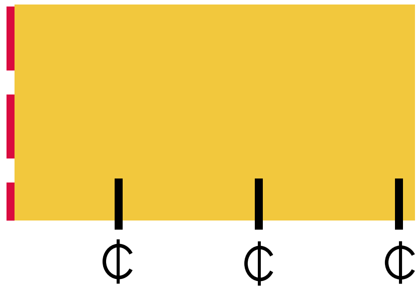
Tolling zone:
- part of the inner-city districts
- Inside ring-road „Gürtel“

Static toll – all vehicles
- Definition: charge **on entry** into **inner city**
- Pricing levels [€]
  - 0, 5, 10, 100





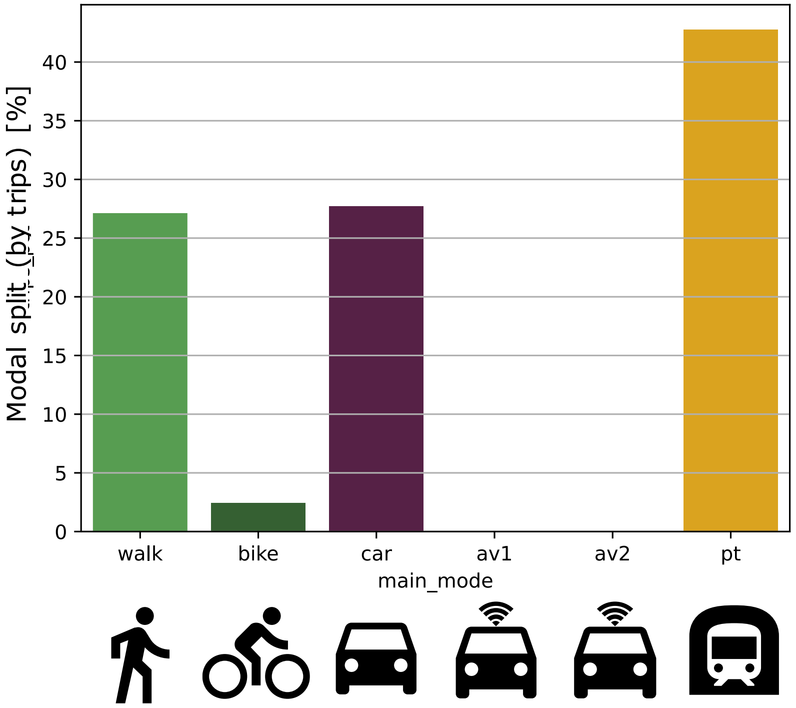
Dynamic toll – all vehicles
- Definition: charge **per distance** within **inner city**
- Pricing [€ / 7 km]
  - 0, 5, 10, 100



RUP: fundamental mode shift

Introduction of **static tolling** at prohibitive level (100 €), for **only humans**, trips to/from **toll area**:

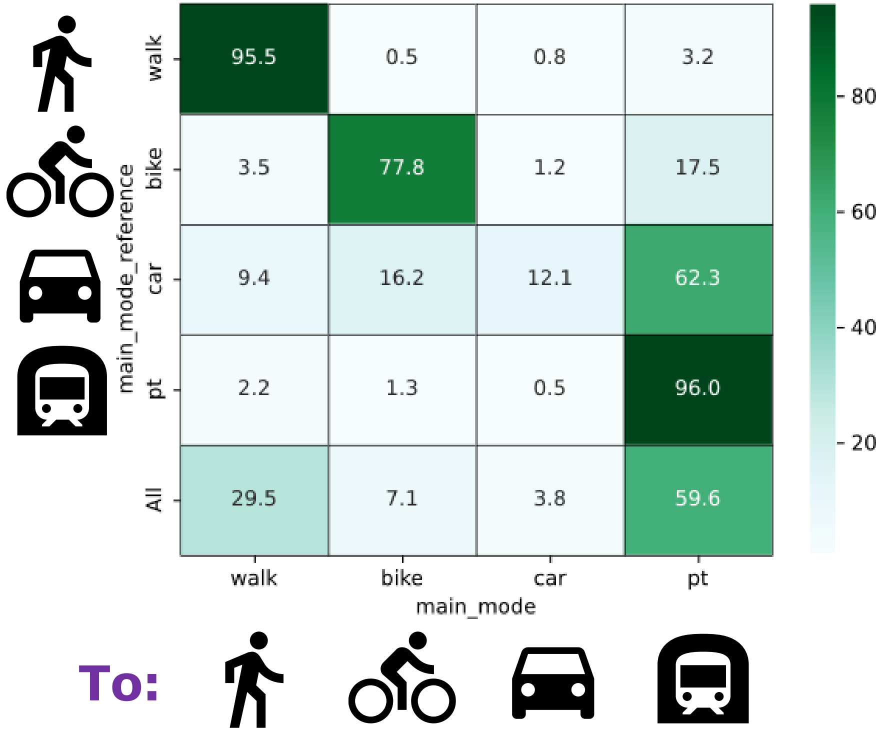
Initial mode split [%]:



Car (CV):
- strongly shifting to PT
- smaller shift to cycling, walking

Cycling:
- medium shift to PT

From:



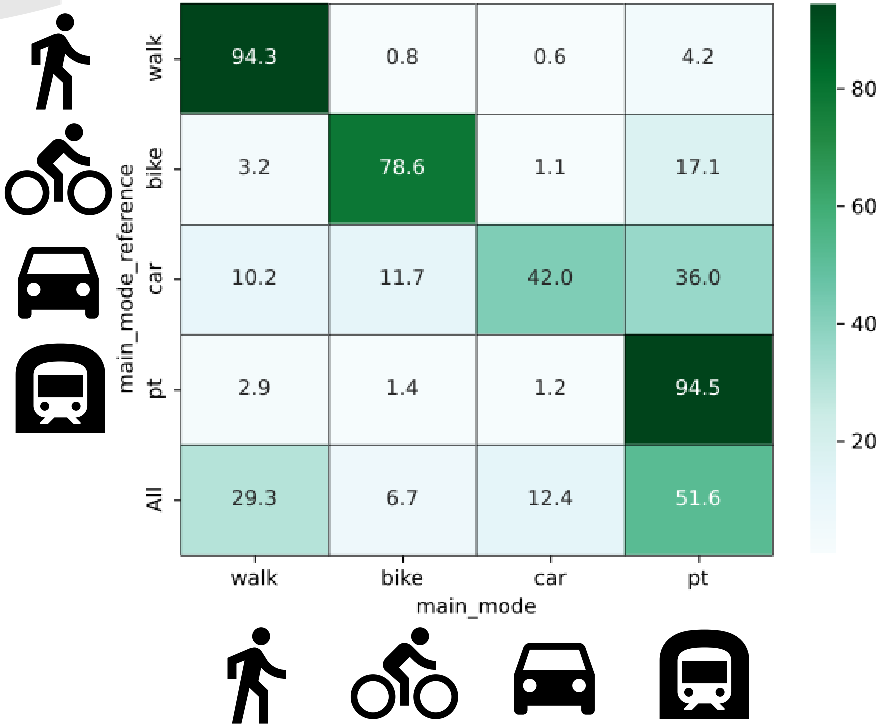
To:

