IPIC 2023

9th International
Physical Internet Conference

June 13-15, 2023
Athens, Greece

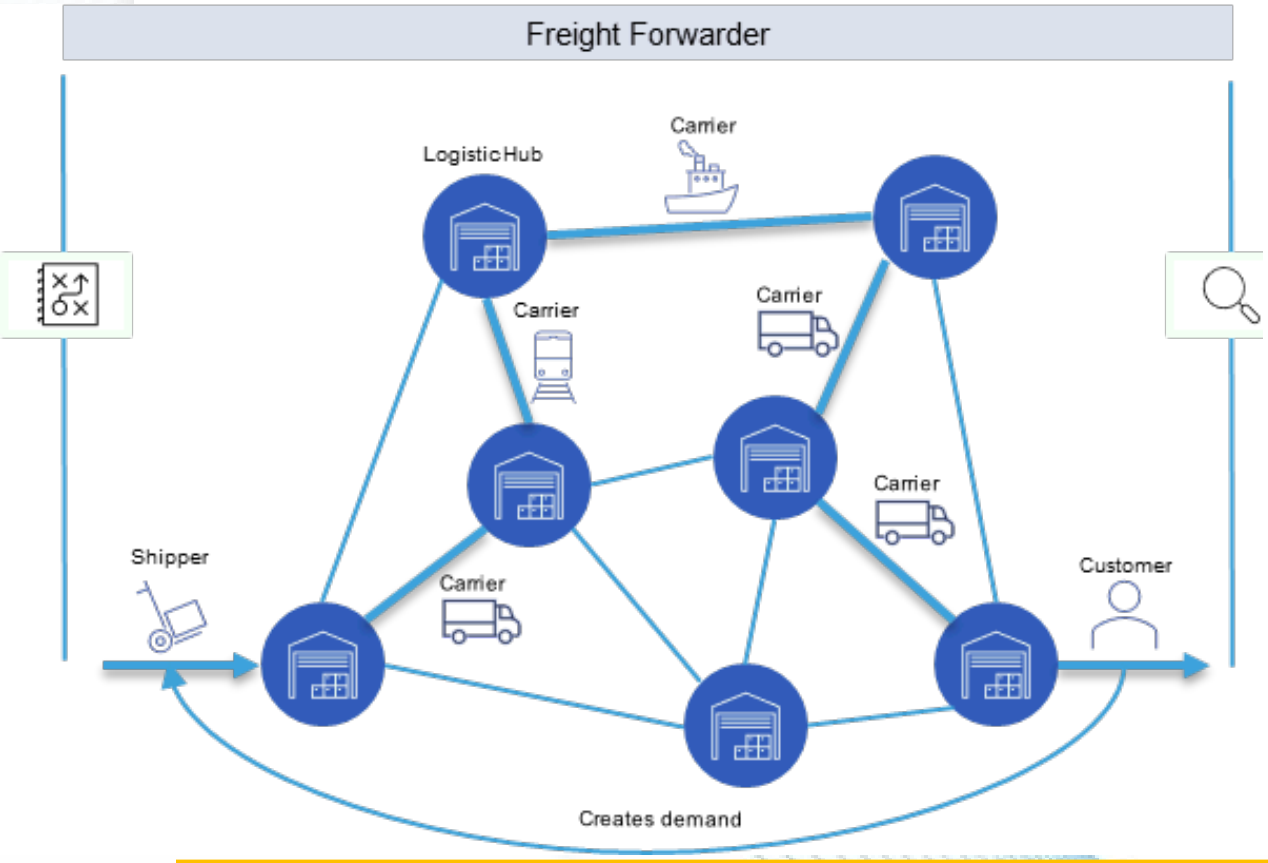
Plenary 4
Physical Internet Applications in Urban Logistics

