

# Autonomous electric vehicles for goods and passenger transport



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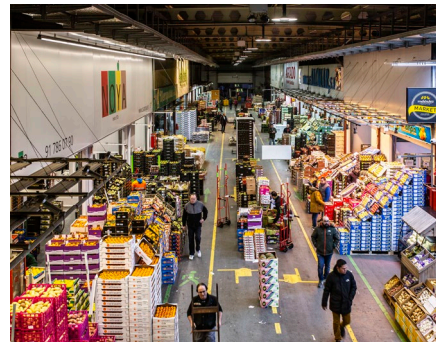
# mercamadrid



**3.4 million tonnes of product.**



**220 hectares with more than 800 companies.**



**9,000 people work, 20,000 access.**



**15,000 vehicles per day on average.**



**Area of influence of 500 km and 12 million consumers.**

# MOBILITIES FOR EU project:

*Madrid – 5 pilotos*



With the main objective of contributing to the transformation of cities towards climate neutrality, the aim is to demonstrate the feasibility of 5 pilots on innovative mobility solutions in a smart urban space: Mercamadrid.

# 5G+, Connecting the future



**Empresas**



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# 5G+

## Connecting the future

### **MOST INNOVATIVE PRIVATE 5G+ HYBRID NETWORK**

It provides the best performance in connecting autonomous vehicles and devices in the project



**SAFETY AND RELIABILITY**

**HIGH CAPACITY AND  
ULTRA-LOW LATENCY**

**MAXIMUM EFFICIENCY  
FOR CONNECTING IOT  
DEVICES**

**Zero Emission, Autonomous and  
Connected Vehicle (CCAM) for the  
transport of people in Mercamadrid.**

**alsa**



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# Context of the MOBILITIES for EU project



## Current situation



### Global

Lack of public transport solutions with autonomous vehicles at the international level.

In Madrid, Alsa operates the only vehicle in Spain operating in open traffic on a regular CRTM line (Cantoblanco Autonomous University campus).

The autonomous vehicles deployed so far are of low capacity (approx. 12 passengers).



### Mercamadrid

There is no public transport solution within the complex, only 2 lines of the city bus.

Predominance of private transport.

Complex traffic environment.



# Proposed solution

## ZEV, Autonomous and Connected Vehicle (CCAM)

Regular commissioning of an electric midibus (ZEV) and autonomous (Level 4+) with more than 20 seats, located in a collaborative and interconnected environment (CCAM) within the Mercamadrid area.

This autonomous electric midibus will operate in a real open traffic space for at least 12 hours a day on a recurring basis.

Proposed interior route to connect the main mobility attraction nodes of the complex, although it is foreseen to be updated throughout the project to adapt it to the needs of people.







# Proposed solution

In addition to the deployment of the CCAM vehicle itself, the Alsa-Mercamadrid project includes the following elements:

## Zero Emission Mobility Plan

We will design a Zero Emissions Mobility Plan specifically for Mercamadrid, so that the circulation of the CCAM bus can achieve a real transformative effect on mobility in coordination with other environmentally friendly modes.

## Customer Centric Service Design

The new mobility system, more comprehensive and designed ad-hoc for Mercamadrid, will have people and their different needs at its core: accessibility, ease of use, suitability, proximity, availability, technology...





# Challenges and opportunities



## Disruptive technology

Deploying an autonomous vehicle capable of responding to a real mobility need

Continuous learning and evolution towards full autonomy (Level 4 → 5)



## Use of the new service

Capture the interest of users and gain their acceptance by responding to their needs.

Consolidating the new CCAM solution within a permanent mobility ecosystem



## Permanent interaction

With other elements of the mobility ecosystem, e.g. other vehicles and infrastructure, charging network, data space, 5G+ network, etc.

