POLIS ANNUAL CONFERENCE 2024
CITIES AND REGIONS FOR TRANSPORT INNOVATION

Implementing Sustainable Micro-Logistics Hubs for Innovative physical internet Urban Delivery Methods: The Bologna case

Session 1F “Unlocking the last mile: Innovations in urban freight”
09:00 AM - 10:30 AM - 27 November 2024

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Mobility Systems Unit

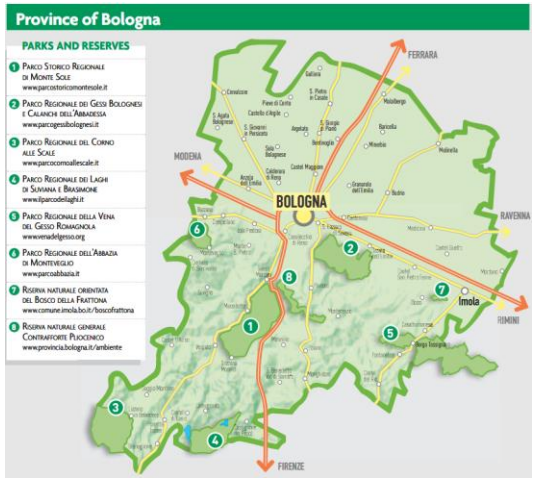
Comune di Bologna

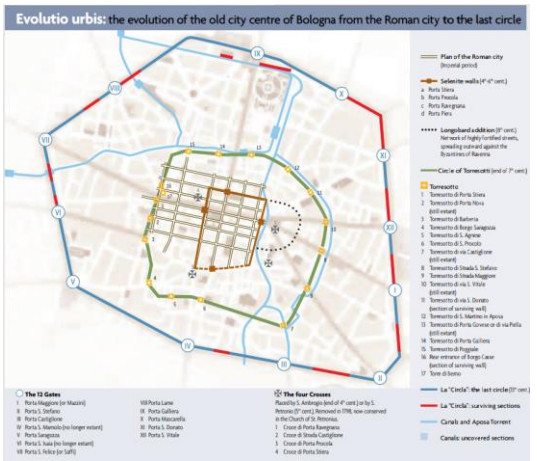
City Overview

Resident population in Bologna	392.227
Municipality area	140 kmq
Old town	4,51 kmq
Limited Traffic Zone (ZTL)	3,20 kmq
Permanent pedestrian areas *(without buildings)*	0,11 kmq
TDAYS area *(without buildings)*	0,02 kmq
Streets with 30 km/h speed limit	479 km

	Car/Motorcycle	PT	Bike	Pedestrian
BOLOGNA Metropolitan Area	68.1%	14%	7.2%	7.5%
BOLOGNA Municipality	57.6%	19%	11.25%	10.8%