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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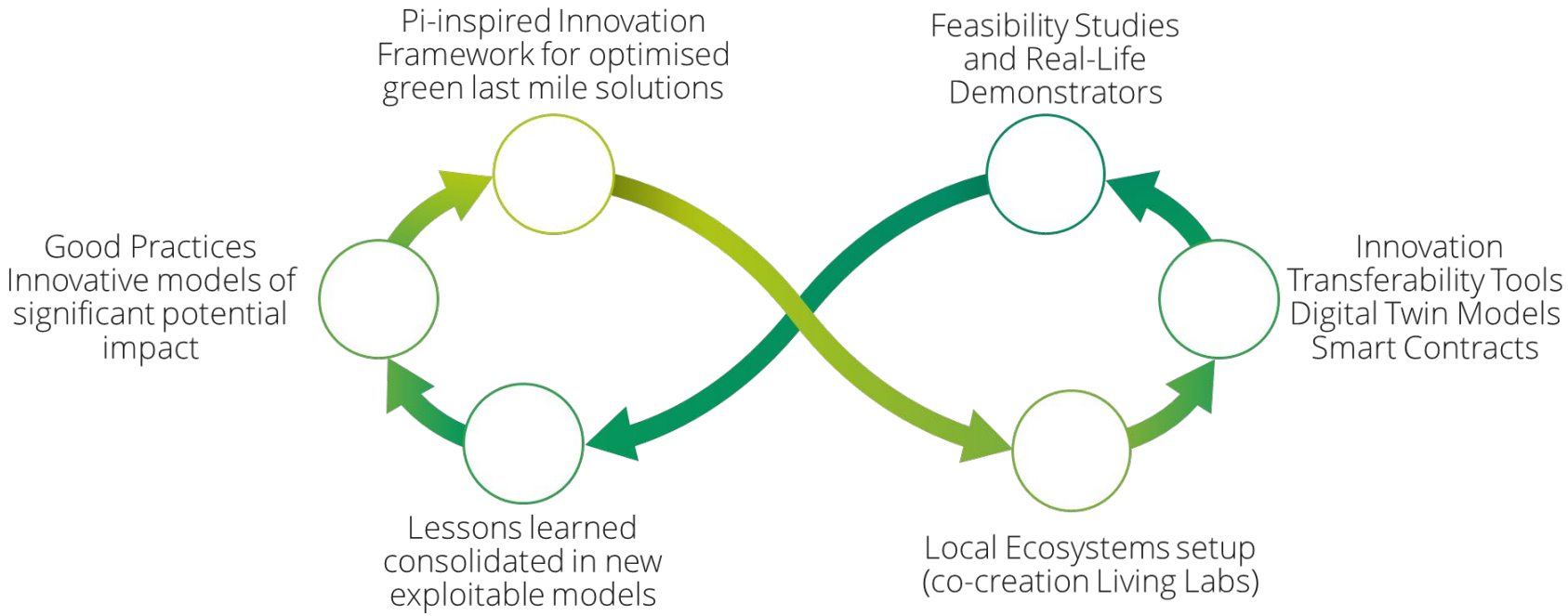
PI-inspired last-mile deliveries

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.

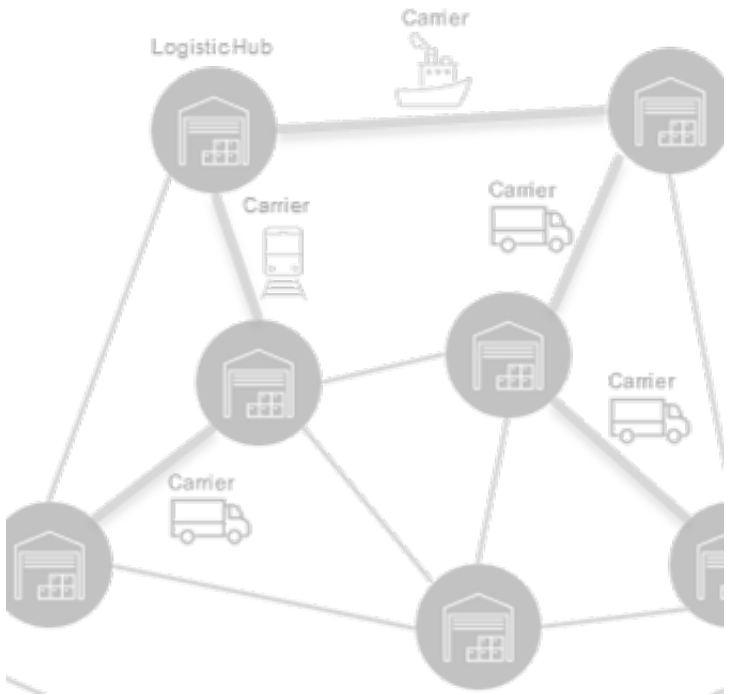
> 4 Lighthouse Living Labs
> 2 Twinning Living Labs
> Feasibility studies in 6 cities