No rebound traffic displacement

Verification: trips to/from **"belt"**; **traffic not pushed there** (e.g. like unwanted consequences of parking prices)

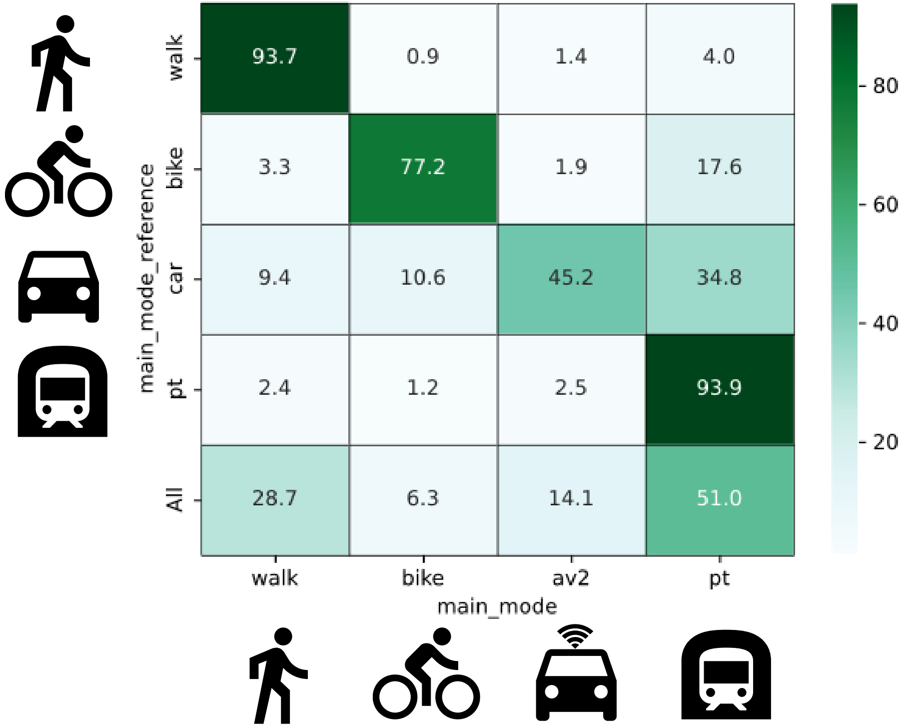
Compare: **from** all humans, no toll
to all humans, maximum toll

- **Smaller effect than** to/from **toll area**



Compare: **from** all humans, no toll
to all CAV, maximum toll

- **Comparable to** the reaction of **humans**



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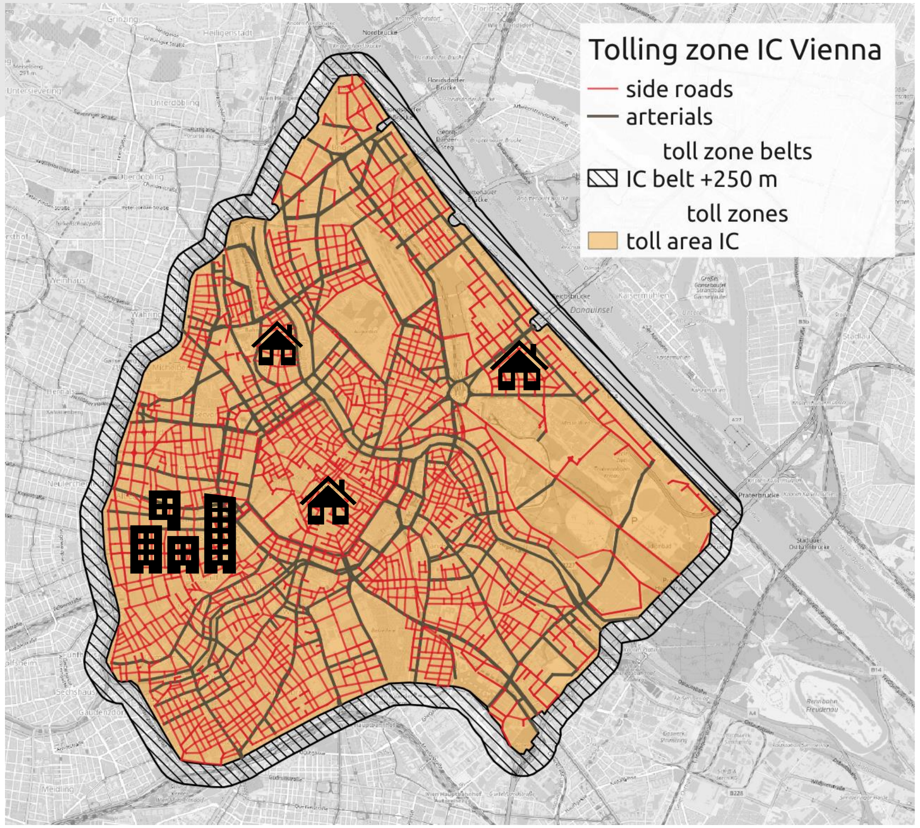
Tolling Exemption and by road-class

Implementing RUP considering **acceptance** and **accuracy**

By **road classification**: arterials, side-roads



- **Exempt residents** in RUP area **from (general)** tolling **charges**, retaining existing access rights

- **Focal areas**, calming traffic in **side-roads**, utilizing modern cars' location awareness

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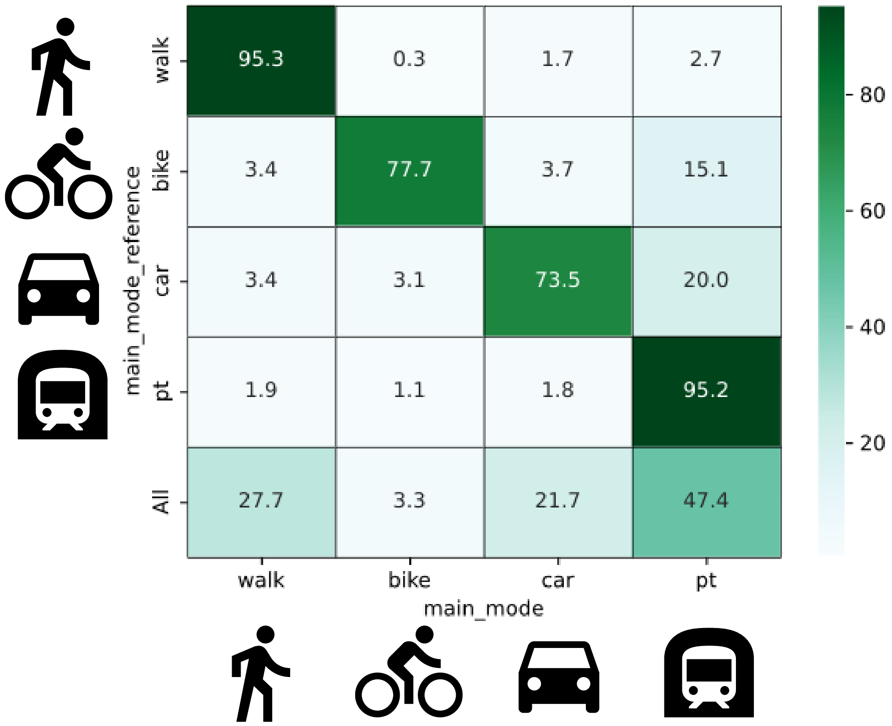
Plausible scenarios

Effects of **possible implementation** on trips to/from **toll area**

10 € level, **side-roads 200 %** price, **no toll** for **residents**.