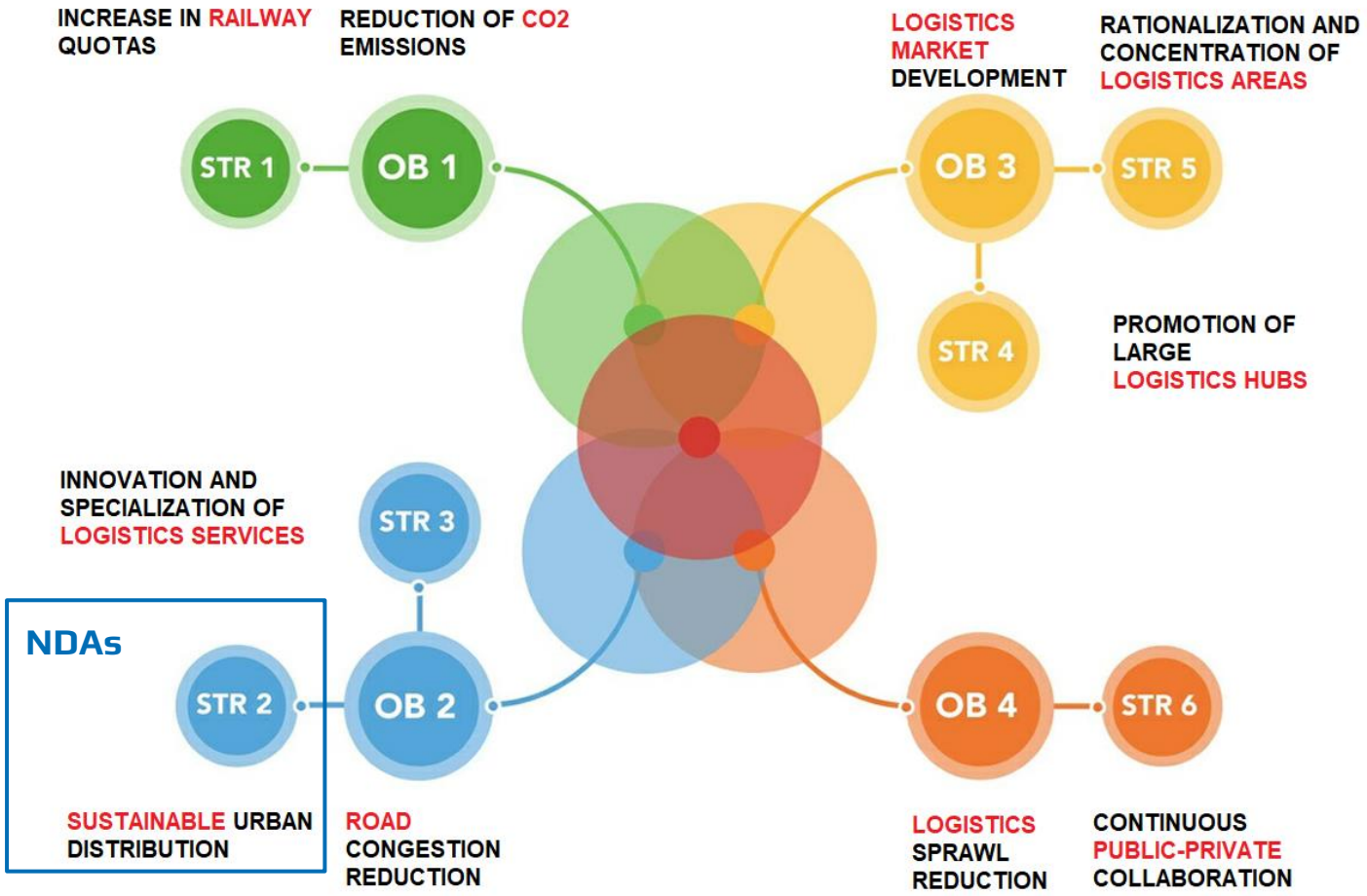
Source: Modal split (work+study) PUMS, 2022





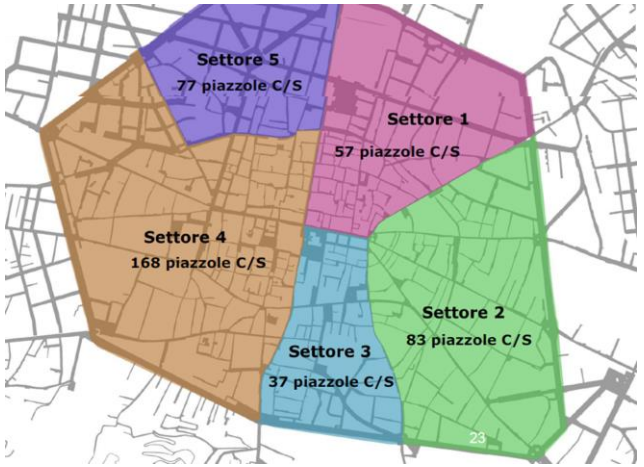
Source: Bologna Metropolitan City

Policy Instrument - SULP



Existing tools

430 L/U Zones in the LEZ area



LEZ access time windows

LEZ		SPECIAL LEZ		PEDESTRIAN AREAS	
DIESEL/PETROL	ELECTRIC	DIESEL/PETROL	ELECTRIC	DIESEL/PETROL	ELECTRIC
0:00-24:00 TOLL PARKING	0:00-24:00 FREE PARKING	6:00-7:30 AND 14:30-15:30 PETROL EURO 2,3 6:00-10:30 AND 14:00-16:00 PETROL EURO 4,5,6 DIESEL EURO 5,6 6:00-12:30 AND 14:00-17:00 METHANE AND LPG EURO 2,3,4,5,6 HYBRID FREE PARKING 30 MIN	0:00-24:00 FREE PARKING	6:00-10:30 PETROL EURO 2,3,4,5,6 DIESEL EURO 5,6 METHANE AND LPG EURO 2,3,4,5,6 HYBRID FREE PARKING 30 MIN	6:00-10:30 FREE PARKING

