Interreg North-West Europe
Co-funded by the European Union

CAMINO

CAMINO.

1st Online Seminar on future CCAM scenarios and market engagement

14th of May 2024

Setting the scene
Purpose and Goals of Our Seminar

Interreg North-West Europe
Co-funded by the European Union
CAMINO

Why This Seminar? Engaging key EU transport authorities in planning large-scale deployments of **shared automated vehicles (SAV)** for public transport.

Objectives: Exchange of innovative **visions** and operational **strategies** among experts.

Impact:

- *Your insights are crucial* - please **share feedback** either verbally or via chat.
- Our aim is that discussions here lead to the development of **new networks, projects or initiatives** (Next generation pilots; EU projects, etc.).

Lukas Zillich,
Projectmanager
connected mobility

Antonia Lorenz - Senior Manager Framework Conditions and Model Regions
Svetlana Drümmer – Senior Project Lead AV

Edwin Mermans
Senior advisor international affairs

Thorsten Möginger -Head of New Mobility
Sofia Pavlaki - Consultant New Mobility

Tom Alkim
Strategic Advisor Connected & Automated Mobility

Martin Schiefelbusch
Contact person for public transport

Javier Guimera Tena -
Head of AV and Operations;
Atziri Guadalupe Sanchez Contreras – Consultant AV

Zafeira Gkioulou,
Program Manager SCALAR ModD

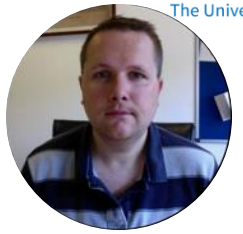
Christian Willoch –
Executive Advisor

Oliver Nahon,
Director of operations

Paul Eradus,
Senior policy coordinator

Lukas Arndt, Project Management
Region Hannover GmbH

Espen Strand Henriksen,
Head of New Mobility



Brian Caulfield, Professor in Transportation

Ranald Robertson,
Director

Delphine Grandsart,
Senior researcher

What's on the agenda?

Interreg North-West Europe
Co-funded by the European Union
CAMINO

1. Camino Project Introduction. — 10 min

2. AV future scenarios (Shared VS Solitary) presentation. De Lijn.
   → Q&A
   PAV scenarios presentation. Almere.
   → Q&A
   — 25 min each

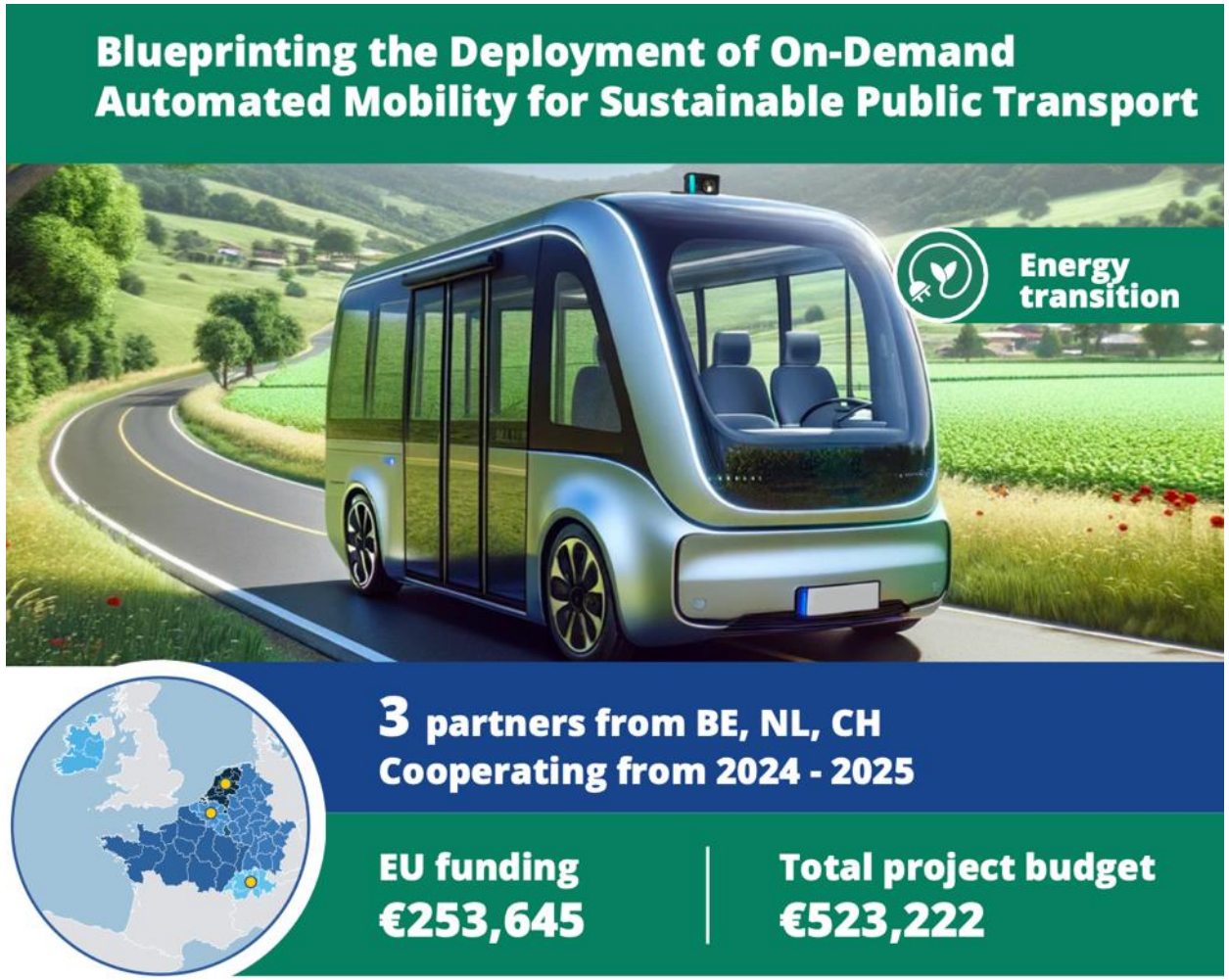
3. Our view on tendering and market engagement presentation. Almere.
   → Q&A
   Traffic model. De Lijn
   → Q&A
   — 12 min each

4. Wrap-up & next steps. — 5 min

The CAMINO project

Interreg North-West Europe
Co-funded by the European Union

CAMINO



Current challenge:

- **PTAs and PTOs lack the know-how to plan for the sustainable implementation of CCAM in their public transport systems.**

The introduction of **Automated Mobility concepts** can improve PT offer by

- **reducing costs** and,
- increasing accessibility,
- providing a **sustainable alternative** to private cars that could lead to a **modal shift of up to 42%** (McKinsey, 2023).

CAMINO consortium

Interreg North-West Europe
Co-funded by the European Union
CAMINO

Project Partners

Gemeente Almere
ROSAS
DE LIJN

Associated Orgs.

UITP
transdev
KEOLIS
PAVE EUROPE
HI TRANS
nvbw
Hamburg
epf
PADAM MOBILITY
SAAM Swiss Association for Autonomous Mobility
Trinity College Dublin The University of Dublin

Interest Groups

DB
SHOW AUTOMATED URBAN MOBILITY
ULTIMO Advancing Sustainable User-centric Mobility with Automated Vehicles
bayern innovativ Innovation leben
rms
HI TRANS
TRANSPORT FOR LONDON
DOVA
ZENZIC SELF-DRIVING REVOLUTION
Connekt
USF UNIVERSITY OF SAN FRANCISCO

& more ...

Interreg North-West Europe
Co-funded by the European Union

CAMINO

CAMINO objective

CAMINO aims to help (…) PTAs and PTOs to define **why**, **where**, **when** and **how** to deploy CCAM concepts to improve the sustainability of PT.

How will this be archived?

We will …

- assess market expectations, simulate uptake scenarios
- discuss 5-10 year deployment scenarios, identify synergies with leading organisations,
- explore adaptable tender formats.

