



From sound to insight- **recycling the future**

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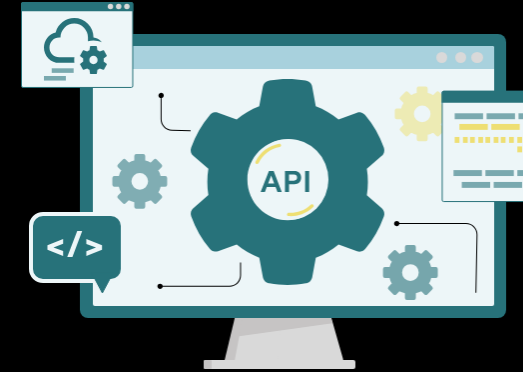
Tech ecosystem

Tax fee



MODULES

- PAYT and RAYT incentives
- Maintenance
- Route Optimization
- Business Intelligences
- Digital assets (RFID tags)
- Smart log
- Weighting scales
- App citizens and partner
- Power BI



RecySmart



Fill level sensors



App



PAYT Module

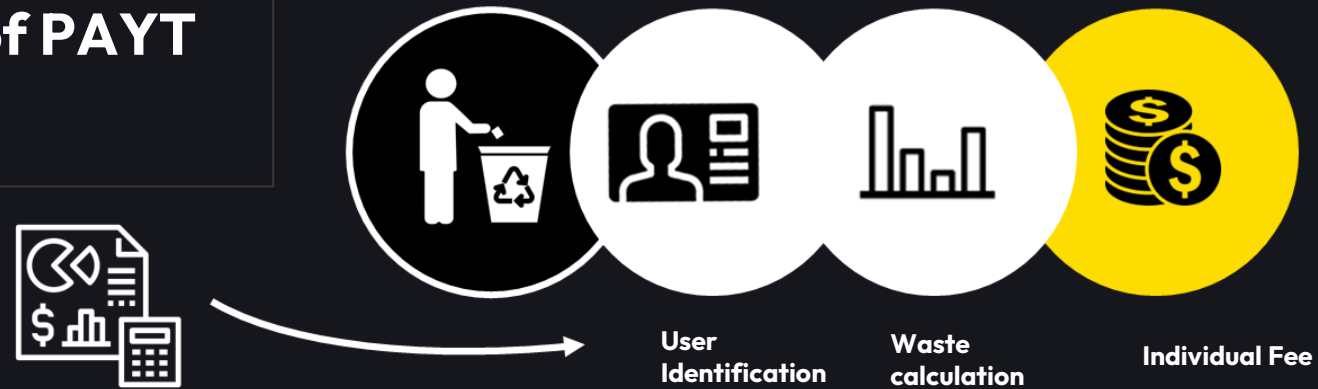
Marketplace
(Incentives)



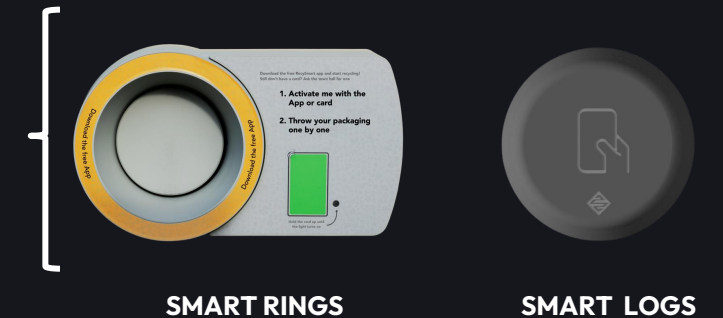
Opt. Routes

Design of the **Fair Waste Rate Model**

The principals of PAYT are based on



- **User identification:** In order to measure the contribution of each citizen, the first step is to identify the generator of the waste.
- **Waste calculation:** number of contributions made with smart rings and closures.
- **Individual rate:** Individualised collection based on the waste generated and the selective separation carried out at source.



RecySmart



Turn any bin on the street into a **smart**.
The only effective, low-cost technology capable of increasing packaging recycling rates.