Existing tools

Year	Zone	Fossil fuel/Hybrid	Electric	Cargo Bike and Walk
2020	Urban area	EURO 5+ H24	✓ H24	✓ H24
	LTZ	EURO 5+ Soft	✓ H24	✓ H24
	City centre	EURO 5+ Restricted Soft	✓ Soft	✓ H24
2025	Urban area	EURO 6+ H24	✓ H24	✓ H24
	LTZ	EURO 6+ Restricted Soft	✓ H24	✓ H24
	City centre	✗	✓ Soft	✓ H24
2030	Urban area	✗	✓ H24	✓ H24
	LTZ	✗	✓ Soft	✓ H24
	City centre	✗	✓ Restricted Soft	✓ H24

Roadmap for accessing L/U zones

Main Policy Actions

ACTIONS

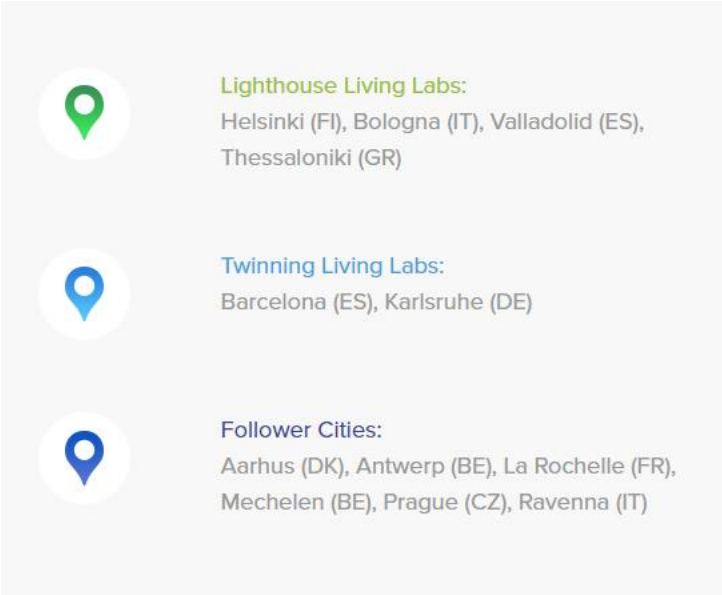
- Stricter Loading/unloading permits management
- Stricter Loading/unloading parking rules (free for clean freight vehicles/charge park)
- Stricter time windows for more polluting fright vehicles
- Electric charging station with suitable dimensions for freight vehicles
- Nearby Delivery Areas implementation (transhipment from diesel vans to light electric vehicles (Electric Freight Vehicles EFV) (European Project "Urbane")

INNOVATIVE ASPECTS AND FINANCING

Subscription of a Ethical Logistic Metropolitan Agreement (environmental sustainability on logistic chain through private/public investments, private/public peer to peer events, sharing logistic, innovative start-up, best practice sharing, logistic fleet renewal)

URBANE Project

URBANE - Upscaling Innovative Green Urban Logistics Solutions Through Multi-Actor Collaboration and PI-inspired Last Mile Deliveries



Quick info

- Horizon Europe project
- Started in September 2022
- Will run until February 2026
- Bologna received a budget of 400.000 €

URBANE Objectives

- Develop new collaborative business model for setup and operation of sustainable micro-logistics hubs network (Nearby Delivery Areas as in the SULP), combined with innovative delivery methods
- Replace conventional vans with light Electric Delivery Vehicles
- Introduction of Physical Internet models in urban freight deliveries
- Develop a Digital Twin of the micro-logistics hubs network, fed with real time data, used for planning and implementing urban freight-related measures

Living Lab Partners And Synergies

Partners

Institutions

Comune di Bologna

Research

ITL ISTITUTO sui TRASPORTI e la LOGISTICA

IT Provider

gel PROXIMITY

Transport Operators

typ1

DUE TORRI — Logistics Partner —

Observers

RegioneEmilia-Romagna

Interreg CENTRAL EUROPE — Co-funded by the European Union

GRETA

Comune di Ravenna

COMUNE DI REGGIO NELL'EMILIA

COMUNE DI PIACENZA

ubm urban bike messengers

URBICO URBAN BIKE COURIER

AICAI Associazione Italiana Corrieri aerei Internazionali

Last miler (contracted)

SALERNO TRASPORTI S.R.L.

Micro-Hub (contracted)

RICOH imagine. change.

