

Accelerating Zero-Emission Urban Logistics Through User-Centric eLCV Innovation: The Shift2Zero Project

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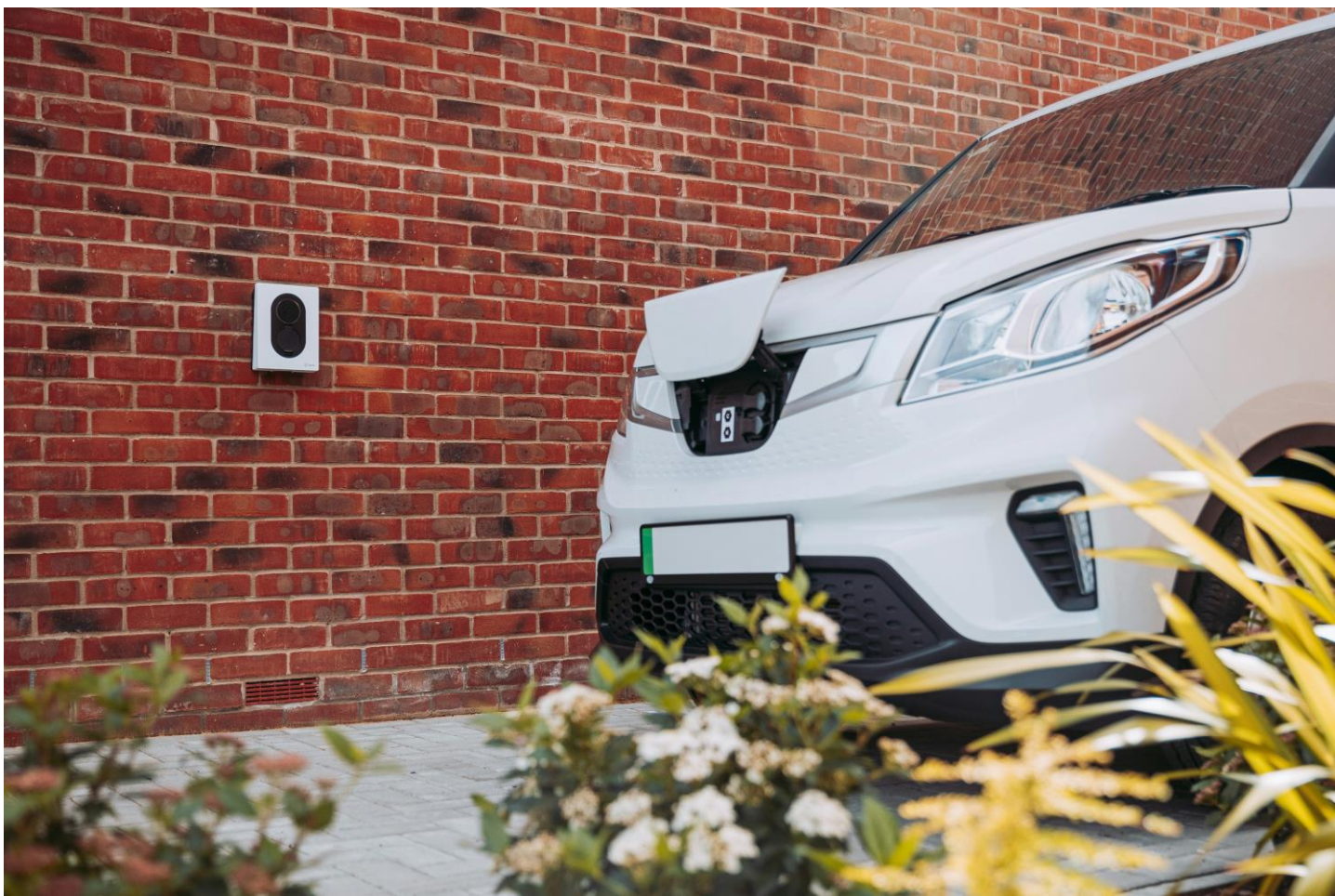
Introduction

Urban logistics must decarbonise to meet EU climate targets, but the adoption of electric Light Commercial Vehicles (eLCVs) remains slow in Europe. In 2023, more than **1.2 million diesel LCVs** were registered compared with **only 108,000 battery-electric vehicles**, revealing a significant adoption gap.

