Plenary 4
Physical Internet Applications in Urban Logistics

Physical Internet in URBANE's Living Labs:

Starting locally and scaling up

Ioanna Fergadiotou – Inlecom Innovation Lab

Micro-hubs as PI-Nodes to overcome siloed operations

Nodes are one of the most complex parts of the PI vision as their role determines the efficiency of the PI network.
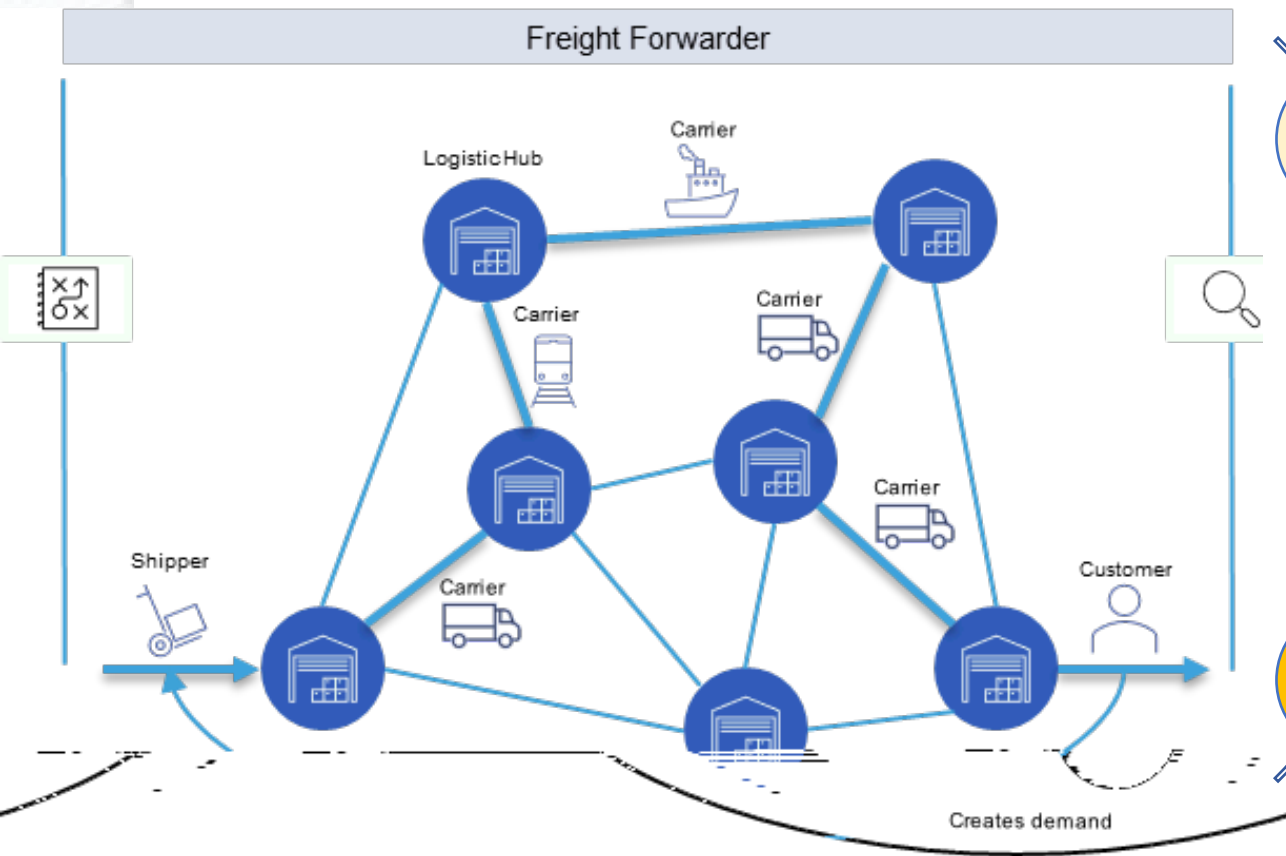
Standardise components for handling and communication.

Standardise and automate their services and start interconnecting bilaterally.

Interact with the logistics network.