Synergies

Institutions

CITTÀ METROPOLITANA DI BOLOGNA

Projects

MOVE 21

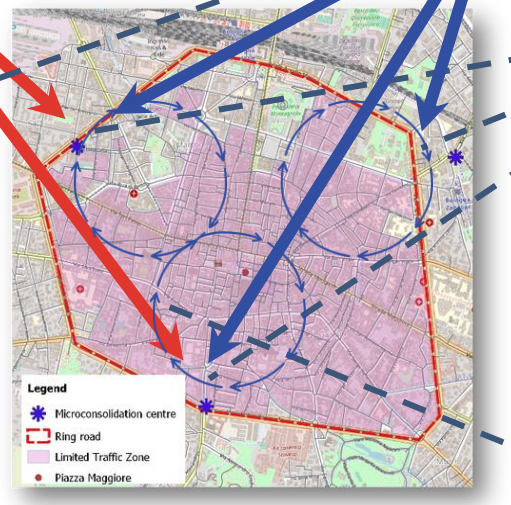
Municipality Objective

01	Promoting shared use of public space	In a smart, flexible and interoperable way avoiding the proliferation of siloed, privately branded micro-hubs
02	Seeking a sustainable business model	Flexible and scalable, transferable solution
03	Improving the governance of urban logistics	Very little data is currently available from operators