Adaptable to any waste bin

Side-loading | Crane-lift | Rear-loading | Underground | Smart Bins



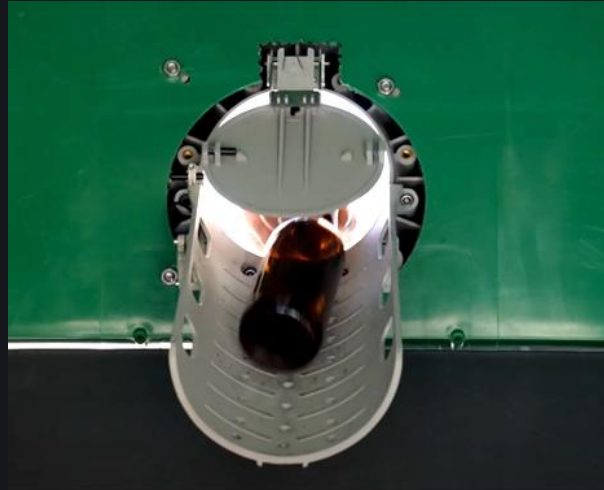
How does it work?

RecySmart



User ID

Citizens log in with the App or RFID card to identify themselves and start the recycling process.



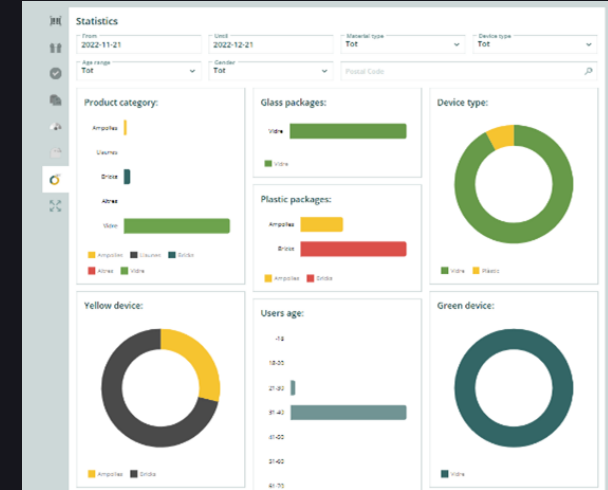
Characterization

They feed their containers one by one into the correct container and RecySmart characterizes the material in real time.



Reward/Cashback

The citizen will receive the corresponding recycling points to exchange for rewards or the economic return of the deposit.