Collaborate to provide services as a single network

→ fully autonomous interaction between nodes at the physical and digital levels.

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PI-inspired last-mile deliveries

URBANE is aimed at developing a Replication and Scale up Model for the wide and fast replication of successful **smart green last mile delivery solutions,** aiming at **20%** reduction in CO2 emissions.
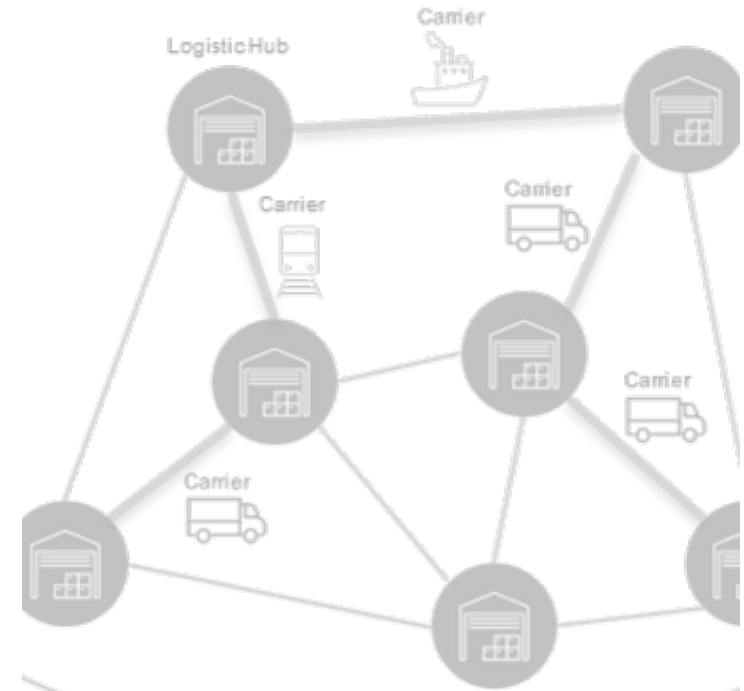
> **4 Lighthouse Living Labs**
> **2 Twinning Living Labs**
> **Feasibility studies in 6 cities**