At the same time, urban freight demand is expected to increase by 36% by 2030, driven by the rapid growth of e-commerce and last-mile deliveries. Despite this urgency, current vehicles are often not optimised for urban logistics missions, resulting in inefficiencies in energy consumption, safety, and operational costs. This underscores the need for purpose-built, zero-emission solutions tailored to diverse logistics requirements.

The **Shift2Zero project** addresses these challenges by **developing mission-oriented electric N1 vehicles designed specifically for real urban logistics needs, enhancing efficiency, reducing emissions, and aligning with evolving operational demands.**

To achieve this, two proven platforms are being upgraded within the project: IVECO's e-Daily, representing the heavier N1 segment, and Alkè's ATX, designed for lighter and custom-built applications. Both platforms have already demonstrated strong performance across various transport operations and offer a solid foundation for delivering right-fit solutions to logistics operators.



Shift2Zero objectives

1. Accelerate the adoption of **electric Light Commercial Vehicles (eLCVs)**.
2. Develop **6 innovative vehicle concepts** based on IVECO eDaily and Alkè ATX platforms.
3. Reduce **CO₂ emissions (1-3%) and operational costs (~10%)**.
4. Enable **one eLCV to replace up to three conventional vehicles**.
5. Support logistics operations in **Zero-Emission Zones**.

Methodology

One of Shift2Zero's strengths is **placing end-users at the core of its innovation process**. By involving logistics operators, fleet managers, policy makers, and industry stakeholders from the start, the project ensures that its new vehicle concepts meet current and future supply and demand needs for the commercial delivery of goods.

1. **Identification of user needs & demands:** operational needs from logistics stakeholders are gathered through:
 - Interviews and surveys
 - Co-creation workshops
 - Experience-based design methods
2. **Translation of insights into technical requirements:** the collected insights are systematically translated into concrete technical specifications for new vehicle concepts.
3. **Deployment & testing of novel vehicle concepts:** these specifications are then:
 - Simulated and optimised
 - Developed into prototypes
 - Tested in real logistics operations
4. **Enhancing adoption rates:** by continuously involving users throughout the process and validating solutions in real-world conditions, the project increases acceptance, usability, and market uptake of the developed innovations.

Key innovations

The Shift2Zero project is developing **six innovative vehicle concepts** addressing different urban logistics challenges.

-  Modular swappable cargo units
-  Optimised thermal comfort infrared panels for cabin heating with HMI
-  Holistic energy management for cold chain logistics
-  Multi-temperature controlled, optimised and energy-efficient cargo body
-  Dual-use modular vehicles for goods and passenger transport
-  Geofenced N1 vehicles for safe & sustainable driving in urban areas

Shift2Zero innovations are stemming directly from end-user engagement and are therefore anticipated to foster rapid acceptance. By reducing particle emissions with advanced tire technology and better brake systems, the project aims to even further reduce the contribution of tires and brakes to air pollution and make these solutions more appealing.

Shift2Zero matrix

Prototype integration level:

-  Vehicle ON ROAD
-  Vehicle CIRCUIT
-  Component PROTOTYPE
-  Virtual SIMULATION