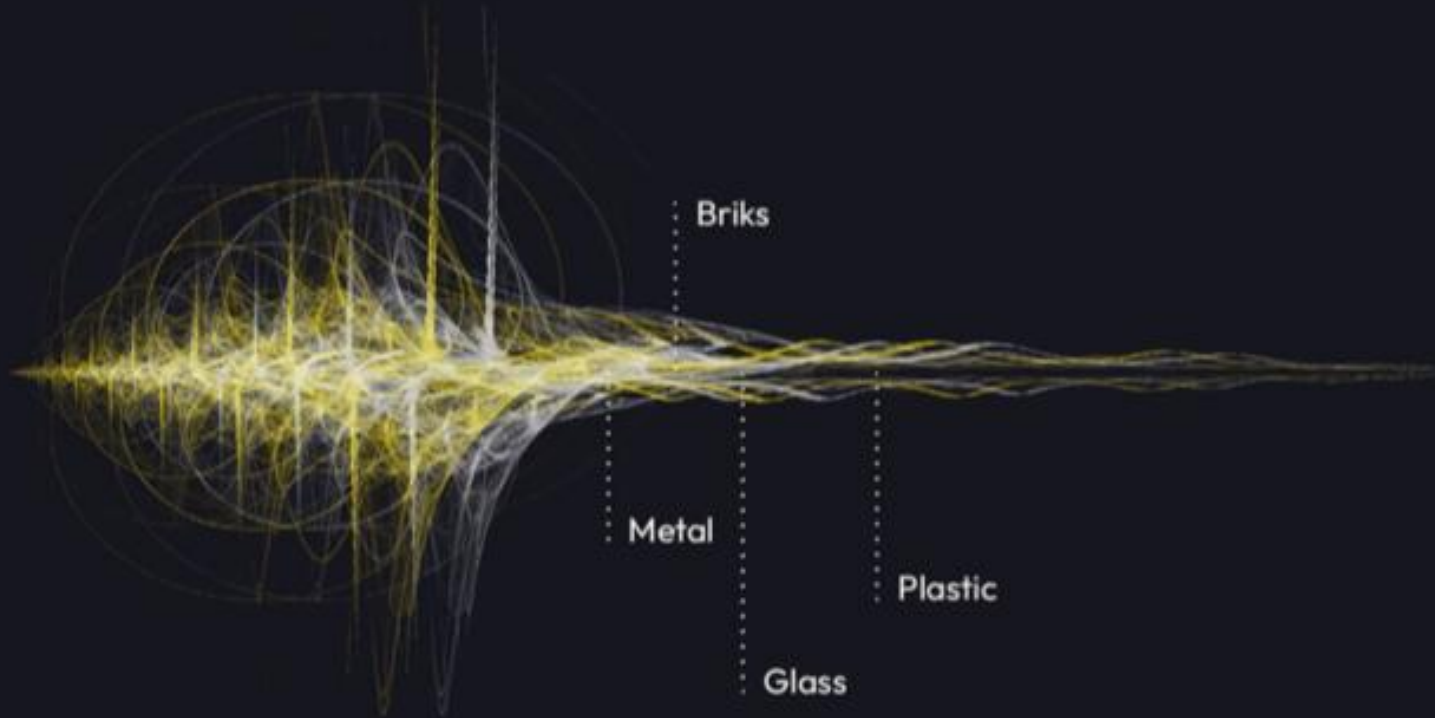
Sending Data

All data (user ID + recycled packaging) is sent to our platform for processing and analysis.

Unique **patented technology** capable of **characterizing** 4 types of packaging waste: Plastic bottles, cans, cartons and glass.



Acoustic patented technology



95%+ material clasification

Proof of disposal:
WHO, **WHAT**, WHERE, WHEN



How it Works – AI + scanner



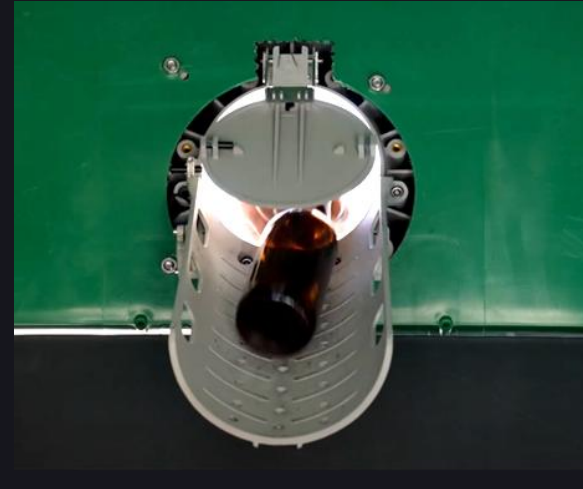
Citizen ID

User logs in with the App or RFID card to identify themselves and start the recycling process.



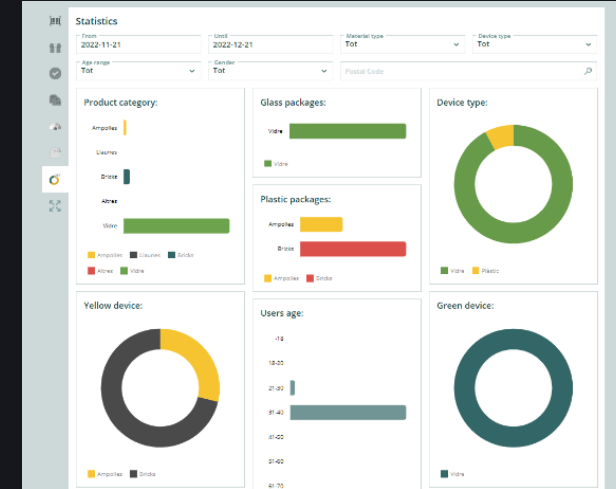
Scanning

User should scan the EAN barcode (or other) on the packaging item before placing inside the waste bin.