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)

Reference Assets

Lighthouse LLs

LL1 Helsinki

LL2 Bologna

LL3 Valladolid

LL4 Thessaloniki

2022

2024

Twinning LLs

TL1 Barcelona

TL2 Karlsruhe

Valladolid

Bologna

Helsinki

Thessaloniki

Human Centric Digital Twinning Tools

URBANE Innovation Transferability Platform

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

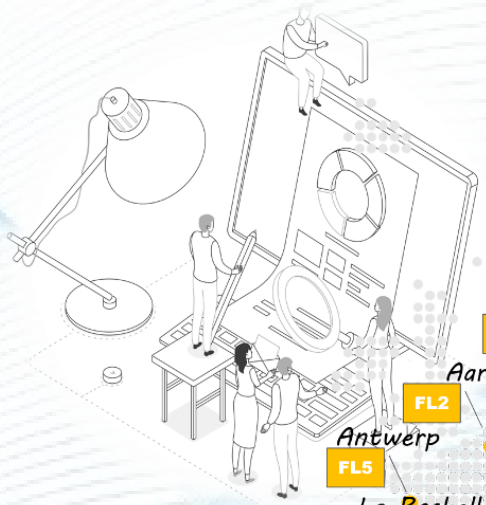
Digital Twins

AI

Blockchain

> Feasibility studies in 6 cities (WAVE 3)

PI - Zero Emissions Vision

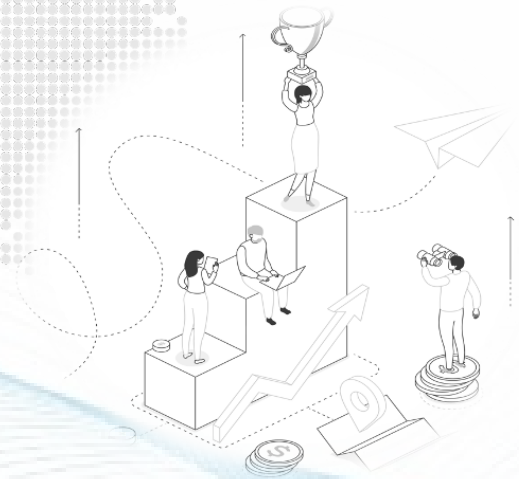


Follower Cities
Adoption Feasibility Studies

2028

2026

Successfully established PPPs



> Policy package & Adoption Roadmap

> Data-driven Impact Assessment Radar

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.

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.