UPSCALING INNOVATIVE GREEN URBAN LOGISTICS SOLUTIONS THROUGH MULTI-ACTOR COLLABORATION AND PI-INSPIRED LAST MILE DELIVERIES
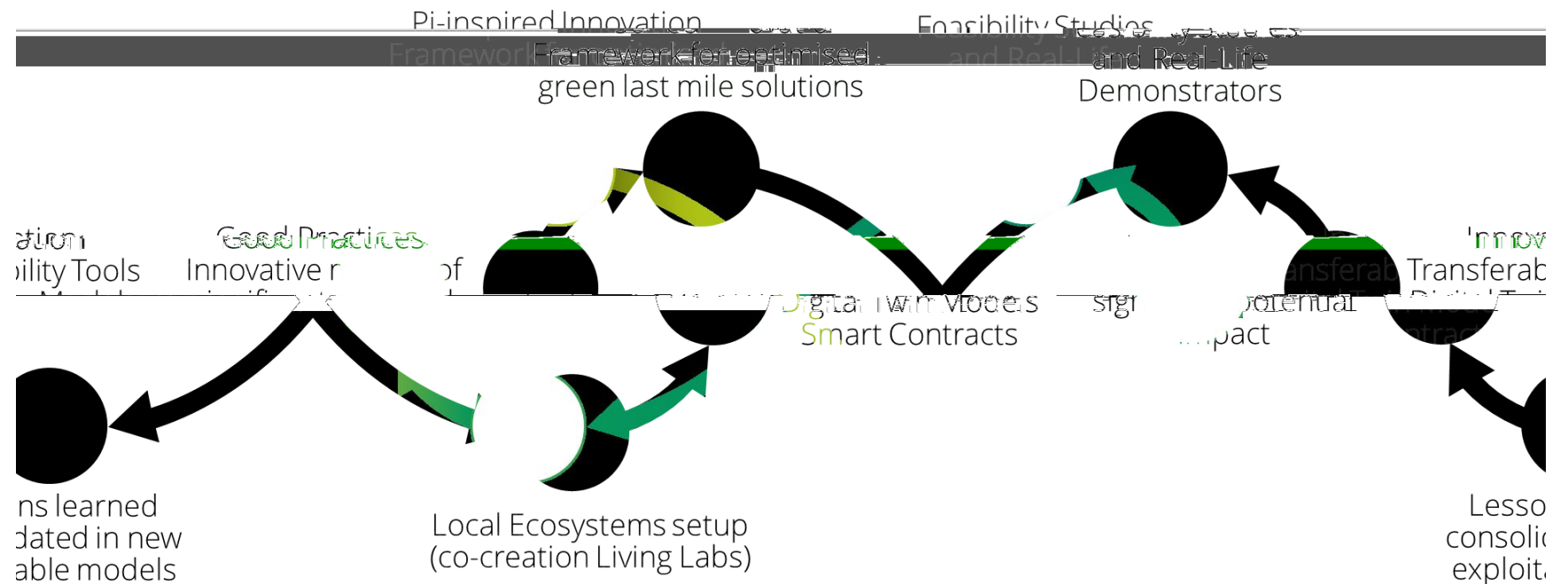