Sending and exploiting data for the benefit of all stakeholders

# Electric and Autonomous Vehicle for waste transport in Mercamadrid

pre  
zero



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## PreZero Service in Mercamadrid

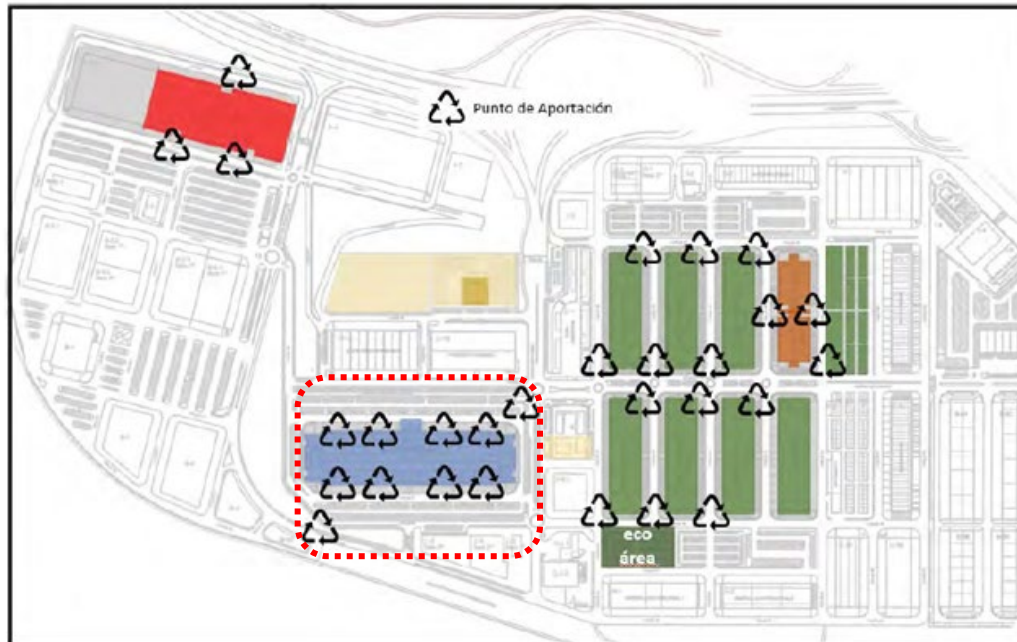
Street cleaning  
services

Central market  
cleaning services

Selective waste  
collection services  
and integrated  
management of  
the Eco-Area



# Scope of the MOBILITIES for EU project



## Current service

### 📍 Location:

Mercamadrid Central Fish Market.

### 🚚 Current situation:

At the **Central Fish Market**, boxes of pórex are generated and deposited at collection points outside the market ( ).

There are currently 20 cages <sup>🗑️</sup> at the 12 points where material is collected (10 points on the ramps around the shed and 2 contribution points).

When these cages are full, an operator who circulates continuously around the site checking the state of the cages, picks them up and takes them to the recycling area. This activity is currently carried out with a diesel vehicle that tows 2 cages on each trip.

# Proposed solution in the MOBILITIES for EU project

## Pilot

Demonstration of the operation of an Electric and Autonomous Vehicle for the collection of empty boxes of pórex (waste) in the Central Fish Market of Mercamadrid.

## Target

To achieve a more efficient and sustainable collection service for recyclable materials thanks to:

- Emission and noise reduction due to diesel vehicle electrification
- Optimisation of vehicle circulation through the design of an on-demand collection solution



# Project development

## Implementation planning

Following an assessment of the working area, a high level of human and vehicle traffic has been identified.

Therefore, the implementation of the pilot will be carried out in 3 phases:

**Phase 1:** Collection of the cages at the two points of contribution (AP1 and AP2).

**Phase 2:** Collection of the cages at the ramps closest to the recycling area (CP9 and CP10).

**Phase 3:** Analysis of the technical and economic feasibility of carrying out collection at all points (CP1-CP10 and AP1-AP2).



## Main challenges

- ✓ Ensuring AGV connectivity
- ✓ Identification of the degree of filling of the cages by sensor system
- ✓ Connectivity between cage sensors and AGVs
- ✓ AGV interaction with traffic
- ✓ AGV interaction with people
- ✓ AGV coupling with cages
- ✓ Displacement of cages (trailer)





## Main advantages of the solution

- ✓ Emission and noise reduction due to diesel vehicle electrification
- ✓ Optimisation of vehicle circulation through the design of an on-demand collection solution
- ✓ Optimisation of human resources and reduction of risks by avoiding the need for operators to constantly circulate around the area to identify the degree of filling of the cages.





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