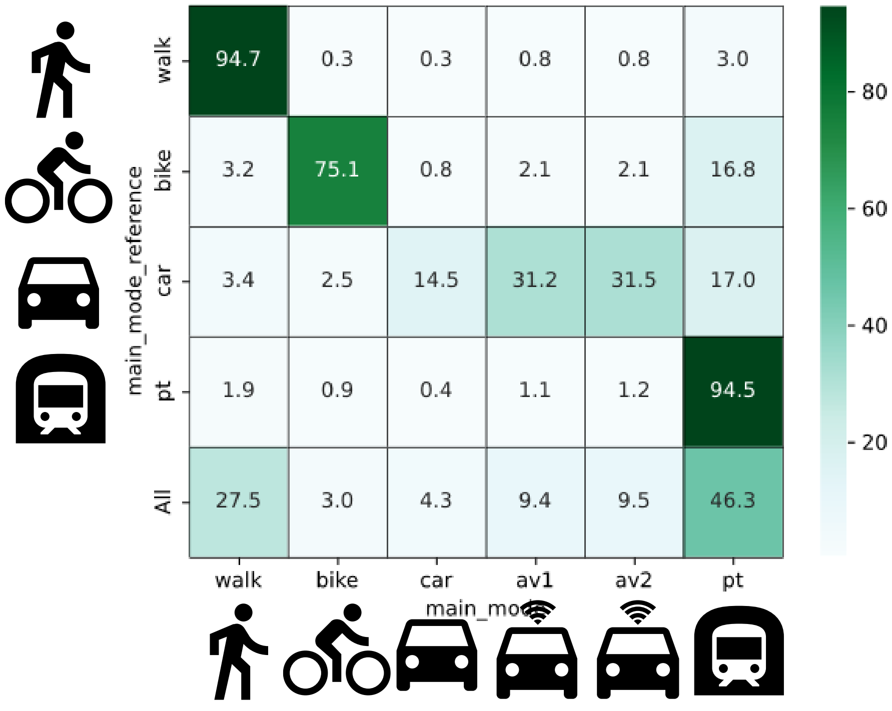
Compare: **from** all humans, no toll
to all humans, 10 € toll, as above

- Still **considerable effective shifts**



Compare: **from** all humans, no toll
to 80 % CAV, 10 € toll, as above

- Effects **similar** to **humans**, but **smaller**



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Summary

RUP introduction:

- Conventional **vehicles** and CAVs **behave similarly**
- Higher **CAV convenience** results in **more attraction** to use meaning: **less** modal **shift away from passenger cars**

Belt region outside tolling area:

- Experiences **uniform but weaker transformations** than tolling area → **no trip aggregation** at toll boundary

Plausible scenarios:

- **Road-class** based **tolling augments** intended **effects enabling significant** policy implementation **consequences** at **realistic pricing** levels

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Rajae Haouari,
Loughborough University

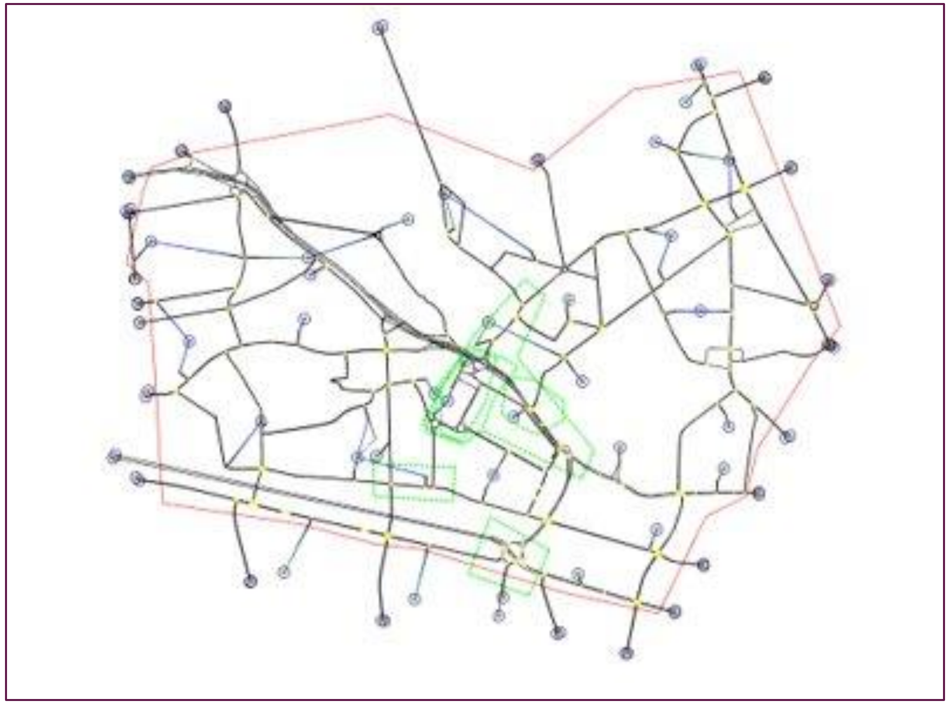
Automated Ride Sharing

LEVITATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

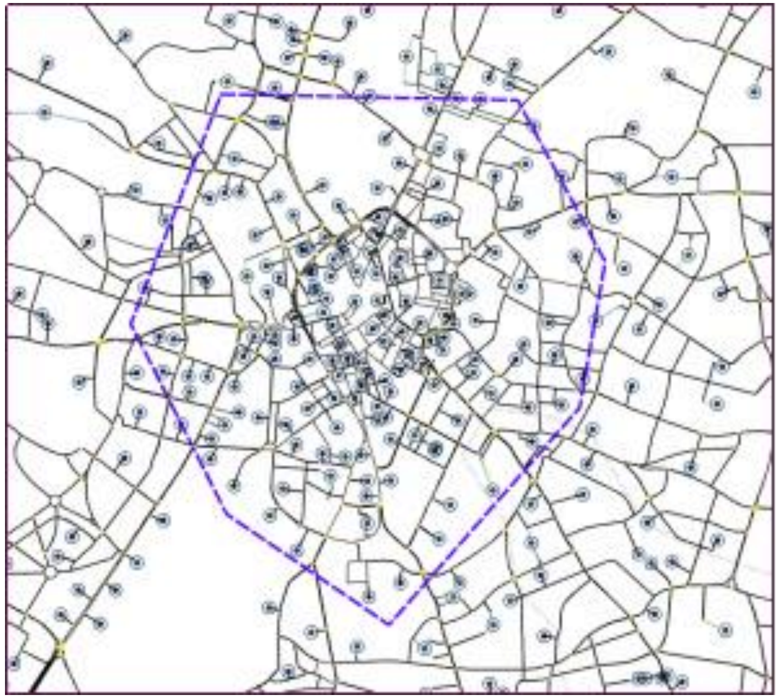
Automated Ridesharing

Aim

- Investigate the impacts of automated ridesharing services during the early stage of deployment in different networks:
  - Greater Manchester & Leicester (United Kingdom)