URBANE's objectives contribute to ALICE's roadmap on PI-led transition in urban logistics
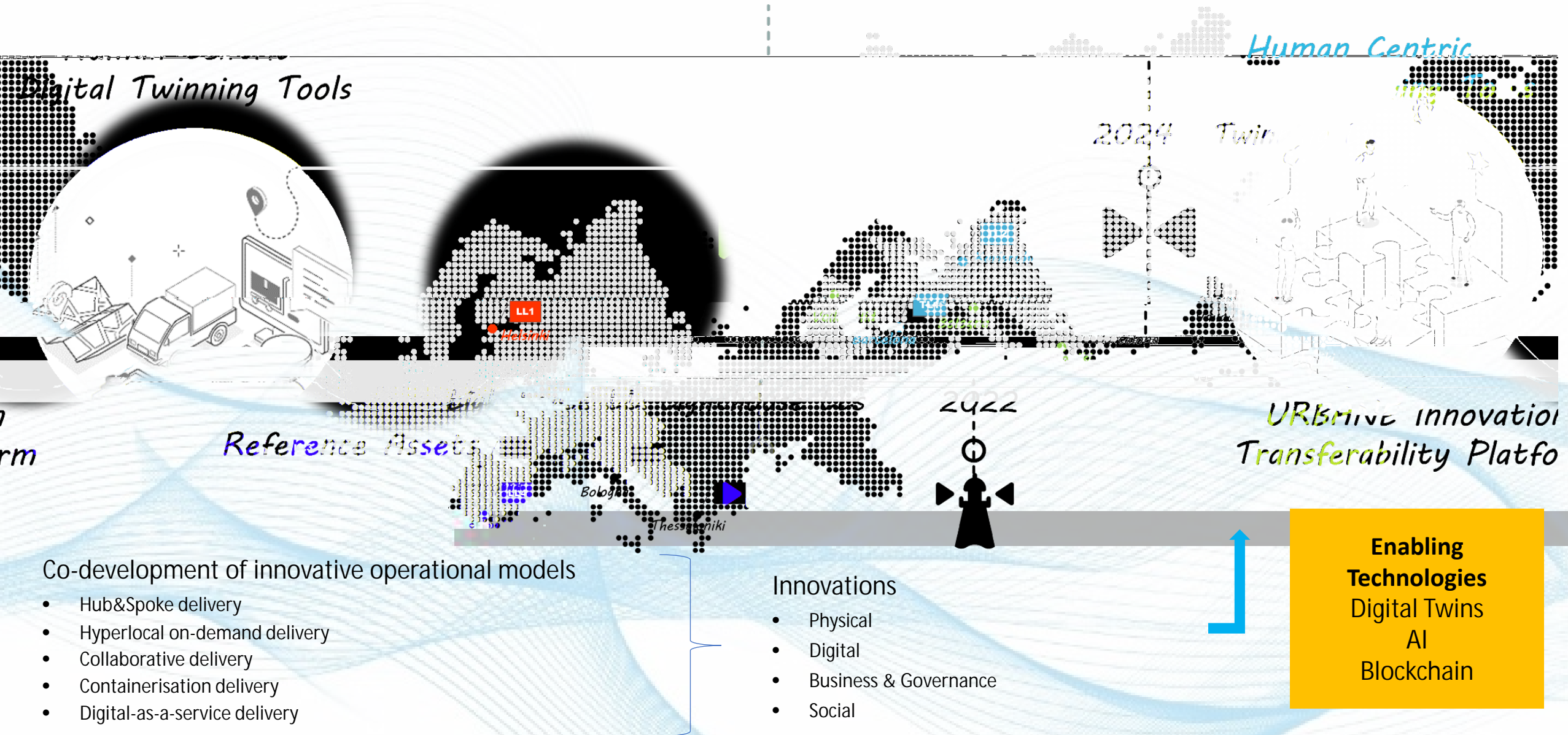
1. Provide evidence of the impact of PI's introduction in real-world last-mile deliveries.