Interreg North-West Europe
Co-funded by the European Union

CAMINO

De Lijn's AV Future Scenarios

Koen Schietecatte,
Project leader automated transport

De Lijn – company overview

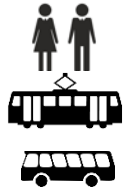
Interreg North-West Europe
Co-funded by the European Union
CAMINO

State owned operator of public bus and tram network

- **Turnover** 1,1 billion €
- **Passengers** 500 million / year

- **Activity** Public transport in Flanders Region – Belgium
  including : network planning - service operation - customer communication
  traffic control centre - infrastructure and maintenance

- **Public + Private**
  - 50% transport service outsourced to private operators
  - 50% transport service insourced – by :
    - 8.000
    - 400
    - 2.240



Agenda

- Inspiration
- Strategic study & market analysis

WAYMO

Interreg North-West Europe
Co-funded by the European Union
CAMINO

Base technology operational – focus on refinement and reduction of human interventions

24h service | without safety driver | > 100 k people on waiting list

San Francisco
>300 vehicles
all inhabitants
full city

Phoenix
>300 vehicles
all inhabitants
city + airport

Los Angeles :
employees and test groups
specific districts

Austin
in start-up

PTO and PTA with ambitions

Interreg North-West Europe
Co-funded by the European Union
CAMINO

Ruter#

Oslo region
400 mio passengers/year

Initiative	Technology demonstration	Business viability demonstration	Scaling demonstration	2030 ->
Geo area	Local area 	Municipality 	Oslo Region 	Oslo – Viken 
AV's total	4 – 20	20 – 250	~ 20 000	30 000 +
Timing	2022-2024	2023-2025	2024-2030	2030-

VHH Verkehrsbetriebe Hamburg-Holstein

HOCHBAHN

Agenda

- Inspiration
- Strategic study & market analysis

Strategic study on shared automated mobility

Interreg North-West Europe
Co-funded by the European Union

CAMINO

Vlaanderen is mobiliteit & openbare werken
DE LIJN
AGENTSCHAP WEGEN & VERKEER
DEPARTEMENT ECONOMIE WETENSCHAP & INNOVATIE
Roland Berger

Research questions

How can the government guarantee that the **potential social benefits of shared autonomous driving** (in particular robotaxi and roboshuttle) on the road in Flanders are **realized** and that the possible **negative undesirable effects** of private autonomous transport are **mitigated**?

A **Scenarios & timing**	• Which **potential scenarios** in private versus shared/pooled autonomous transport will manifest themselves at different locations in Flanders without government intervention? • Which **associated timelines** (2030 - 2040) are linked to this?
B **Role of public authorities**	• What is the **role of the government** in this story? • How can the potential **societal benefits** of shared autonomous driving for passenger transport be **maximised?**
C **Preparation**	• How can the government best **prepare** for this role?

Automated transport – Business models

Interreg North-West Europe
Co-funded by the European Union
CAMINO

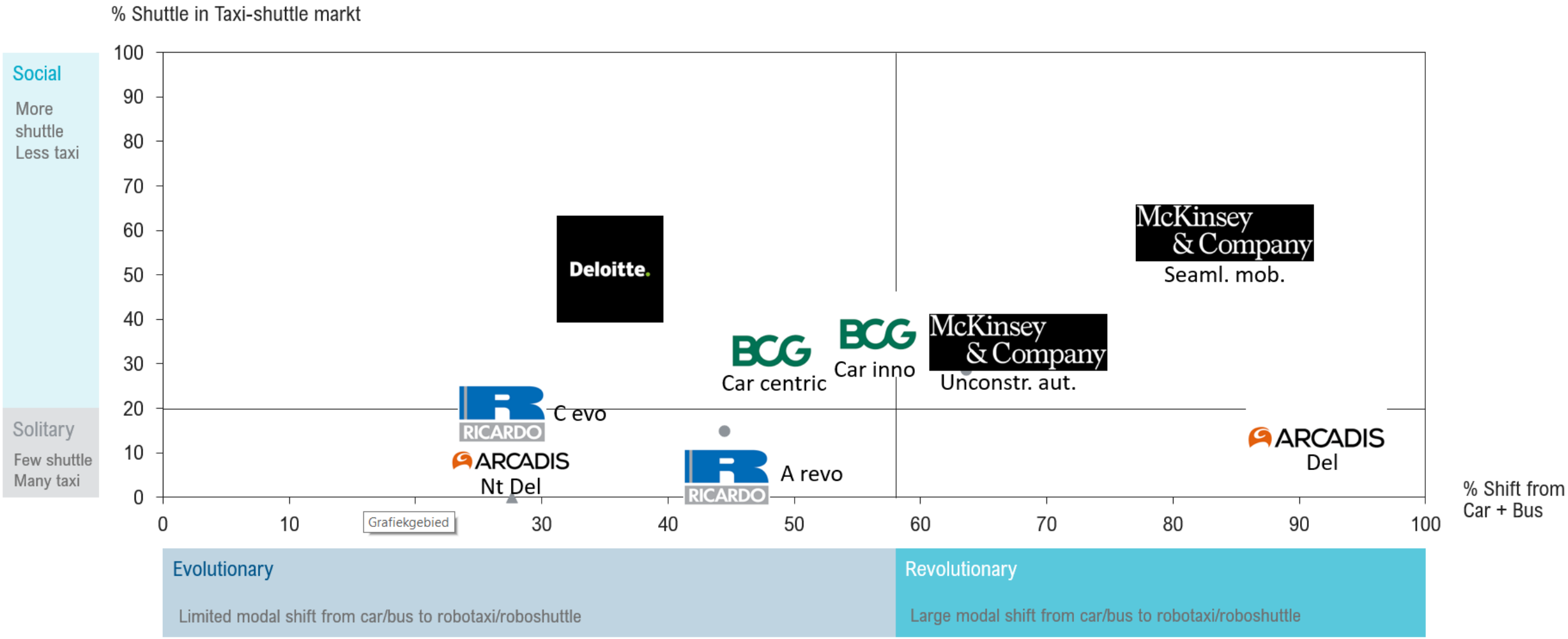
Business model – Scenarios

	Description	Value proposition for customer	Vehicle type	Existing examples [not exhaustive]
Private 	The autonomous car remains the property of 1 individual or family	**Car as house extension** Autonomous cars in which people can work, sleep, relax,... Average occupancy lower than current private car 	**Private car**	Beta testing of Tesla's Full Self-Driving (FSD) module for private cars 
Shared 	Autonomous taxis are called via an app. Users move around without having a third-party present in the vehicle	**Car as-a-service** Transport tailor-made and on demand. Waiting time of a few minutes Average occupancy lower than current private car 	**Robotaxi** • Privately used • Dynamic trajectory • Smaller vehicles (3-6 persons)	Waymo offers fully autonomous robotaxi rides (empty vehicle picks up customer) and operates in Phoenix, San Francisco and Los Angeles 
Pooled 	Autonomous shuttles are called via an app. The vehicle may make a stopover along the way to allow third parties to join in	**Transport at lowest cost** Comfortable transport at a minimum cost. Few minutes extra time and detour to pickup a possible third party Average occupancy slightly higher than current private car 	**Roboshuttle** • Pooled used • Dynamic trajectory • Smaller & medium sized vehicles (3-12 persons)	Volkswagen, MOIA & Mobileye test ride-pooling service in Hamburg with the aim of commercial rollout in 2025 

Bron: Roland Berger

Analysis of available market studies

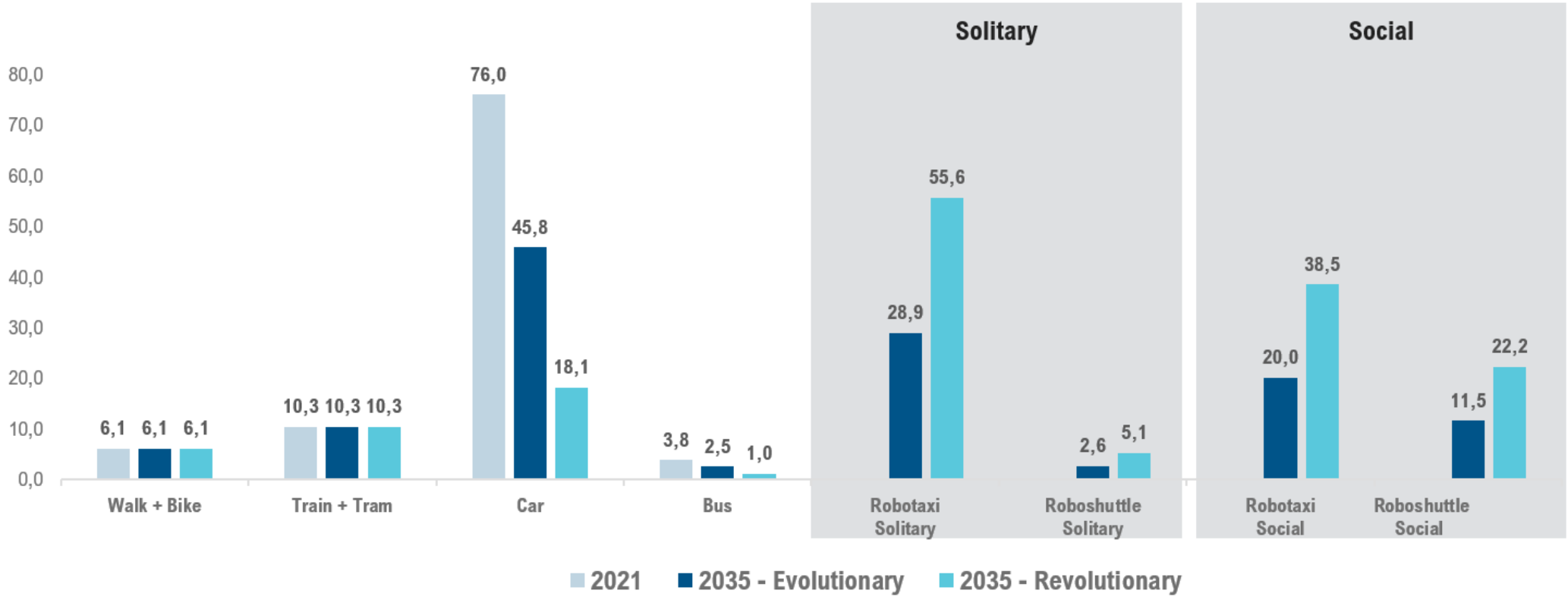
Interreg North-West Europe
Co-funded by the European Union
CAMINO