Greater Manchester



Leicester

Automated Ridesharing

Sevice Characteristics

- **Door-to-door** service offered by a **shared autonomous vehicle (SAV)** fleet.
- Two use modes: individual trips or sharing rides with other passengers
- Travellers' **willingness to share (WTS)** their rides with strangers.

Focus

- Traffic congestion, driven km, and environmental impacts.

Implementation:

- Operational research
- Microsimulation

Scenarios

- **Baseline:**
  - The current situation without any automated ridesharing services or automation considered
- **Automated ridesharing service**
  - 5% Demand for the new service.
  - Willingness to share (WTS): (0%, 50%, 100%)
  - CAV technology:

characteristics	1st Generation	2nd Generation
Sensing	limited	advanced
Data processing		
Car-following gaps	longer	shorter
Lane changes anticipation	early	early
Give-way	longer	shorter

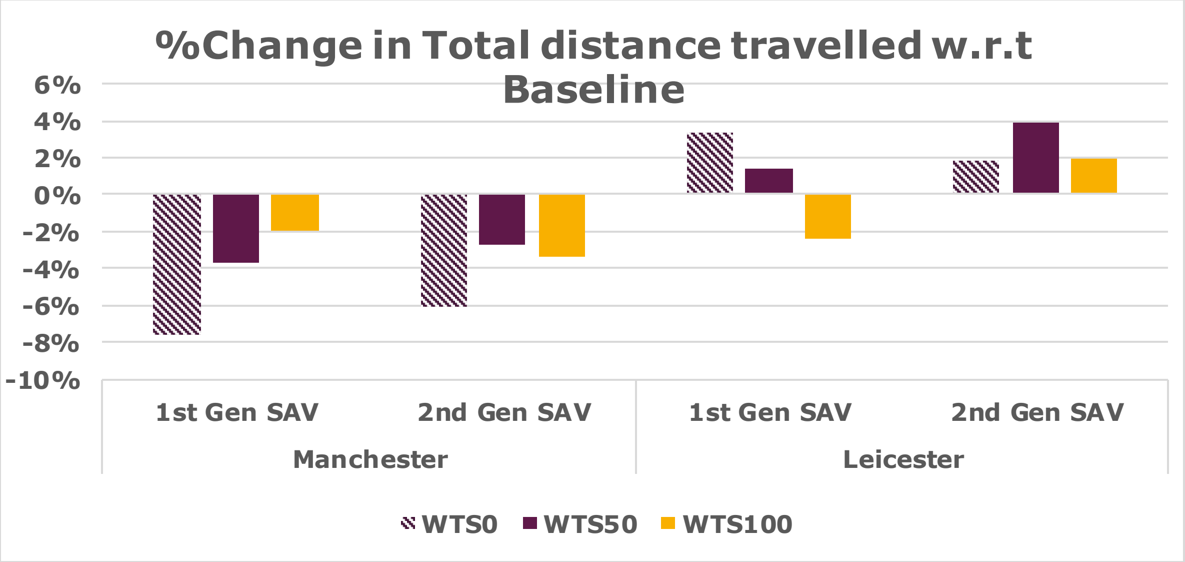
Assumptions

- Automation is only considered for SAVs.
- Battery capacity can support full-day operations
- Parking spaces are enough for all SAVs in each depot.
- WTS is presented as a parameter with two statuses (Yes, No),
- Cancellation of assigned SAV is not allowed.
- An SAV request refers to one traveller.