2. Improve understanding of the PI through Digital Twin models at Living Lab level, with focus on the location optimisation of micro-hubs and dynamic routing.

3. Advance the PI concept of collaborating nodes and focus on addressing optimisation challenges resulting from capacity, transport and other constraints.

4. Examine different degrees of automation and centralised governance to understand the effectiveness of the PI at different stages of implementation.

5. Provide a framework and practical guidelines for the transition to the PI.

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> **4 Lighthouse Living Labs** (WAVE 1)

> **2 Twinning Living Labs** (WAVE 2)

Co-development of innovative operational models
- Hub&Spoke delivery
- Hyperlocal on-demand delivery
- Collaborative delivery
- Containerisation delivery
- Digital-as-a-service delivery

Innovations
- Physical
- Digital
- Business & Governance
- Social

Enabling Technologies
Digital Twins
AI
Blockchain

> **Feasibility studies in 6 cities** (WAVE 3)

PI - Zero Emissions Vision

Successfully established PPPs
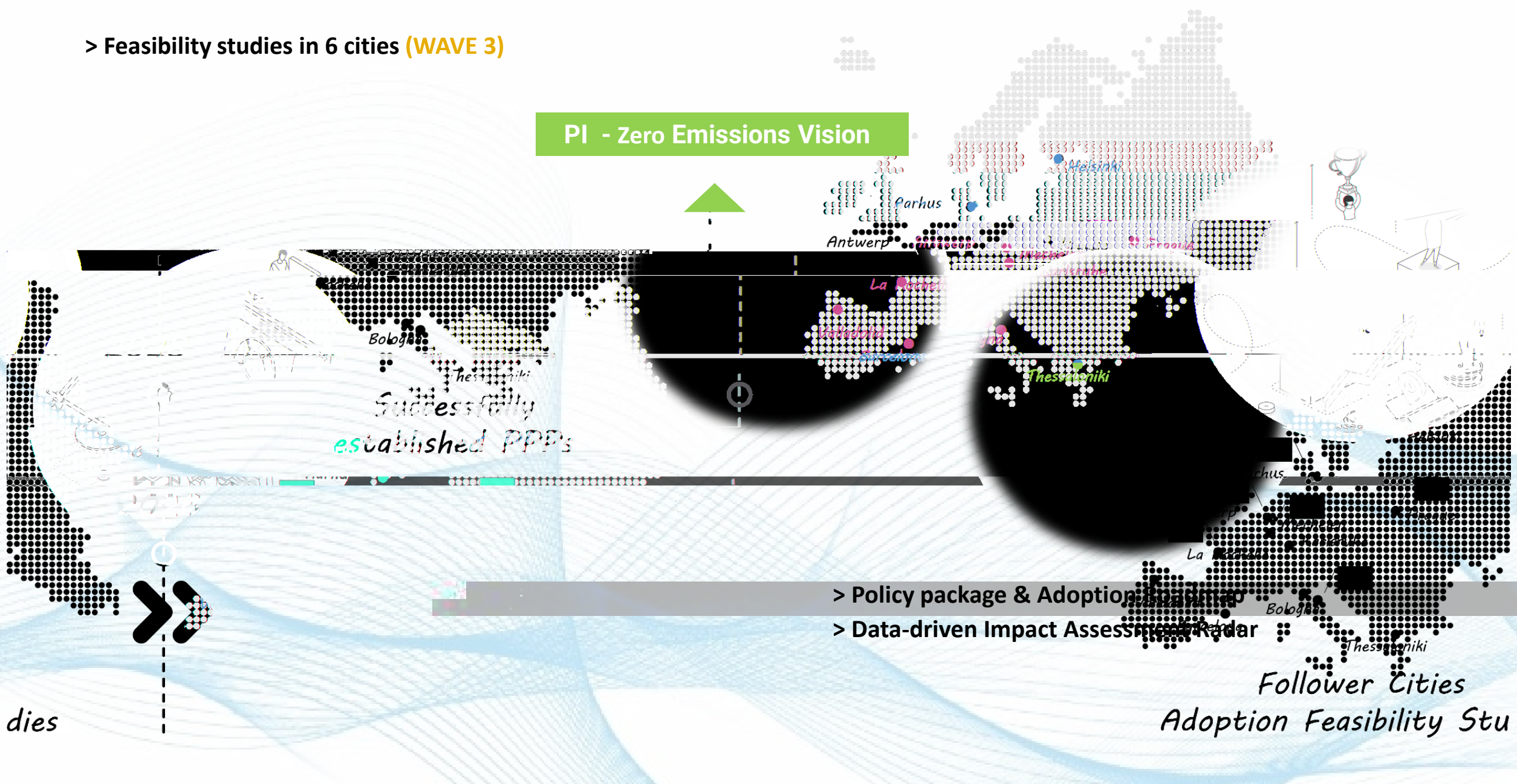
> **Policy package & Adoption Roadmap**
> **Data-driven Impact Assessment Radar**

Follower Cities
Adoption Feasibility Stu

dies

Antwerp

Bologna

Thessaloniki

La Rochelle

Aarhus

Helsinki

Helsinki - ADVs assisted operations

- Validate and measure the environmental impact versus conventional vehicles and co-design a future proof solution for low-emission zones.
- Reducing the number of routes.
- Testing operation with a range of goods and robots' deliveries.

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Bologna - Micro-hubs networks

- Introduction of PI models in urban freight deliveries
- Develop new business model for setup and operation of sustainable micrologistics hubs network, combined with innovative delivery methods.
- Digital Twin of the micro-logistics hubs network, fed with real time data, used for planning and implementing urban freight-related measures.

Valladolid – EVs with solar panels

- Zero emission urban deliveries with the use of a fully electric fleet.
- Dynamic e-routing to minimize energy consumption.
- Vehicle to everything communication.
- Collaborative delivery.

Ambitions: zero emissions urban deliveries

Daily CO_2 reduction:
- Electric veh: 13,7 kg
- Photovoltaic: 5,4 kg
- Add measures: 1,2 kg

Yearly: 5,8 CO_2 tons

Daily CO_2 reduction:
- Electric veh: 8,7 kg
- Photovoltaic: 2,5 kg
- Add measures: 0,6 kg

