



# Reducing Plastic Waste Through Smart Technology

## Scanning Solution Incentivises People to Visit Recycling Containers to Return Plastic Bottles and Beverage Cans

Ecoembes is a Spanish non-profit environmental organisation which coordinates the recycling of household packaging throughout the country. Its RECICLOS initiative is a Return and Reward System run in all the Autonomous Communities of Spain. Citizens in over 100 municipalities are rewarded with incentives for recycling their beverage cans and plastic bottles.

The incentives can be put towards projects related to green mobility, cleaning of natural spaces or replanting of natural areas, as well as social incentives such as contributing to Food Banks, the Red Cross or local non-governmental organisations (NGOs).

Jose Luis Moreno, Innovation Manager at Ecoembes, says, “The recycling objectives set by the European Union are increasingly ambitious and require a great effort on the part of all of society. For this reason, at Ecoembes we want to contribute to meeting this challenge with innovative solutions, such as RECICLOS, which helps to promote the circularity of packaging and with which citizens can also contribute to improving the environment through the rewards they obtain when recycling.”

### A Complex Set of Requirements

Rewarding people for returning plastic bottles and beverage cans to recycling containers is a challenging task. Ecoembes needs to guarantee the traceability of the waste being deposited. It must also identify people, with whom it has no previous relationship, while creating a solution which is easy to use and accessible to all.

Furthermore, there were several technical hurdles which needed to be overcome. For example, many recycling containers are located outside and exposed to all types of weather, while there is no permanent source of power. After creating a specification for the project, Ecoembes spoke to several companies. It selected Madrid-based Retail Tools, an expert in track and trace and mobile technology, to create the solution. This is now being piloted in the city of Sant Boi de Llobregat near Barcelona, with 16 containers.

### SUMMARY



**Customer**  
Ecoembes

**Partner**  
[Retail Tools](#)

**Industry**  
Recycling

**Challenge**  
Encourage people to recycle beverage plastic bottle and cans waste. This includes identifying the person who is recycling, what they are recycling and when, where and how often they recycle.

**Benefits/Outcomes**

- Reliable and durable recycling solution that incentivises people to recycle light packaging and help reduce plastic waste going into landfills.

**Solution**

- Zebra SE4757 OEM Array Imager Scan Engine

### An Ingenious Recycling Solution

“This is a project where we knew we needed state-of-the-art technology, but we were not sure how that technology could be made to work reliably given the challenges. We must know too if there was an issue with a container, which meant Retail Tools had to think about a way of continuously monitoring them,” comments Moreno.

The solution features two main components. The first is an app, developed by Ecoembes, which people download to their phones. The second is a special scanning enclosure, designed by Retail Tools, following the instructions and guidelines defined by Ecoembes which is retrofitted to each container. The device recognises the user’s application using 5G Narrow Band internet of things (NB-IoT) technology to ensure they are rewarded for items deposited in the containers. Then a Zebra scanner is used to read the barcodes on the plastic items.

Retail Tools has worked with Zebra Technologies for two years and was confident its original equipment manufacture (OEM) scanner range was perfect for this project. The scanning device has to be compact, easy to connect robust and reliable because it’s installed in containers which have a non-modifiable design and measurements. What’s more, containers are exposed to unpredictable humidity and temperature conditions and are susceptible to movements and knocks.

With these issues in mind, the Zebra SE4757 OEM Array Imager Scan Engine was selected for several reasons. It can read 1D and 2D barcodes from three centimetres away, and it features an innovative and accurate scan engine which can capture codes that are faint, damaged or scratched. Critically, too, with its robust build, tests revealed it can withstand the high temperatures Spain experiences during summer.

Retail Tools created the secure housing for the scanner, which protects it from moisture and excessive temperatures and also integrated a teleservice function. This streams data on each container’s components to determine whether the device is working properly and, if not, what the issue is. Battery level status is also relayed. The compact lithium-ion battery powers the scanner and is recharged through solar panels housed on the surface of each smart ring. In keeping with the sustainability ethos of the project, Retail Tools designed software to make the use of power as efficient as possible when data is scanned, processed and transmitted.

### A Popular Recycling Solution

Retail Tools was able to offer Ecoembes a solution that is self-sufficient in terms of energy consumption, easy to operate and maintain and available to municipalities in Spain and beyond as a complete solution.

Early indications show recycling containers are being more frequently used, helping to reduce the amount of waste going into landfills. Although the pilot is ongoing, and data is still being collected, most people opt for the community rewards option.

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