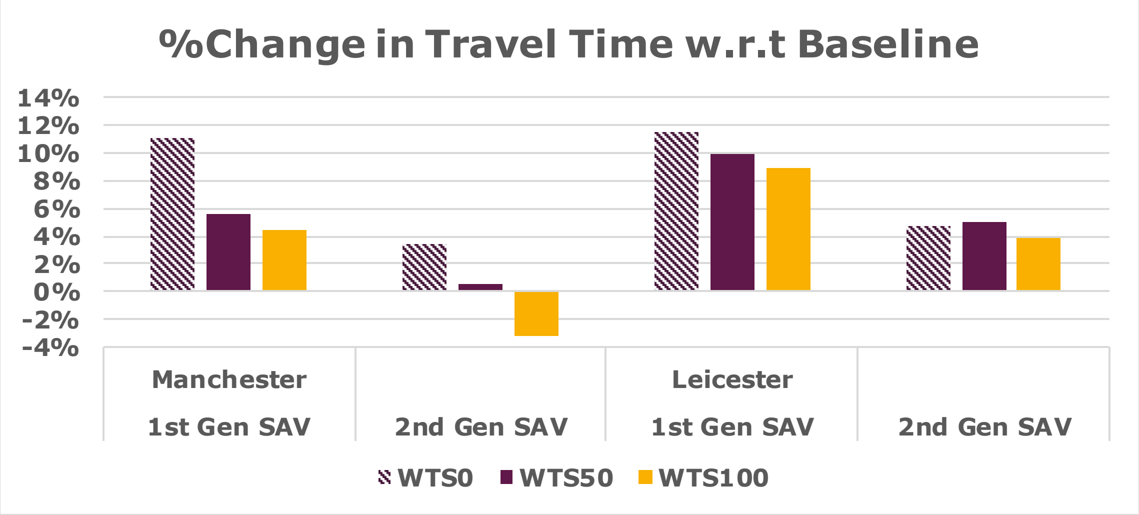
ARS - Fleet Size and Driven km

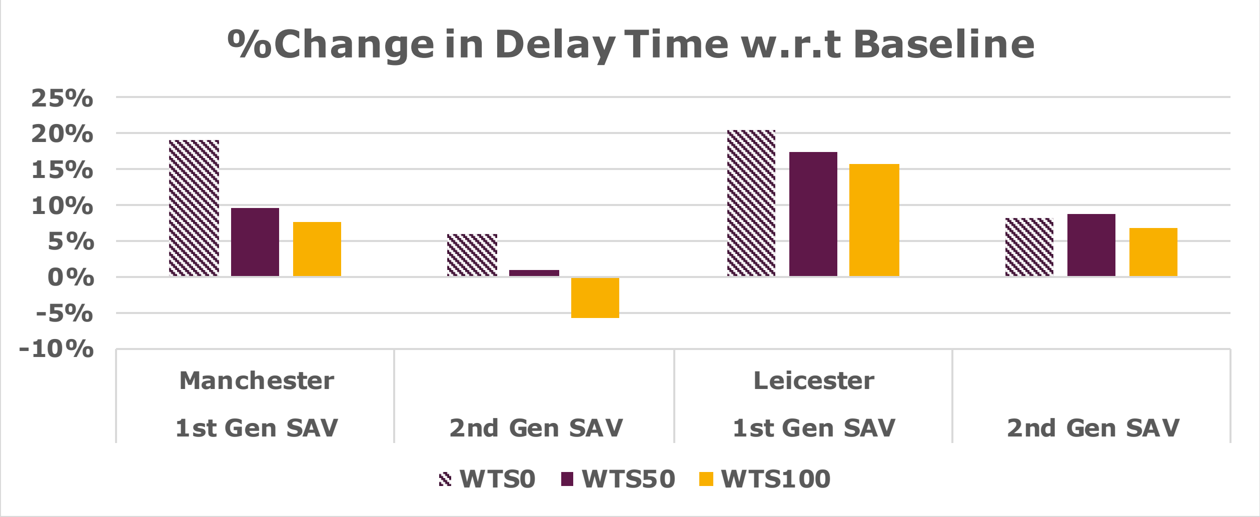
Network	No of trips	Willingness to share (WTS)	Optimal SAV Fleet size	SAV Total Driven km	Empty driven km
Manchester	1134	**0%**	682	5,924.95	2,998.50
		50%	570	5344,72	2435,30
		100%	435	4420,16	1554,17
Leicester	937	**0%**	730	3792,63	2084,05
		50%	663	3574,37	1880,42
		100%	547	3167,84	1529,42

- The SAV fleet size, driven km, and empty driven km **<u>decrease</u>** with increased **<u>WTS</u>**.
- **<u>Total distance travelled</u> decreases** for **Manchester** compared to baseline due to congestion.
- **<u>Total distance travelled</u> increases** in the **Leicester** network due to an increase in freight vehicles, PT, and SAVs empty VMT.



ARS - Impact on Congestion





- Automated ridesharing significantly increases delay and travel time for both networks due to:
  - ❑The interaction between SAVs and human-driven vehicles
  - ❑SAV empty repositioning trips (pick-up trips)
  - ❑SAVs circulating behaviour (using low capacity roads and secondary roads to reach their destinations).

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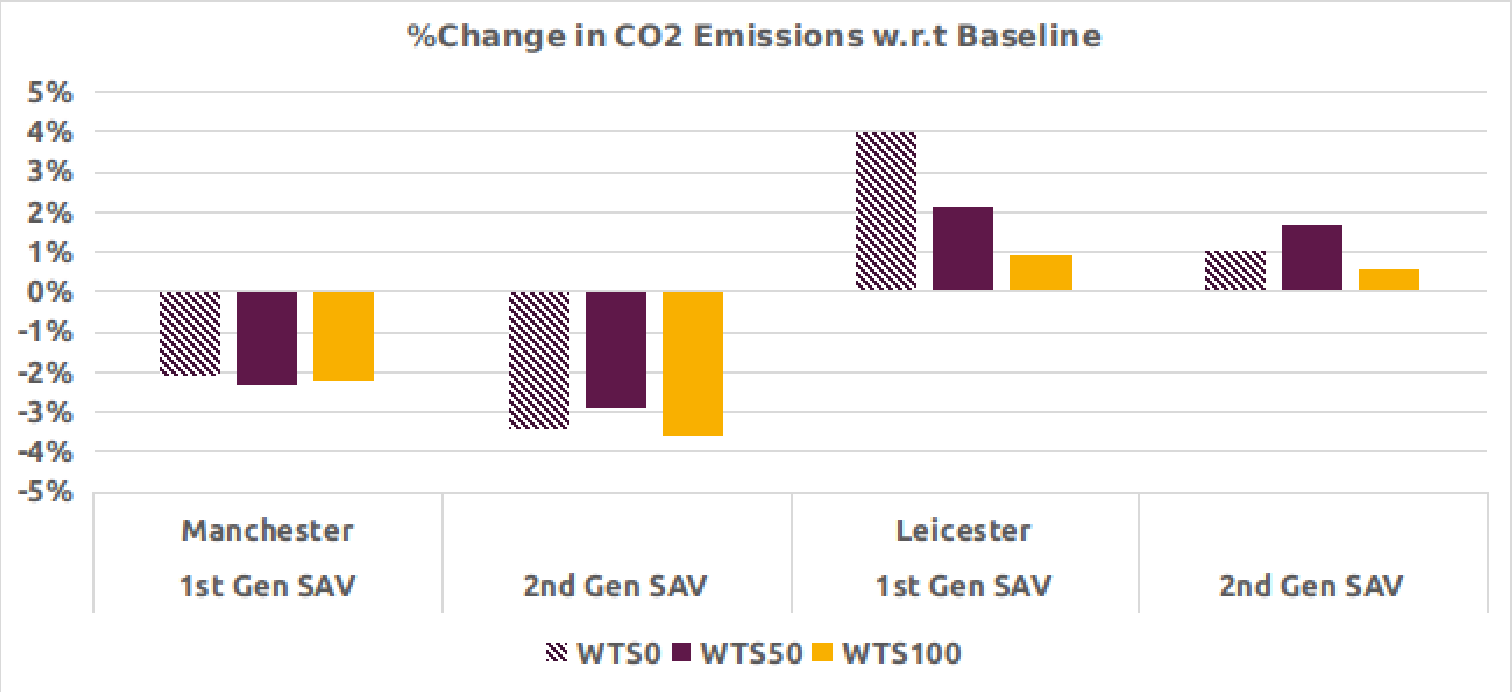
Environmental Impacts



- CO2 Emissions:
  - ❑ Decrease in Manchester due to reduction in traffic flow.
  - ❑ Increase in Leicester due to an increase in freight vehicles and PT.
- High levels of **willingness to share** and advanced SAV could reduce the impact on emissions.

Key Factors for Policy Considerations

- **Network characteristics:**
  - **Suburban:** negative impact on traffic performance and increased emissions due to congestion
  - **City Center:** increased congestion and emissions associated with increased traffic flow

- **Passengers' preferences for individual or shared trips:**
  - High levels of **<u>willingness to share</u>** can reduce the adverse impact on traffic congestion and emissions.

  Also:
  - Reduce the required SAVs fleet
  - Reduce Empty VKT

- **CAV technology**
  - Advanced (2nd generation) CAV as a part of the automated ridesharing fleet can help reduce congestion and emissions.