Living Lab Scheme

Transportator A
Warehouse

Transportator B
Warehouse

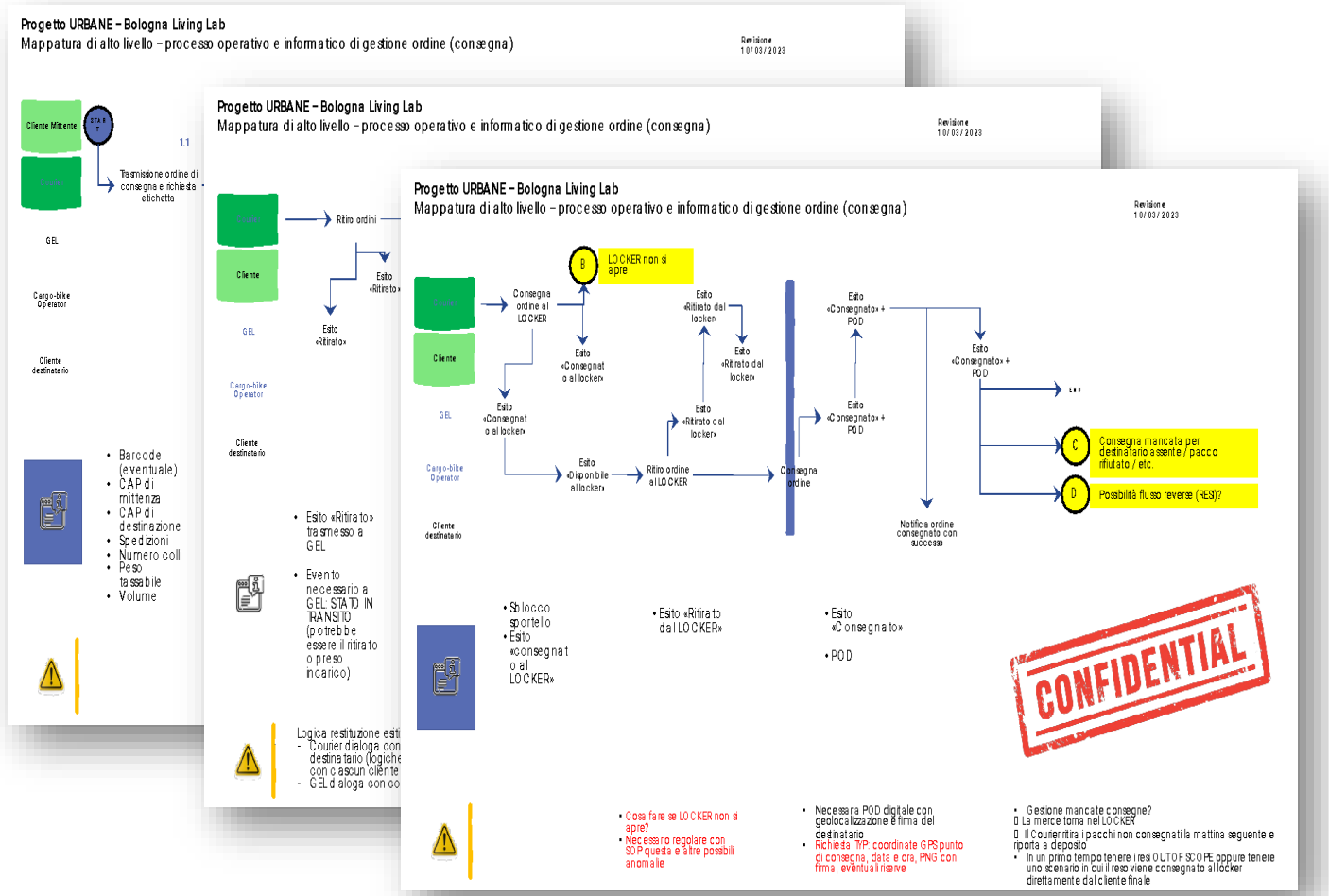


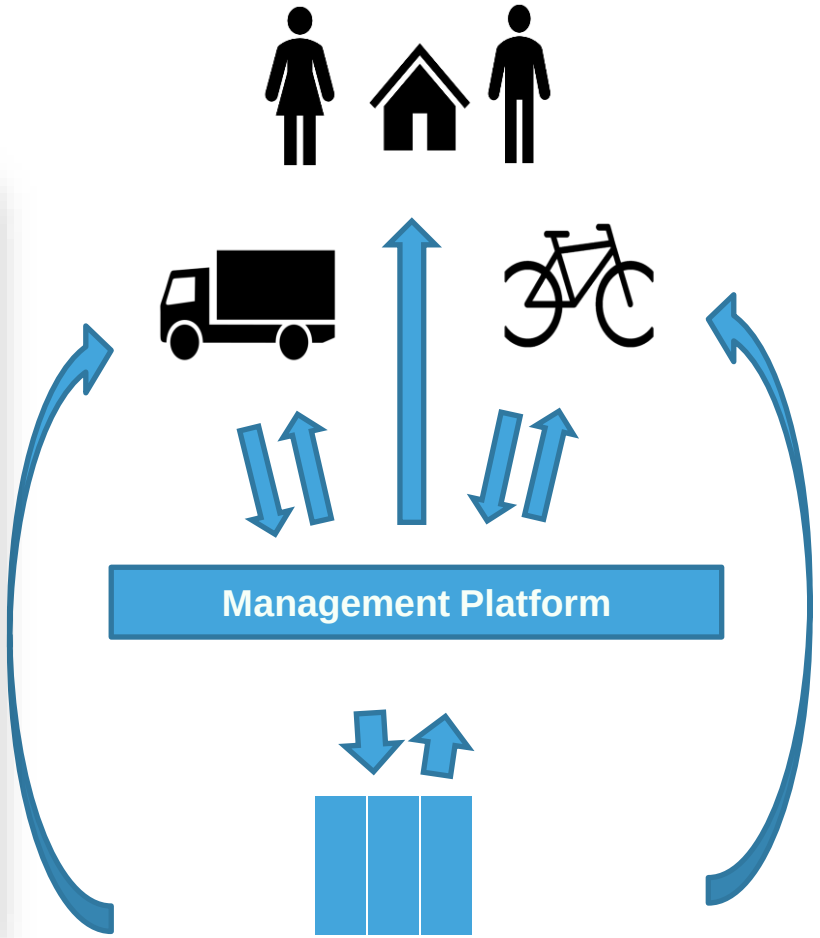
3 automated Micro Hubs
as a transshipment point

Innovation through a
collaborative routing model

Last mile delivery with
light electric vehicles

Management Platform - IT Integration

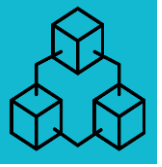




Tools

Blockchain

- **Objective:** Integrate a blockchain technology on the existing delivery process
- **Motivation**: Certify specific steps of the process (assignment & delivery). Proof of delivery.
- **Physical Internet:** Centralize sensible information across different carriers that may be involved in other similar project – trusting in the pilot is fundamental and BC is able to guarantee the transparency level of all the information to be shared



Tools

Collaborative Routing Model

- **Objective:** Suggest better delivery process for last milers
- **Motivation**: Reduce travel times and reduce CO2 emissions for Last Milers that don't have zero-emission fleets
- **Physical Internet:** Reduce/improve traffic in the city center. Voluntary data sharing from transport operators is important