Projections shared automated driving Flanders

Modal split - % split passenger kilometres

Available study data applied on Flanders



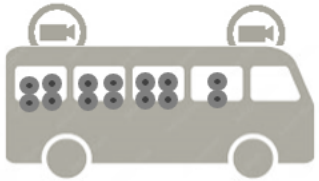
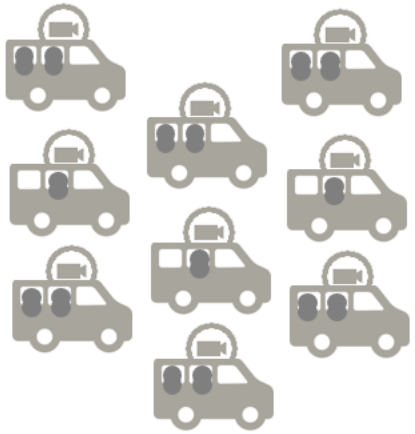
Interreg North-West Europe

Co-funded by the European Union

CAMINO

Future impact
shared automated transport

Interreg
North-West Europe
Co-funded by the European Union
CAMINO

	Bus De Lijn	Roboshuttle De Lijn	Roboshuttle others	Robotaxi	Private car
Current					
Future					

Questions for all

15:00

Interreg North-West Europe
Co-funded by the European Union
CAMINO

1) How are you **preparing for automated driving**?

2) How do Robotaxis/-shuttles **relate** to the **use of private cars** and **public (bus) transportation**. *(Add-on vs substitution? How strong will this relation be - 10%/niche cases vs 80%/mass impact?)*

3) Name **3 companies selling the most advanced** automated driving technology **in 2030**

4) When would it be relevant to **stop buying / start offering human-driven buses**. **What should change** for you to consider adding digital drivers to your offer?

Interreg
North-West Europe
Co-funded by the European Union

CAMINO

Almere's PAV Scenarios,

Gemeente Almere

Eduard Röntgen,
Transport Consultant

Interreg North-West Europe
Co-funded by the European Union

CAMINO

Almere Virtual Pilot experience (PAV project)

Presentation CAMINO meeting

May 14, 2024

Gemeente Almere

Interreg North Sea Region
PAV
European Regional Development Fund

EUROPEAN UNION

Exploring options

Sept 2019 – Early 2022

PTO and municipality involvement
(shift of focus due to Covid-19)

Manufacturer cooperation
(overall lukewarm interest)

Public road admission
(lengthy procedures)

PAV
Almere
Pilot

Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

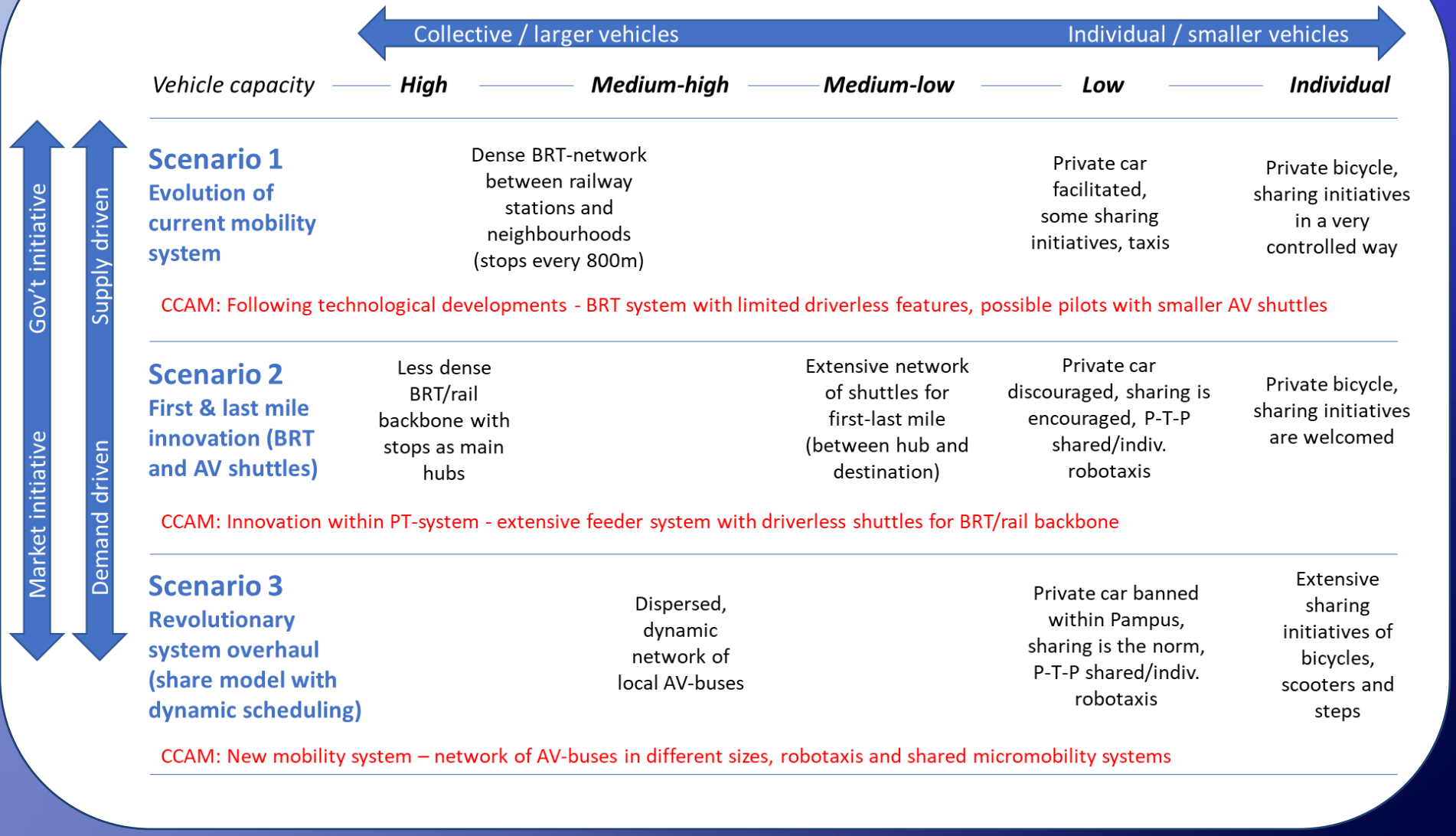
Key Steps

Early 2022 – March 2023

Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

Final scenarios developed based on workshop results

Workshop
May 2022



Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

Key Steps

Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

Key Steps

PAV
Almere
Virtual
Pilot

Scenario Exploration
(workshop)

Demand Forecast
(quantitative modelling)

Scenario Optimisation
(network analysis)

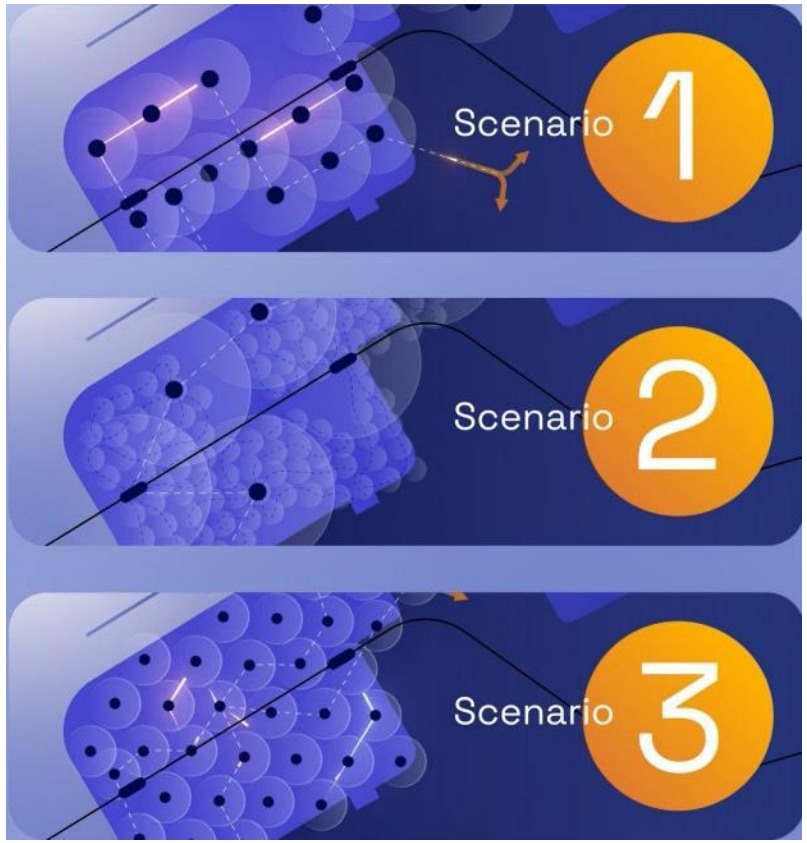
Citizen Feedback
(quantitative survey)