The role of LEVITATE in understanding the policy implications of CAVs

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LEVITATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

Amna Chaudhry,
Loughborough University

Introduction

LEVITATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

General Recommendations for Policy Considerations

- Impacts dependency on the manner of implementation
- Importance of full impact assessment for policy making
- Policy making for early generations of automated vehicles
- Policies for balancing the Public Transport usage and Active Travel
- The LEVITATE project has shown the benefits of conducting detailed impact forecasts based on a broad spectrum of modelling methods.
- The methods can be applied to other CCAM interventions and can also be adapted to evaluate real-world trials of CCAM services and technologies.

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Policy Interventions within LEVITATE

Passenger Transport						Urban Transport		Freight Transport			
RUP	Provision of DLs on urban highways	Parking Price	Parking space regulations	-Automated Ride Share	GLOSA	Point-to-Point AUSS	On-demand AUSS	Automated urban delivery	Automated consolidation	Hub-to-Hub automated transport	Platooning on urban highway bridges
Dynamic Toll	DL on A Road and motorway (left most lane placement)	Enter, drop-off passengers and return to origin	Removal of parking spaces to 50%	5% demand with varying WTS (20-100%)	Implementation on 1 intersection	Point-to-point AUSS connecting two modes of transport	Anywhere-to-anywhere AUSS	Semi-automated delivery	Manual delivery with bundling at city hubs	Operation via transfer terminal	Structural reinforce-ment
Static Toll	DL on Motorway (left most lane placement)	Enter, drop-off passengers and return to outside parking	Conversion to driving lanes	10% demand with varying WTS (20-100%)	Implementation on 2 intersections	Point-to-point AUSS in a large-scale network	Last-mile AUSS	Automated delivery	Automated delivery with bundling at city hubs		Intelligent access control
	DL on A road with right most placement	Enter, drop-off and drive around while waiting for the passenger	Conversion to cycle lanes	20% demand with varying WTS (20-100%)	Implementation on 3 intersections		E-hailing	Automated night delivery			
	DL on A road with left most lane placement		Replacement with pick-up/drop-off spaces								
			Conversion to public spaces								

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Recommendations based on Specific Interventions

- **Road use pricing** can be a promising option for improving use of active modes and public transport with increasing prevalence of CAVs.
  - It is expected to lead to a number of additional benefits over the baseline impacts: better energy efficiency (dynamic toll more than static toll or empty km pricing), higher vehicle occupancy rate, and lower parking space demand.
- The optimum parking behaviour of CAVs can be managed by the **price of parking**. Travel time and congestion increase substantially over the current scenario when CAVs drop off passengers then drive around, return to base or `park outside.
- The impact of **Automated Rideshare Services** depends heavily on the proportion of total demand fulfilled by the service and also passengers' willingness to share with others.
- Various **On-street Parking Space management** options can have both positive and negative aspects which should be carefully assessed based on the local transport policy goals
  - On-street parking replaced by driving lanes, public spaces or cycle lanes indicate promising benefits towards decreasing congestion.
- **Green Light Optimised Speed Advisory (GLOSA)** systems in general showed small improvements in traffic impacts when used with fixed time controllers.
  - Increasing the number of GLOSA controlled intersections on arterial roads resulted in small additional improvements in traffic impacts. The impacts need to be carefully assessed when human-driven vehicles comprise the largest proportion of traffic.

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Recommendations based on Specific Interventions…cont’d

- The early phase of CAV deployment (low MPR) in the transport system can be challenging towards improving road safety. Policy making is critical in influencing the road safety impacts

Policy Interventions studied within Levitate	Description of expected road safety impacts (compared to baseline scenario)
Point-to-point automated urban shuttle	No clear additional impact on crash rate
On demand automated urban shuttle	No clear additional impact on crash rate
Dedicated lanes for CAVs	No clear additional impact on crash rate
Parking price regulation	Increase in crash rate expected
Replacing on-street parking	Further decrease in crash rate expected
Automated ride sharing	Increase in crash rate expected
Green Light Optimised Speed Advisory (GLOSA)	No clear additional impact on crash rate
Automated delivery	Decrease in crash rate especially at lower penetration rates of CAVs
Automated consolidation	
Hub-to-hub with transfer hub	

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Recoemmendations based on Specific Interventions…cont'd

- Under all of the deployment scenarios examined the impacts of **Automated Urban Shuttle Services** were relatively low as the vehicles routinely formed only a small part of the total fleet.
  - Most societal impacts were positive. However, care should be taken to prevent the anticipated unwanted impacts of these services, for example on the use of active travel modes.
- Freight vehicles also tend to be a small proportion of the total fleet nevertheless Automated Urban Freight Delivery services provide many positive benefits. Automated freight vehicles that enable night-time deliveries to be made produce additional benefits to travel time and congestion.
  - Automation alone will most likely lead to an increase in freight mileage (because of smaller and cheaper freight vehicles), so corresponding policy measures in favour of freight consolidation should be considered to mitigate this trend. Fortunately, automation is expected to facilitate the consolidation process.
- A focused assessment of the impact on **bridges of truck platooning** has identified the need to improve the structural resistance of bridges over 55m span in bending and over 60m span in shear. Alternatively, increased forward headways must be imposed.

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Helmut Augustin,
City of Vienna

The Vienna Perspective

LEVITATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

Autonomous Vehicles adapt to the needs of the city and its inhabitants, not the other way round.

https://smartcity.wien.gv.at/wp-content/uploads/sites/3/2022/05/scwr_klima_2022_web-EN.pdf