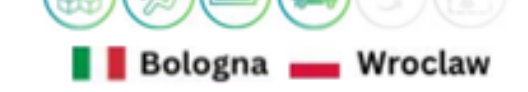
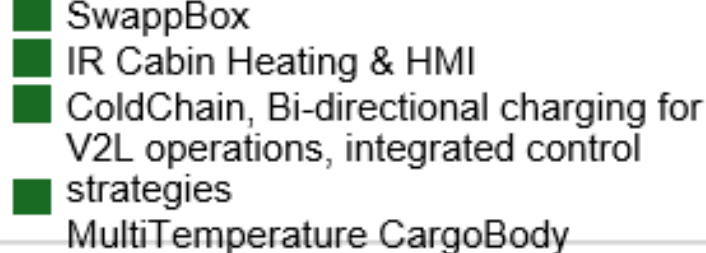
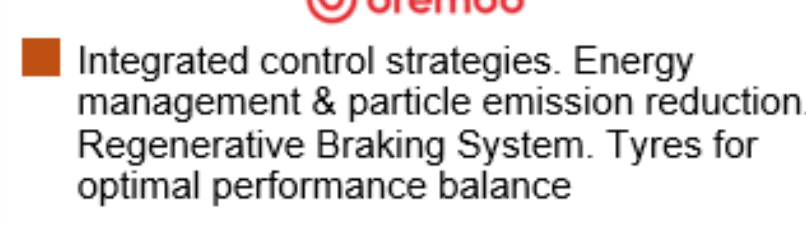
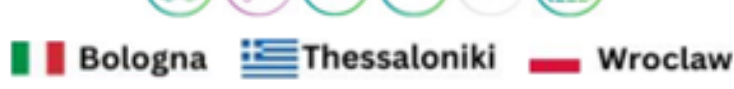
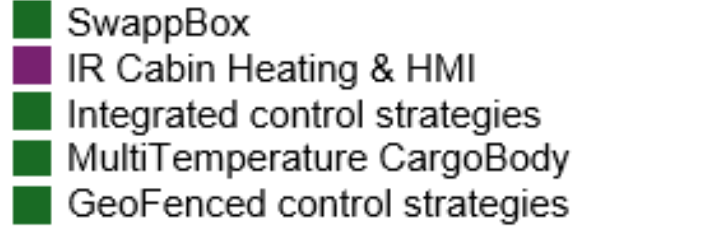
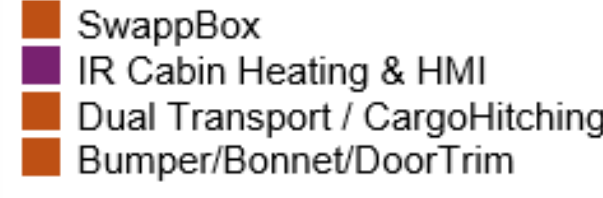
IVECO S2Z v1 (1x)	IVECO S2Z v2 (1x)
  	  
ALKÈ S2Z v2 (1x)	ALKÈ S2Z v3 (1x)
  	  