Review by Planners and Experts
(workshop)

Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

Scenario Optimisation

Scenario 2



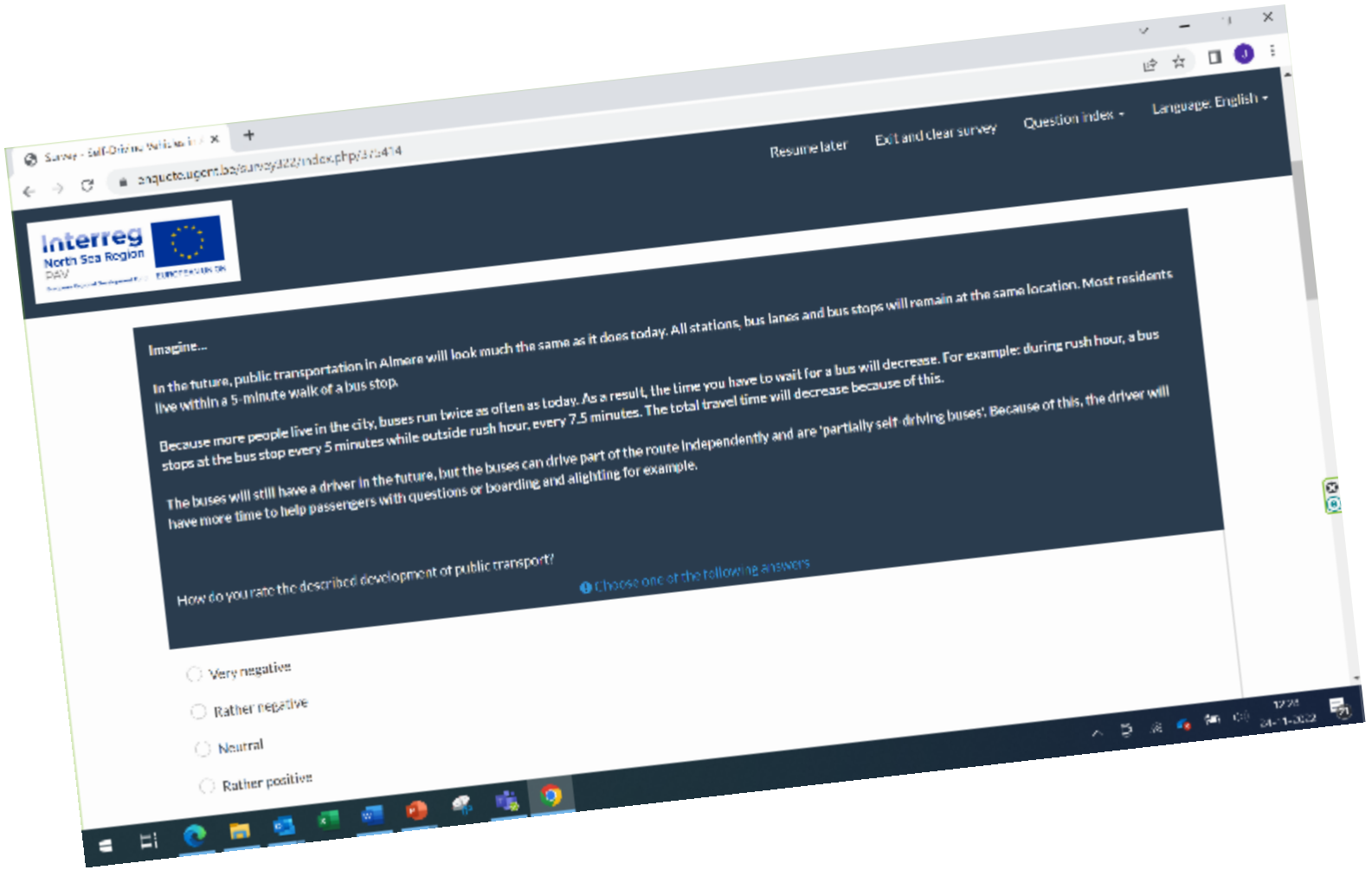
Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

Key Steps

Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

Citizen Feedback

Quantitative Survey Q4 2022



Interreg North Sea Region PAV European Regional Development Fund EUROPEAN UNION

Key Steps

PAV
Almere
Virtual
Pilot

Scenario Exploration
(workshop)

Demand Forecast
(quantitative modelling)

Scenario Optimisation
(network analysis)

Citizen Feedback
(quantitative survey)

Review by Planners and Experts
(workshop)

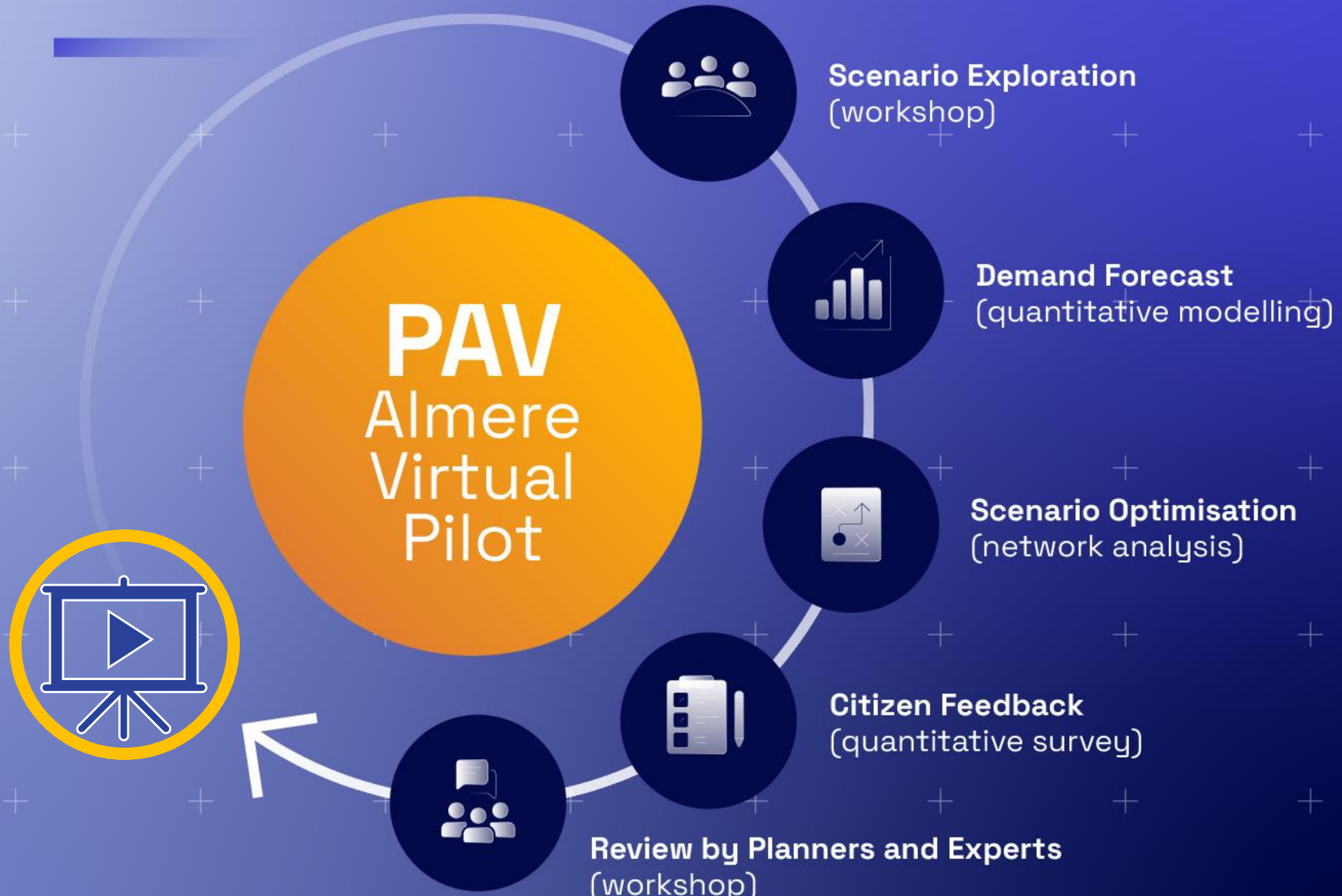
Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

Review by Planners and Experts

Workshop
January 2023

Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION

Key Steps



Interreg North Sea Region PAV
European Regional Development Fund
EUROPEAN UNION


For starters, BRT lines are no longer necessary in Pampus itself.

Some overall take-outs from the pilot

The virtual pilot can provide a **unique chance to involve urban planners** that are at the beginning of the planning process, and can be an effective way to **kick-start meaningful discussions about CCAM** developments and implications and choices to be made.

Valuable despite the limitations - many unknowns still (Pampus and technology), models sensitive to assumptions made - and we are bound by our own imagination as well.