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Space and Efficiency

Safety

Infrastructure

Traffic Management

City of Vienna

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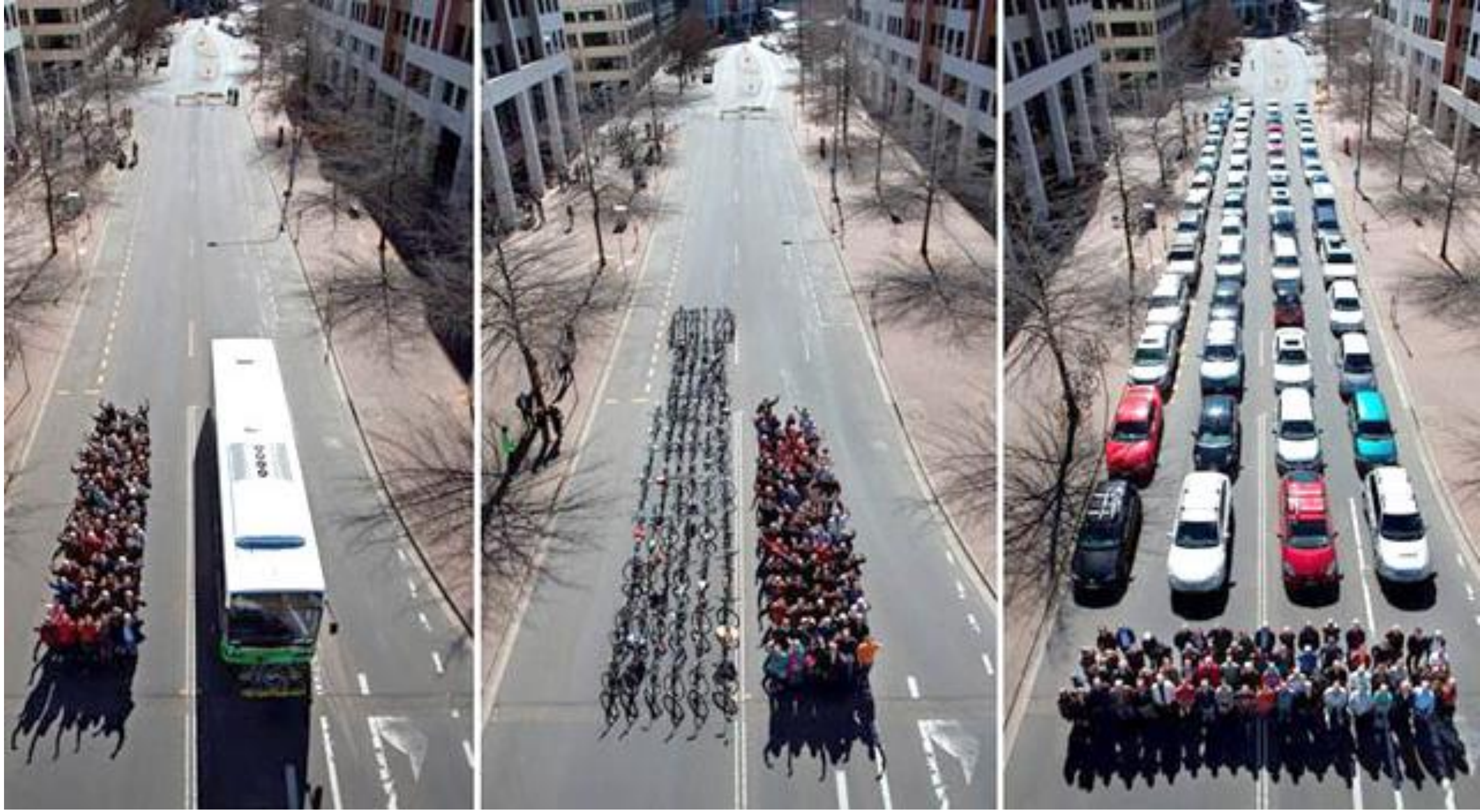
Space & Efficiency

Space is scarce in cities.

It must be used as efficiently as possible.



© we ride Australia

AV services **complement**, not compete **public transport**

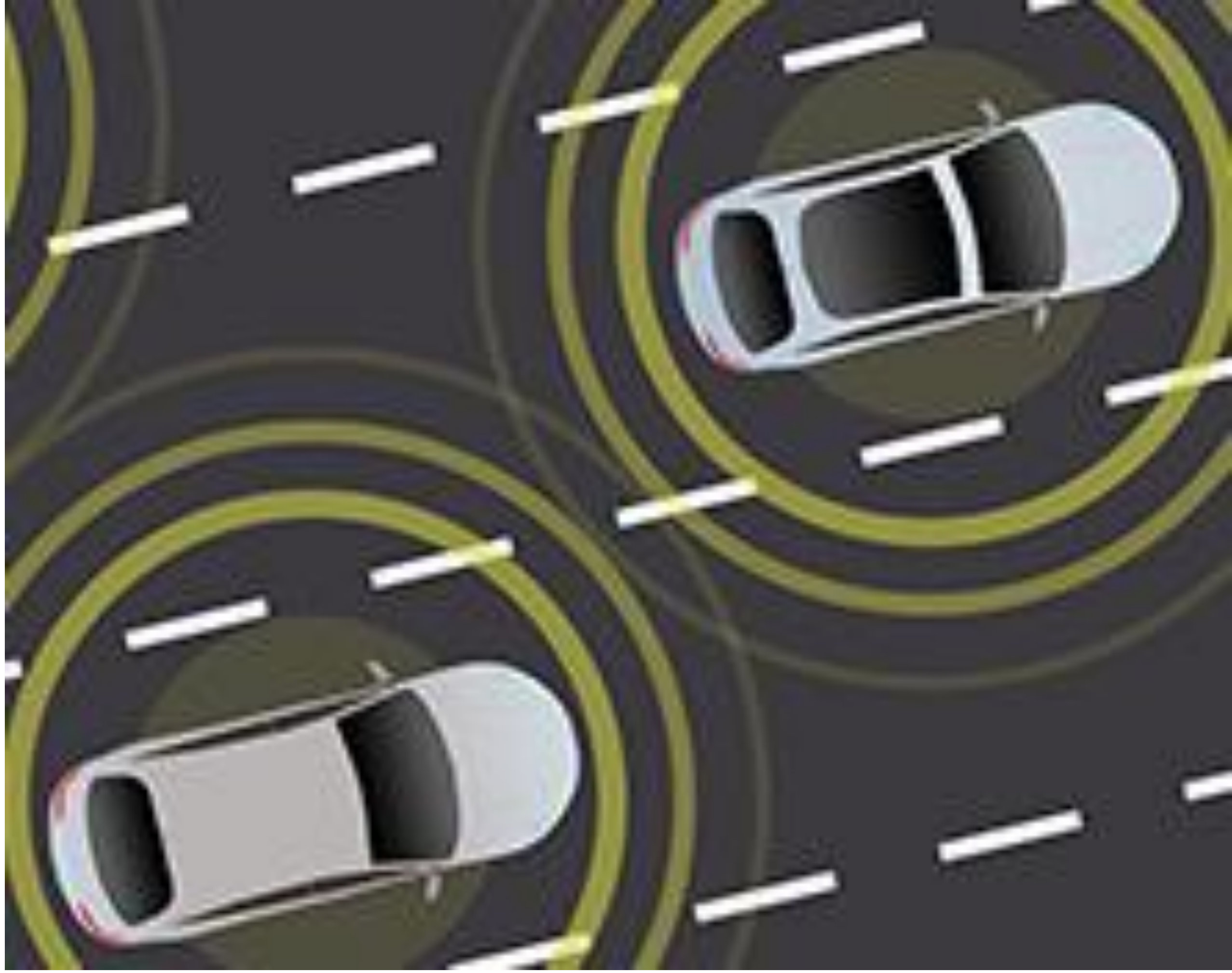
Incentives for **high degrees of occupation / ride sharing**

Safety

Priority to **intrinsic safety**

AVs must deal with conventional traffic participants.

They will only be permitted if proven to be significantly safer than human drivers



Infrastructure

AVs adapt to public spaces, not the other way round. They deal with the existing traffic guidance facilities.

No additional, costly infrastructure in public space in order to compensate possible weaknesses of AVs

No additional barriers in urban spaces due to AVs.