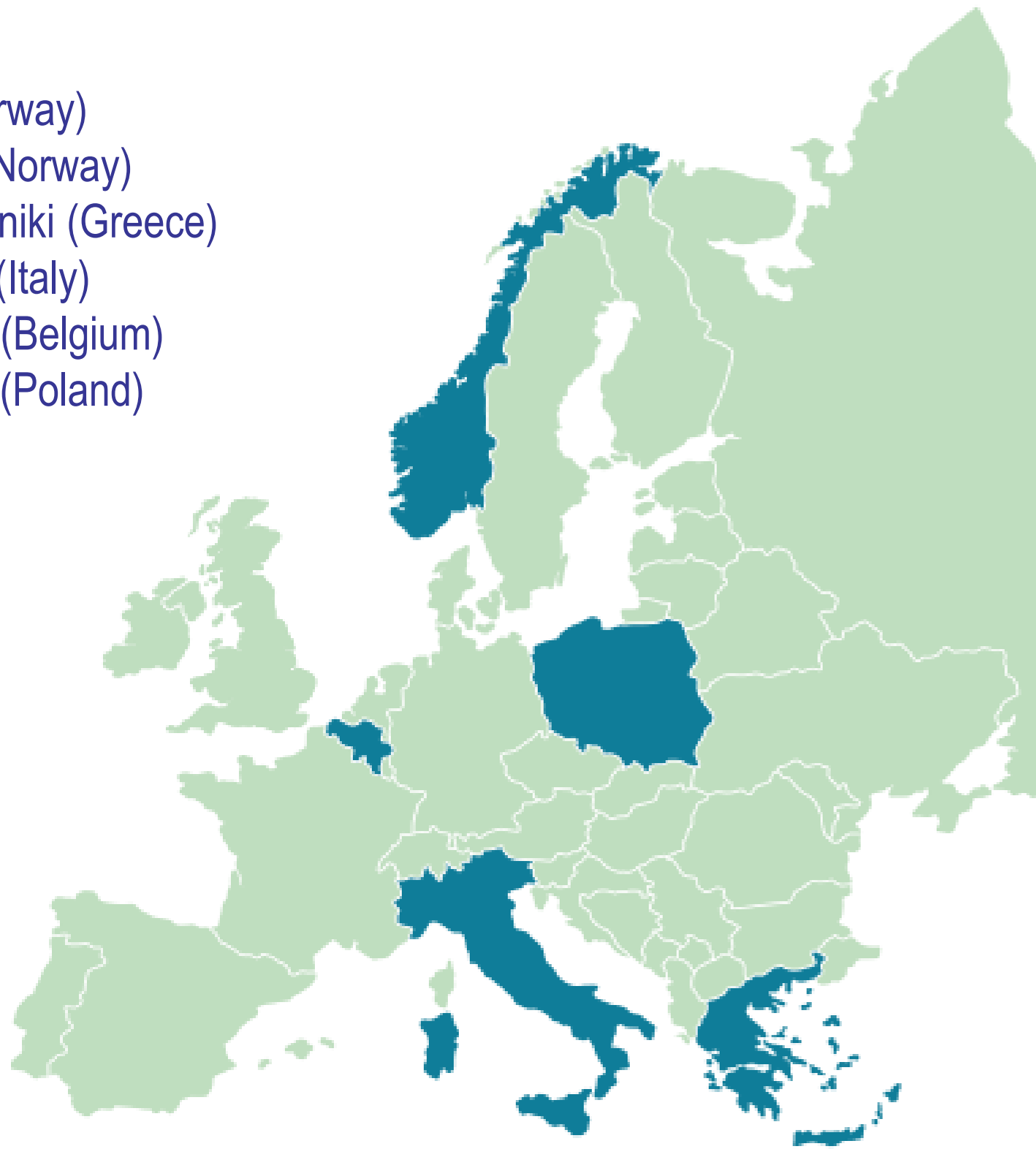
Figure 1: Shift2Zero matrix per vehicle and pilot

Our pilots

Shift2Zero develops four pilots and one macro-pilot to demonstrate its six new vehicle concepts in scalable zero-emission real-life operations.

The pilots, conducted over **six different European cities from five countries**, are representative of diverse urban realities of North, West, Central and Southern Europe. This allows extensive good practice and knowledge sharing while keeping context-specific replicability of solutions.

- Oslo (Norway)
- Bergen (Norway)
- Thessaloniki (Greece)
- Bologna (Italy)
- Brussels (Belgium)
- Wroclaw (Poland)



Results and expected impacts

Shift2Zero project has the objective to deliver:

- **6 innovative eLCV concepts**
- **4 physical prototypes** based on two N1 platforms
- Technical and operational requirements for future eLCVs
- Scalable **business models and policy guidelines**
- Demonstration in **real logistics operations**

Expected benefits include:

- Reduced CO₂ emissions
- Lower logistics operational costs
- Increased safety in urban environments
- Higher adoption of electric commercial vehicles

Conclusions

Shift2Zero demonstrated that user-centred vehicle design is key to accelerating the transition toward zero-emission urban logistics.

By integrating modularity, energy efficiency, geofencing, and dual-use transport solutions, the project provides scalable and future-proof eLCV concepts adapted to real logistics missions.

These innovations support the transformation of urban freight systems, enabling cleaner, safer, and more efficient last-mile logistics in European cities.

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