Relevant for Almere: the virtual pilot with its 3 fundamentally different scenarios is a promising tool for Almere municipality to future—proof its BRT system.

Must be part of a process which involves many stakeholders and disciplines – workshops that provided a knowledge exchange between different disciplines involved in the development of Pampus, survey among inhabitants, data analysis by the planning & mobility department, …

Questions for all

Gemeente Almere

Interreg North-West Europe

Co-funded by the European Union

CAMINO

What is your **feedback** on the **approach** for the PAV scenario with a virtual pilot **and the outcome**?

…and how can we use this for the future?

05:00

Interreg North-West Europe
Co-funded by the European Union

CAMINO

Almere's view on tendering and market engagement,

Gemeente Almere

Lysander van der Sluis,
Strategic Public Transport Advisor

AV in the tendering process

Gemeente Almere

Interreg North-West Europe

Co-funded by the European Union

CAMINO

How does Almere deal with AV in the tendering process for public transport concessions?

- BRT City-network and 3 BRT bus-lines between Almere and Amsterdam up for tendering in December 2027

- **Current BRT-system:**
  - 8 Metro bus-lines 99% dedicated bus-lanes
  - 3 BRT-lines between Almere and Amsterdam using dedicated bus-lanes and highway
  - 2 regular city bus-lines mixed with other traffic and 1 regional bus-line

- Publication public tender Q2/2025, offers: Q4/2025, Requirements: Q4/2024-Q1/2025

AV in the tendering process

Gemeente Almere

Interreg North-West Europe

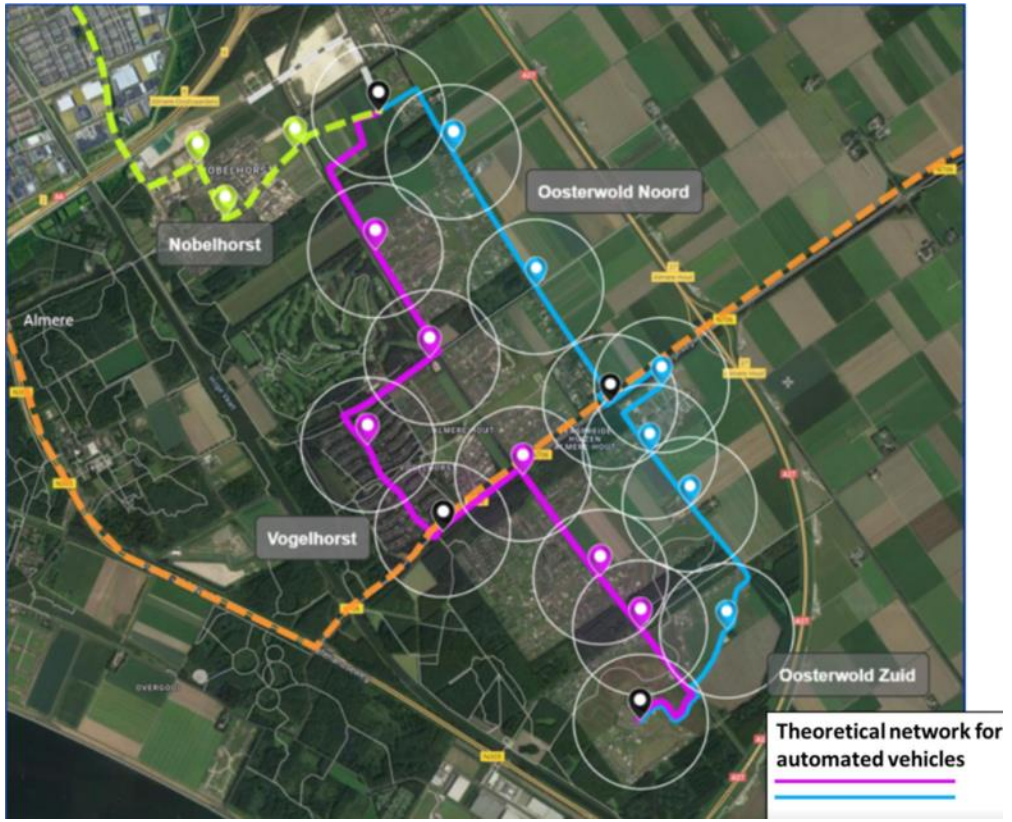
Co-funded by the European Union

CAMINO

- **Duration of concession:** 10-12 years

- **Assessment criteria:**
  - Lowest price for a set level of production or
  - Offered level of service based on a set level of financial funding by the municipality
  - Separate business-cases for innovation or expanding the level of service due to the build-up of new neighbourhoods

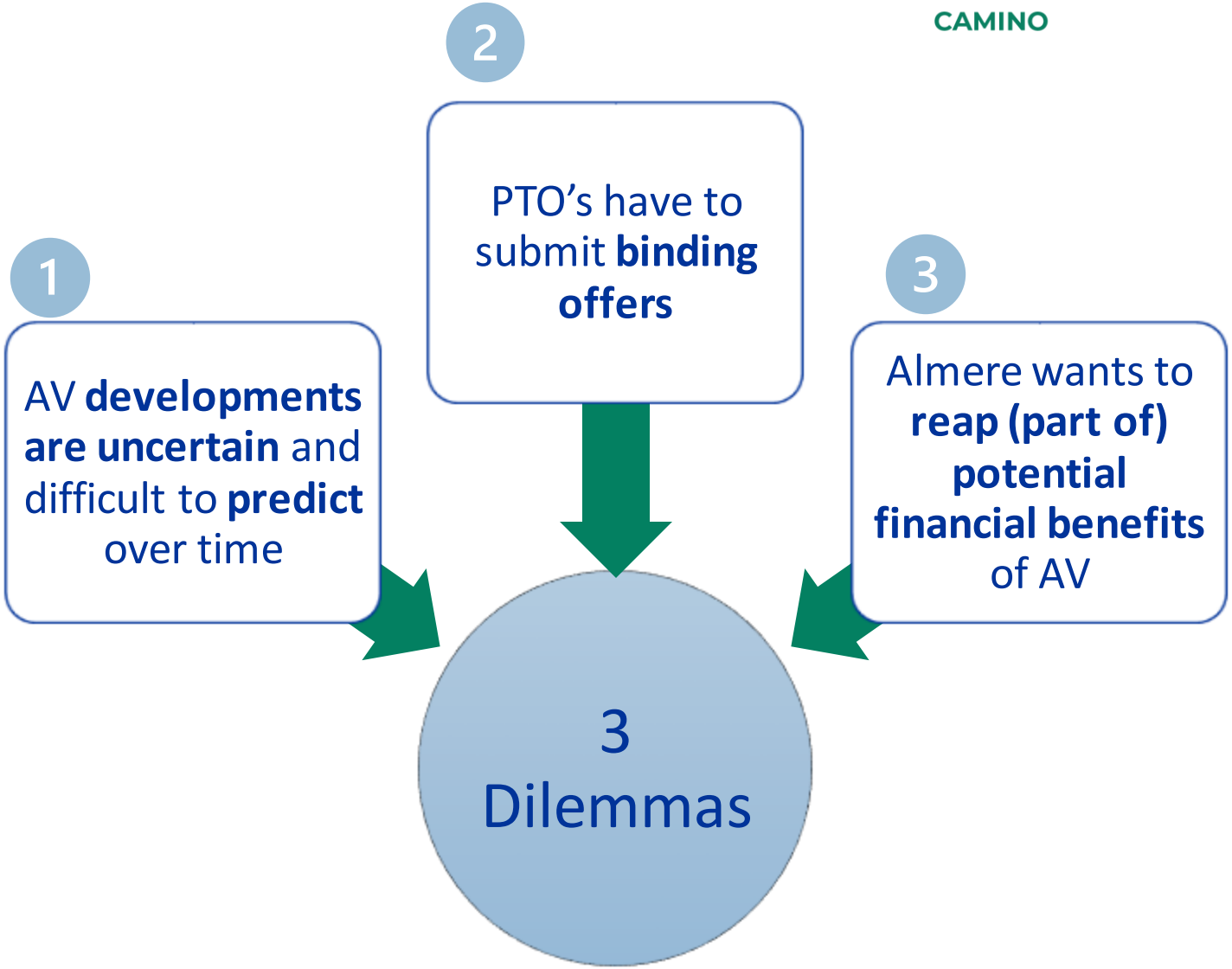
- **Potential** for AV in next concession:
  - Operation on dedicated bus-lanes
  - First/last-mile solution for servicing new neighbourhood Hout



Simulation neigbourhood Hout

The Dilemmas

Uncertainty vs. binding offers:



Questions for all

Gemeente Almere

Interreg North-West Europe

Co-funded by the European Union

CAMINO

1) How do we **manage the uncertainty** of technological and regulatory advances in AV, while ensuring that our **offerings remain relevant and promising**?

2) How can we at Almere (the PTA), not just the PTO, **benefit financially from SAV**?

3) How have **other PTAs dealt with this kind of dilemma** in the tendering process?