Traffic Management

Management of public infrastructure is a public task.

Traffic Management is increasingly driven by algorithms and data.

Targeted are more and more Navigation-Systems rather than human drivers.

Data-based steering requires data including B2G access to **in-vehicle-generated-data**

© Manfred Helmer

What Makes AVs a Success for Cities?

AVs are neither good nor evil, it depends on the framework

- Carbon-free propulsion
- High occupancy = Ride Sharing
- Complement, not compete Public Transport
- km travelled do not increase

Public Tasks

- Regulatory Framework
- Traffic Management
- Liveable Streets

How does Vienna benefit from LEVITATE?

knowledge about

- direct and indirect societal effects of CCAM
- the effects of potential policy interventions

this enhances our ability to

- understand what is coming up
- derive comprehensive policy measures

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Thank you for your attention!

Helmut Augustin
Head of the Coordination Unit for Digitization

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City of Vienna

Liam Potts
Transport for Greater Manchester

The Manchester Perspective

LEVITATE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824361.

Content

- TfGM's latest thinking on CCAM
- How we can use Levitate
- Challenges/observations/further research
- Next steps

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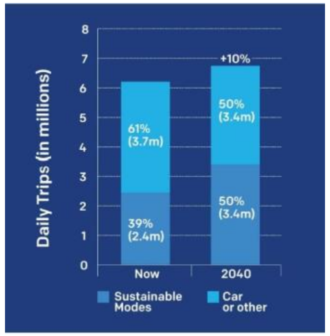
Strategy Review

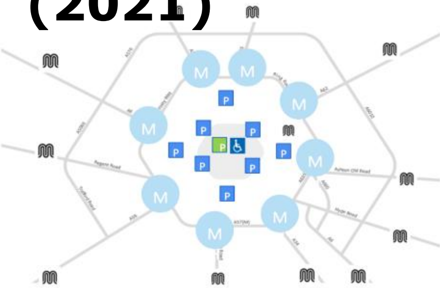
Greater Manchester Freight and Logistics Strategy (2022)

Road Danger Reduction Plan (2021)

Right Mix Plan (2021)



Manchester Parking Strategy (2021)



Greater Manchester Transport Strategy 2040 (

- Recognises that connected mobility and autonomous vehicles may bring benefits.
- However, it also recognises that the integration of technology should be managed to align with our strategic objectives.

Streets For All Strategy (2021)

Advances in data science, artificial intelligence and sensing technology are increasing the rate of innovation in driverless or connected and autonomous vehicle (CAV) technology. We aim to make sure that when CAVs are eventually used in our city-region, they fit in with Greater Manchester's strategic plans. These include the need to improve safety and accessibility standards for everyone who uses our streets. support our environmental goals and give the opportunity for people to use shared forms of transport where public

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Guiding Principles for Connected and Autonomous Vehicles

- **Principle 1**: The development and implementation of CAVs must **improve safety standards** for all street users.
- **Principle 2**: CAV deployment must be treated as an **opportunity to improve accessibility and inclusivity** for all GM residents.
- Principle 3: Use of CAV technology in GM must **align with our environmental goals**, and must demonstrably contribute to the achievement of the Greater Manchester's key ambition for carbon neutrality by 2038.
- **Principle 4**: CAVs in GM must primarily be used to **supplement access** to, or journeys between mass transit systems.
- **Principle 5**: CAVs must not be viewed as a replacement for active modes of travel such as **cycling and walking, which must remain the preferred options for short urban journeys**.
- **Principle 6**: CAVs must provide positive benefits to the GM economy, through efficiency gains and **job creation**, and must also address potential job losses resulting from the automation of transportation services.
- **Principle 7**: Where appropriate, an **open data policy** will be adopted for CAVs.

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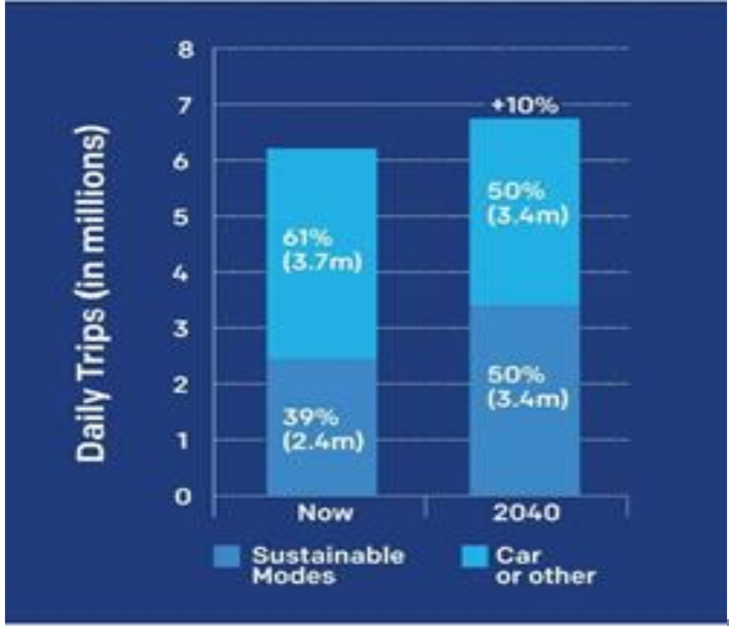
How TfGM can use Levitate

- Integration with existing strategies
- Scenario Planning
  - Right Mix targets to be reviewed?
  - Right Mix Pathway to be reviewed based on CCAM interventions?
- Scheme Development
  - Use cases to be considered to meet objectives
- Scheme Assessment
  - PST to be used to appraise schemes
- Strategy Development
  - Dedicated CCAM strategy
- Funding Proposals

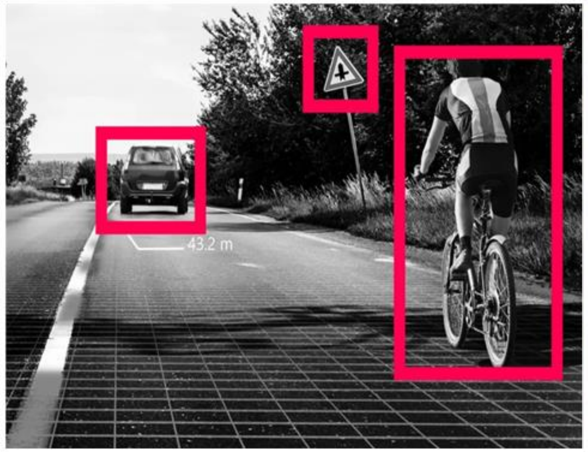


Next Steps

- Disseminate to Local Authorities and stakeholders
- Internal dissemination
- Expansion of GOLSA schemes

Challenges/Opportunities for Further Research

- Is there a need to re-model given Covid impacts?
  - How will this impact KM’s travelled? Congestion? Demand for CAV’s?
- Will improved road safety have an impact on Cycling?



For more information:

www.levitate-project.eu

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