Tools

Digital Twin

- **Objective:** Improvement of green routing and rerouting of last milers
- **Motivation:** Optimise last-mile network based on traffic flow conditions and environment sustainability
- **Physical Internet:** Further support municipality's objectives for efficient deliveries in city center from multiple LSPs (carriers and last milers)

Pilot Results

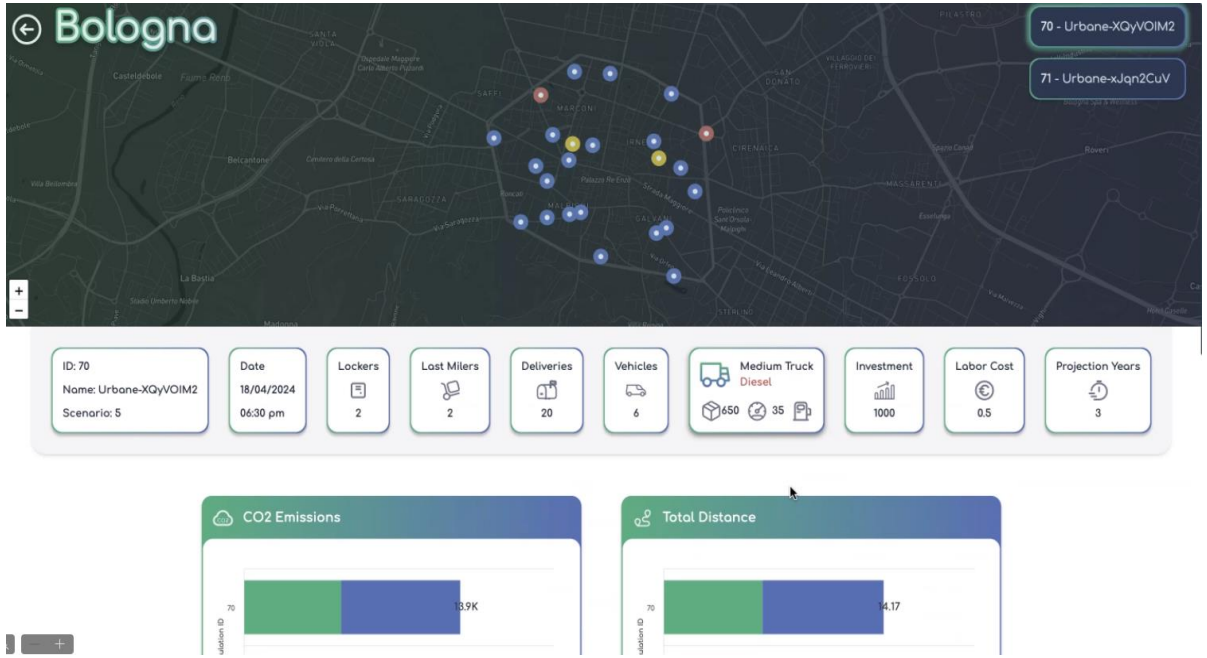
Results achieved in the first 6 months of operation

- **30-50% CO2 emissions savings compared with their conventional door-to-door deliveries;**
- **The quality of the deliveries increased as most of the parcels were delivered on the first attempt.**
- **Integration of blockchain and smart contracts for the Proof of Delivery;**
- **Showcase viability of data sharing without compromising security or privacy.**

Key Lesson Learnt

Lessons learnt in the first 6 months of operation

- **Difficulty in the involvement of other transport operators except for the 2 project partners;**
- **Express couriers prioritize their own staff and branded services. They are not inclined to use a third-party transport operator;**
- **Start with low volumes to consolidate the relationships between LL stakeholders and optimize the flow.**
- **Optimize the microhubs' potential: expand their capacity to include the handling of multi-item orders.**



Open Issues

- How to involve more operators?
  - Dissemination, questionnaires, market research
  - Express couriers vs small transport operators
  - Branding
- How to scale the model?
  - economic sustainability, number of hubs, type of parcels processed, public vs private space
- After the project who pays? Who is going to internalise costs

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Thank you for your attention!

For more information:

- https://www.comune.bologna.it/servizi-informazioni/progetto-europeo-urbane
- http://www.comune.bologna.it/relazioniinternazionali/notizie/159:50717/
- https://www.urbane-horizoneurope.eu/
- https://move21.eu/city/bolo/

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Comune di Bologna

Baden-Württemberg
Ministry of Transport

Karlsruhe