Yearly: 3,4 CO_2 tons

Thessaloniki - Hub and Spoke delivery model supported by Digital Twins

- Collaborative macro and micro consolidation delivery system by integrating hub and spoke principles and digital as a service delivery models.
- Micro-fulfilment centres tested in real operational environment to achieve higher load factors and lower vehicles, enhancing the effectiveness of the operational planning process and the customer experience.
- Creation of an ecosystem enabling scalability and transferability of the measure
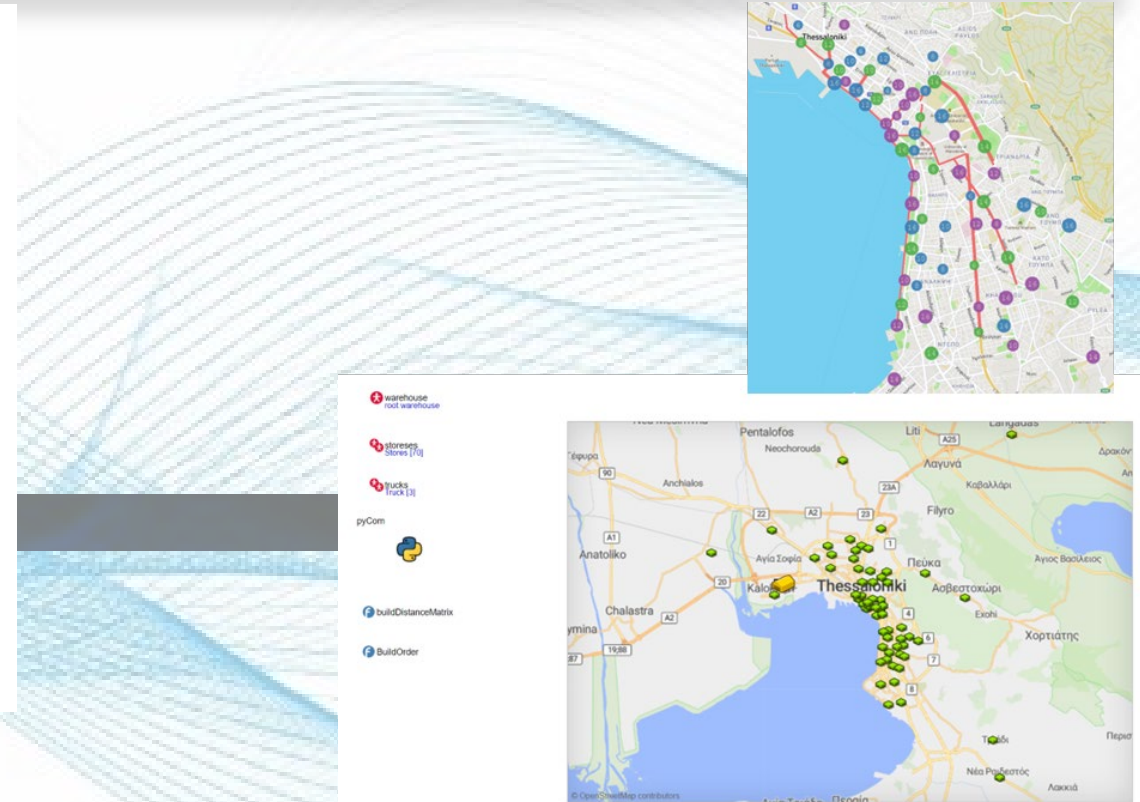
Set the objectives and