10:00

Interreg North-West Europe

Co-funded by the European Union

CAMINO

Traffic Model

Lesley De Beuckeleer,
Mobility Researcher De Lijn

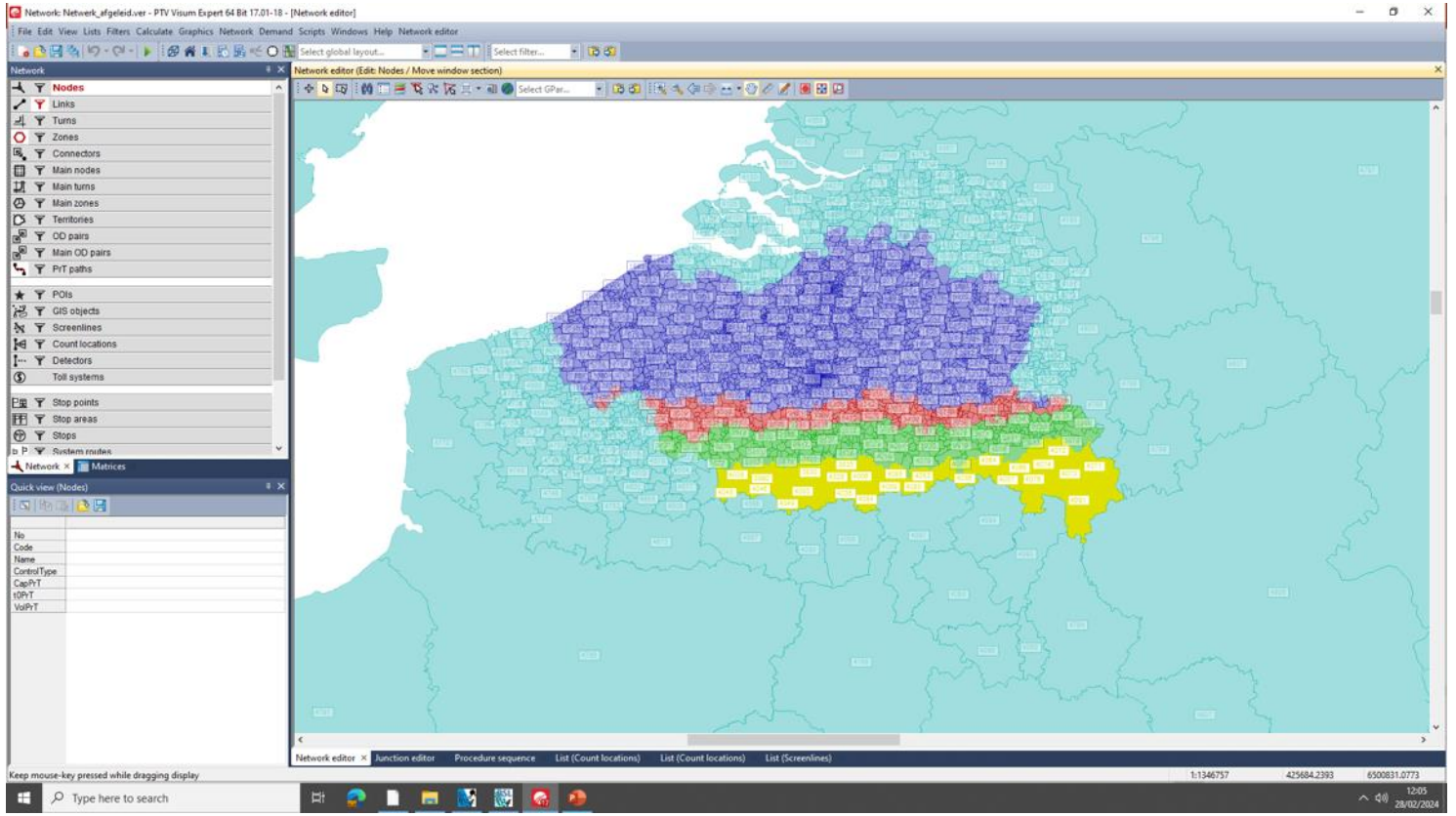
Traffic Model De Lijn

Interreg
North-West Europe
Co-funded by the European Union
CAMINO

Macroscopic model

- Flanders
  - 4.808 zones
  - Based on statistical zones
  - Subdivided in 4 different areas
    - Area of study
    - Area of influence
    - 2 outside areas
    - Abroad