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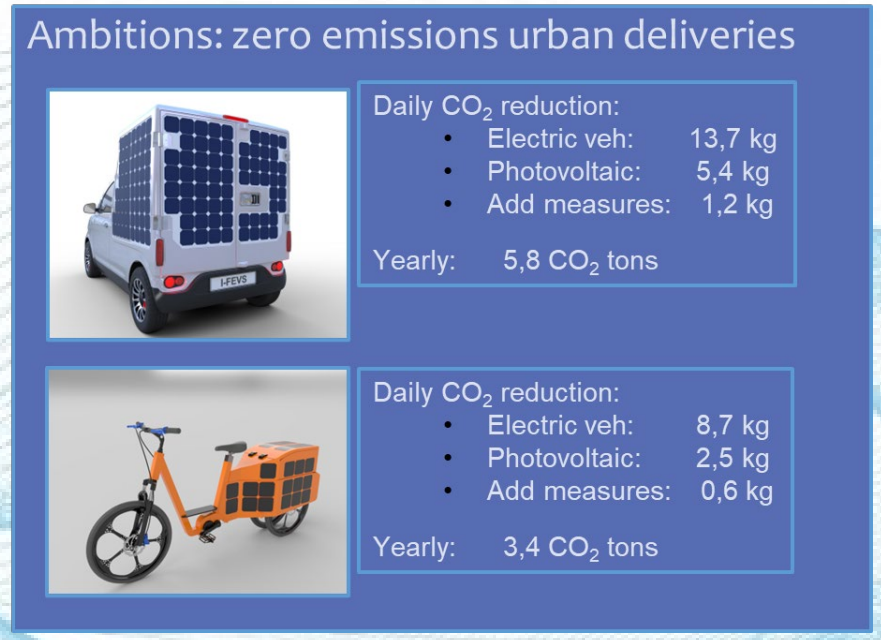
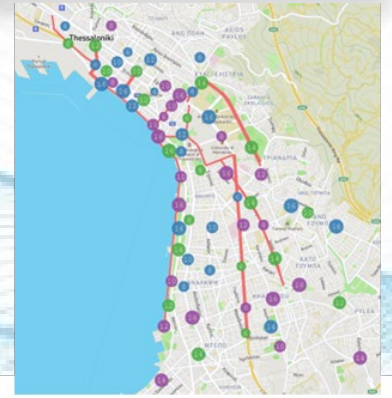
Valladolid – EVs with solar panels

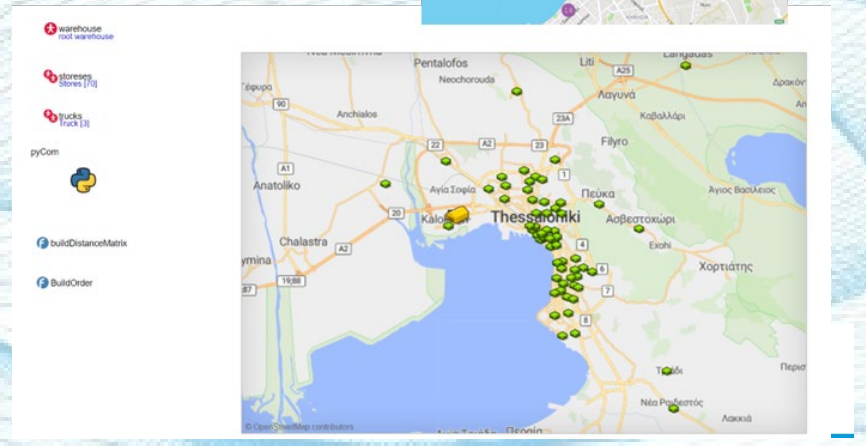
- Zero emission urban deliveries with the use of a fully electric fleet.
- Dynamic e-routing to minimize energy consumption.
- Vehicle to everything communication.
- Collaborative delivery.



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





Practical Guidelines to URBANE Living Labs

Set the objectives and map the LL elements and boundaries

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.

Practical Guidelines to URBANE Living Labs (2)

Develop an ongoing dialogue and define details on operations

5. Identify the actors and define the roles. Meet with the actors to discuss options and refine plans.

6. Get engaged with city authorities to commonly discuss and define regulations that provide value socially, ecologically and economically.

7. Define infrastructure (physical and digital) for operating the network according to PI principles

8. Identify the services: transportation, warehousing, inventory management, order processing, and delivery. Define requirements, relationships and interactions

Practical Guidelines to URBANE Living Labs (3)

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.

URBANE Key Facts

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

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

Ioanna Fergadiotou

Inlecom Innovation

inlecom

Ioanna.fergadiotou@inlecomsystems.com