1. Define objectives.

2. Define the nodes and links. Identify the physical locations and the routes connecting the nodes.
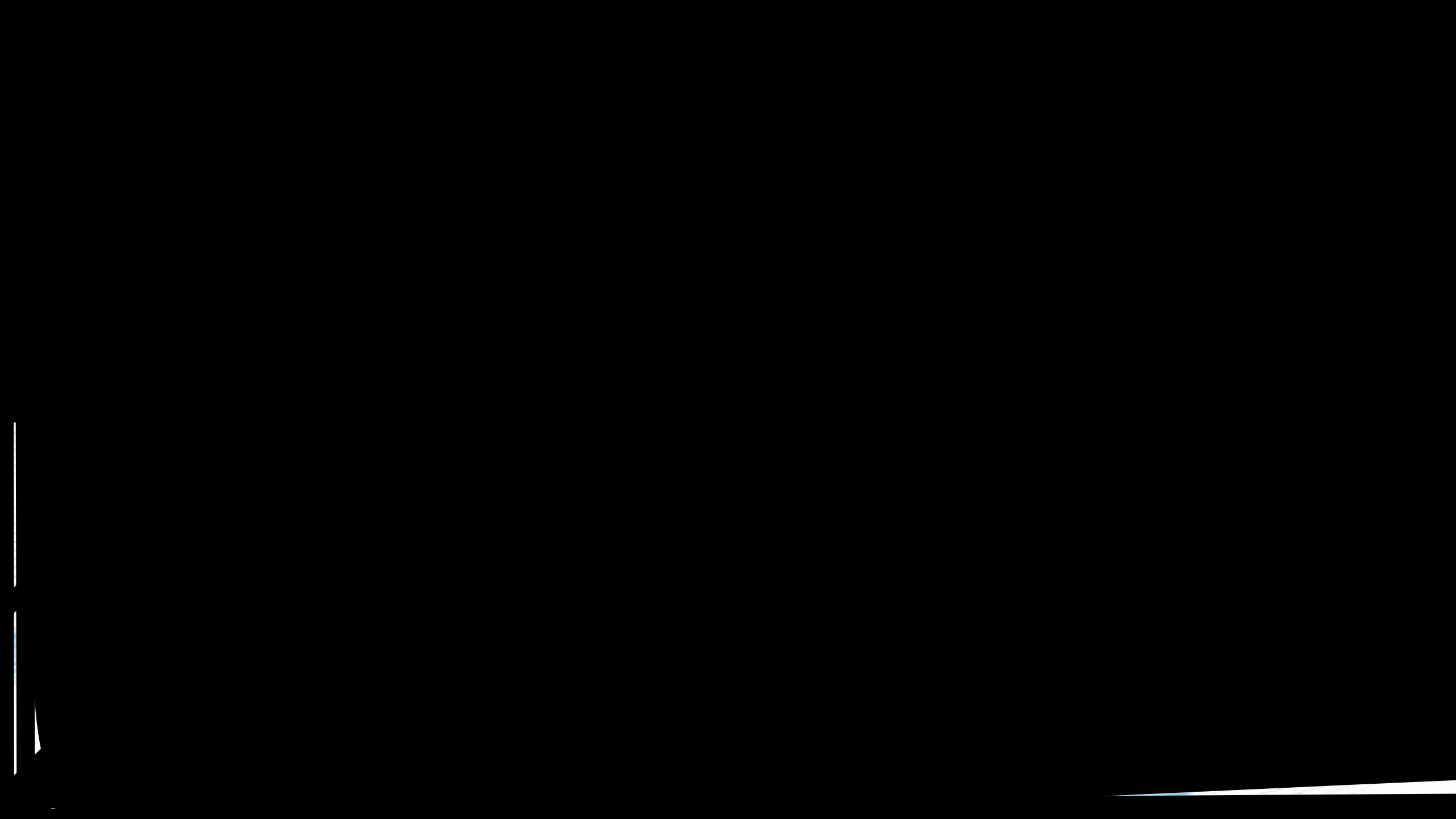
3. Define potential PI-inspired innovations to be included in the nodes of the Living Labs.

4. Define the scope and boundaries of the Living Lab logistics model, considering the geographic area, types of goods and the modes of transportation.

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Identify the actors and define the roles. Meet with the actors to discuss options and define plan.

Measure, Evaluate, Refine, Predict

9. Map flows through the network. Develop processes and procedures to capture data from operations.

→

10. Incorporate technical assets to optimise the performance of urban logistics operations.

→

11. Evaluate the effectiveness of urban logistics operations and PI services.

→

12. Validate/ test models and operations using real-world data. Use the models developed to make predictions/take decisions about network design, operations, and management.

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URBANE Key Facts

12 Cities
Helsinki, Bologna Thessaloniki, Valladolid, Barcelona, Karlsruhe Aarhus, Antwerp, Mechelen, La Rochelle, Prague, Ravenna

o Project number: 101069782
o Project Start Date: 01/09/2022
o Project End Date: 30/02/2026
o Budget: ~ 9 million Euros
o Type of action: IA
o Topic: HORIZON-CL5-2021-D6-01-08
o Duration: 42 months
o Number of partners: 39
o Number of countries: 13
o Coordinator: INLECOM INNOVATION

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- https://www.urbane-horizoneurope.eu

- https://www.linkedin.com/company/urbane-project/

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Thank You!

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alice | Alliance for Logistics Innovation through Collaboration in Europe

Expanding the logistics Scope