- Current underlying network 2017
- Future underlying network 2030

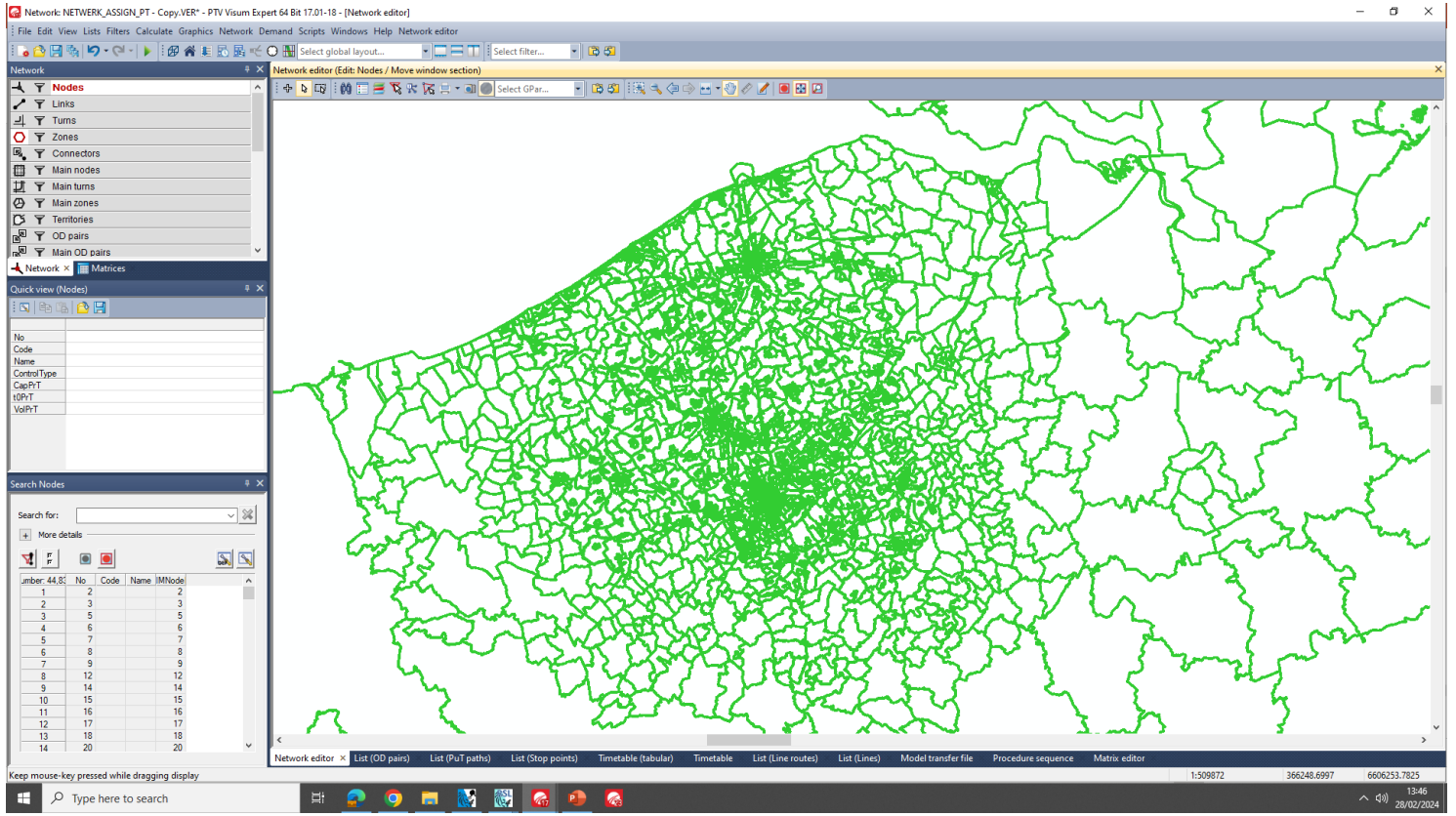


Traffic Model De Lijn

Interreg North-West Europe
Co-funded by the European Union
CAMINO

Macroscopic model

- 10 regional models
  - E.g. 2.744 zones for West-Flanders



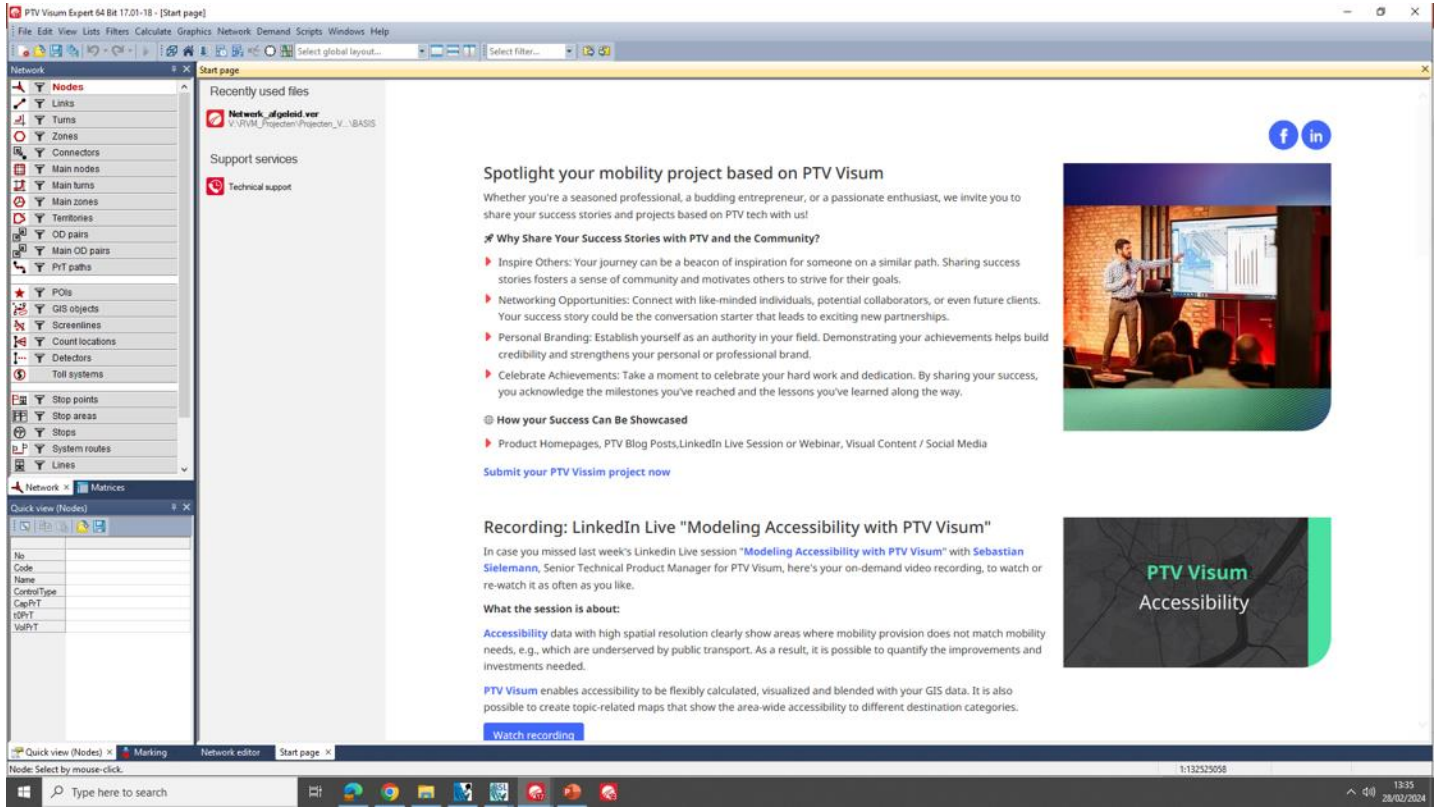
Traffic Model De Lijn

Interreg North-West Europe
Co-funded by the European Union
CAMINO

Software: PTV Visum

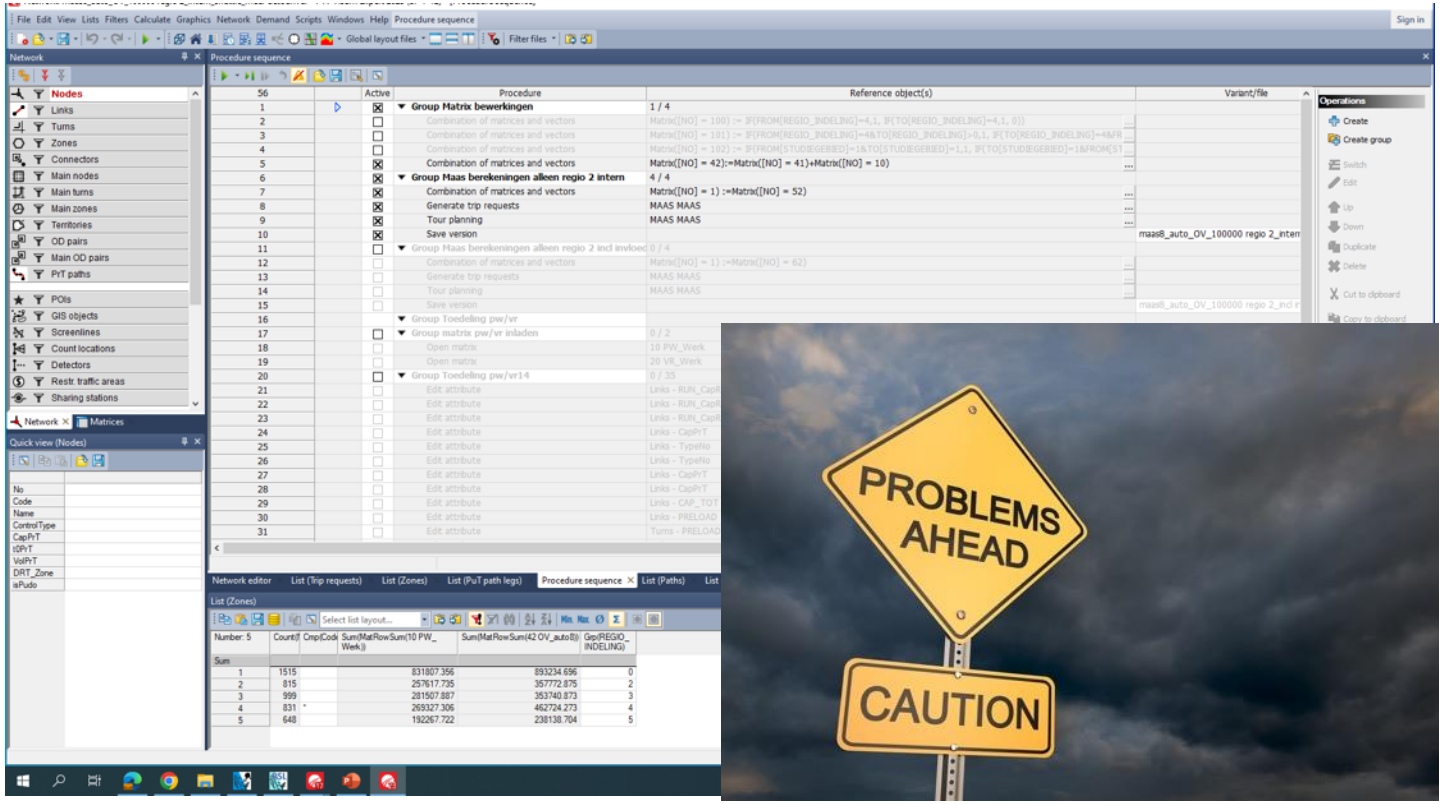
- Now Visum 2017 and 2023

In the near future Visum 2024



Simulations for automated vehicles by De Lijn

Interreg North-West Europe
Co-funded by the European Union
CAMINO

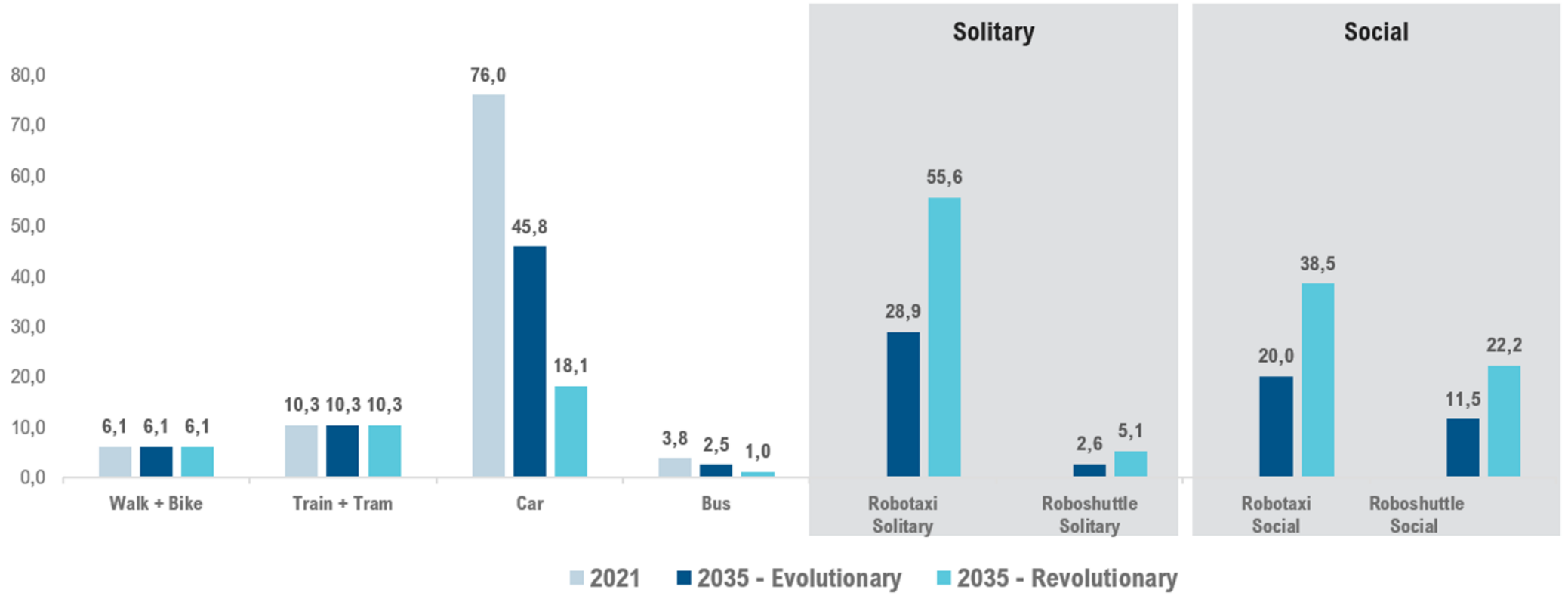


Visum MaaS Modeller
Visum Add-on Shared Mobility

Multiple scenario's

Simulations future

Interreg
North-West Europe
Co-funded by the European Union
CAMINO



Questions for all

Interreg
Co-funded by the European Union
North-West Europe
CAMINO

1) How did you choose a **use case for automated vehicles**? What **criteria** did you use? How did you create your own **scenario** for future market development?

2) Have you done any **simulations** for this use case?
   - Which **traffic model** have you used?
   - Which **software program** does it run on?

3) Were there any **problems with the simulations**?

10:00

Interreg North-West Europe

Co-funded by the European Union

CAMINO

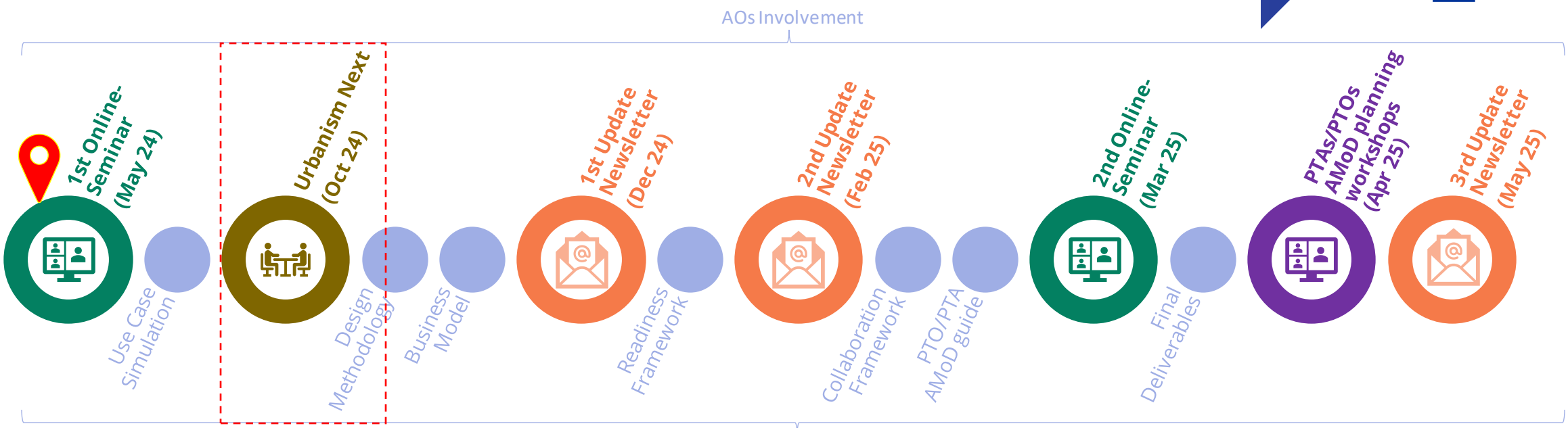
Next steps

In CAMINO and beyond!

CAMINO's Engagement Plan Overview

Interreg North-West Europe
Co-funded by the European Union
CAMINO

Knowledge Sharing & Attendance to Meetings



Dissemination Activities

Urbanism Next

Amsterdam , 9-11 October 2024

Interreg North-West Europe

Co-funded by the European Union

CAMINO

Workshop about:
Paths to Shared Automated Mobility for Public Transport -
Strategies and Scenarios for Large-Scale Deployment in Europe 2030 and Beyond

When? **Friday, 10/11/2024, 1:00pm - 2:30pm**

Where? **Maritim Hotel Amsterdam**, Bercylaan 307, 1031 KP Amsterdam

- Presenting the work of the CAMINO project in a forward-looking workshop

Learning 1	Learning 2	Learning 3	Learning 4
Understand future scenarios	Evaluate public-private partnership	Analyse regional integration strategies	Structure innovative approaches

What happens next?

Seminar Insight Paper + …

Development of 2x **strategies for PTAs and PTOs** on how to prepare for integrating SAVs into public transport

Kolumbus

Ruter#

RMV RHEIN-MAIN-VERKEHRSVERBUND

DE LIJN

Hamburg

Gemeente Almere

DB

Creating a **pan-European "task force"** of equally ambitious authorities for the deployment of SAVs in PT (*HorizonE ULTIMO*)

Interreg North-West Europe

Co-funded by the European Union

CAMINO

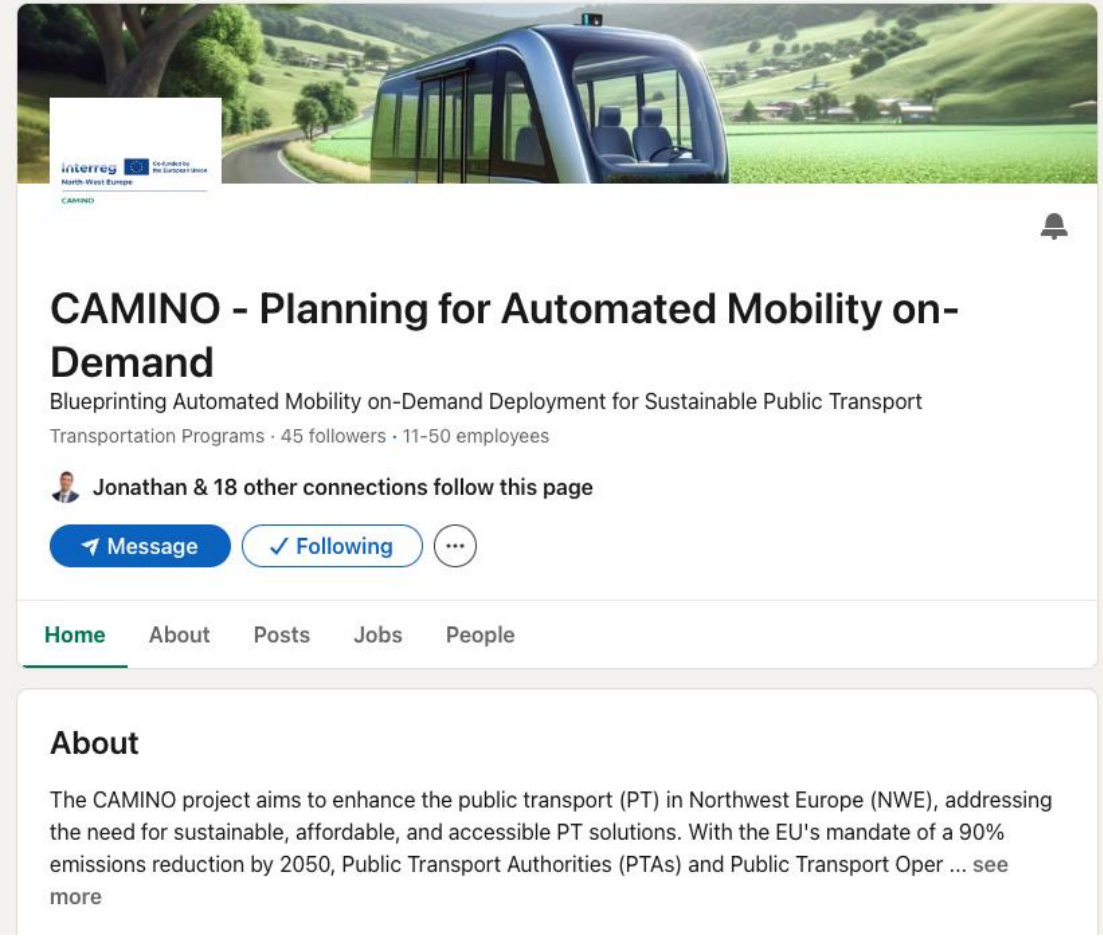
ATM Àrea de Barcelona Autoritat del Transport Metropolità

ATHENS

Working groups on **roadmap development** from early stage (vision) to concession contracting *(Interreg ART-Med)*

Stay tuned for more!

Interreg North-West Europe
Co-funded by the European Union
CAMINO



Interreg North-West Europe
Co-funded by the European Union

Thank you!

https://camino.nweurope.eu/
https://www.linkedin.com/company/camino-nwe/