Material Characterization

They introduce their packaging items one by one in the correct bin and RecySmart characterizes the packaging material in real time.



Refund & Data sending

All the data (citizen ID + packaging recycled) is sent to our platform or third party via APIs for processing and provide the deposit or reward to the user.



RecySmart Bin



A smart, accessible container for:



- ✓ Events
- ✓ Beaches
- ✓ Pedestrian areas
- ✓ Bus/train stations
- ✓ Shops
- ✓ Gas stations
- ✓ Airports
- ✓ Sports clubs
- ✓ Private companies



GLOBAL BENEFITS

- Increases packaging recovery rates.
- Increases the quality of the material.
- Reduces improper waste.
- Avoid the abandonment of packaging on the streets.
- Control of recycled packaging by the municipality in real time.



<https://www.youtube.com/shorts/GcVHjIVeYs4>

Technology ecosystem: Recysmart Ring

INTERCONNECTION:

CITIZENRY

LOCAL ENTITIES

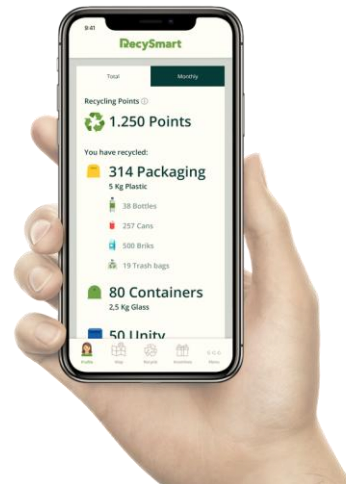
WASTE MANAGERS

SHOPS
LOCAL

RecySmart
Device



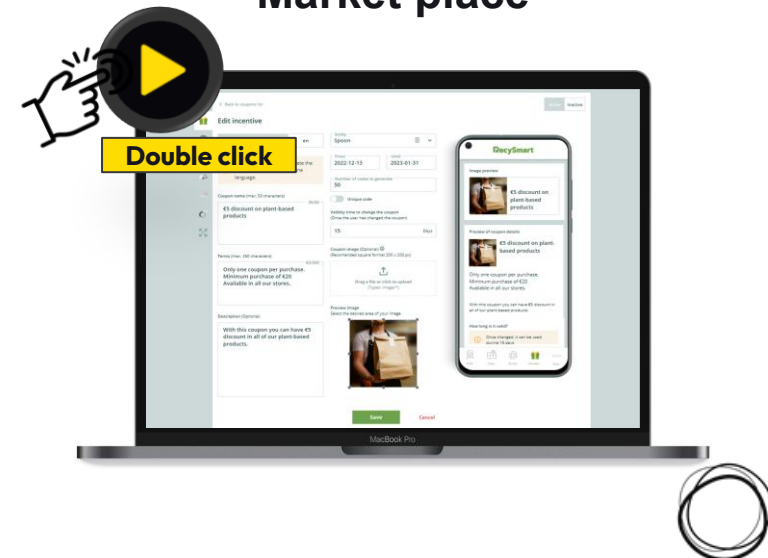
Citizen App



Business Intelligence



Market place



Market place - Benefits

Example incentives: **Food Waste**



Commerce

- ✓ They market surpluses that would otherwise be discarded
- ✓ Generate new revenue



Citizen

- ✓ Incentives up to €8 for recycling packaging



Ajuntamiento

- ✓ Prevents packaging abandonment
- ✓ Increases recovery rates and packaging quality
- ✓ Increase in income from the sale of packaging waste to Ecoembes and Ecovidrio
- ✓ Reduction of food shortages



~~12 €~~

Real value of the meal pack

3.99 €

Price with the **RecySmart App**

Free platform

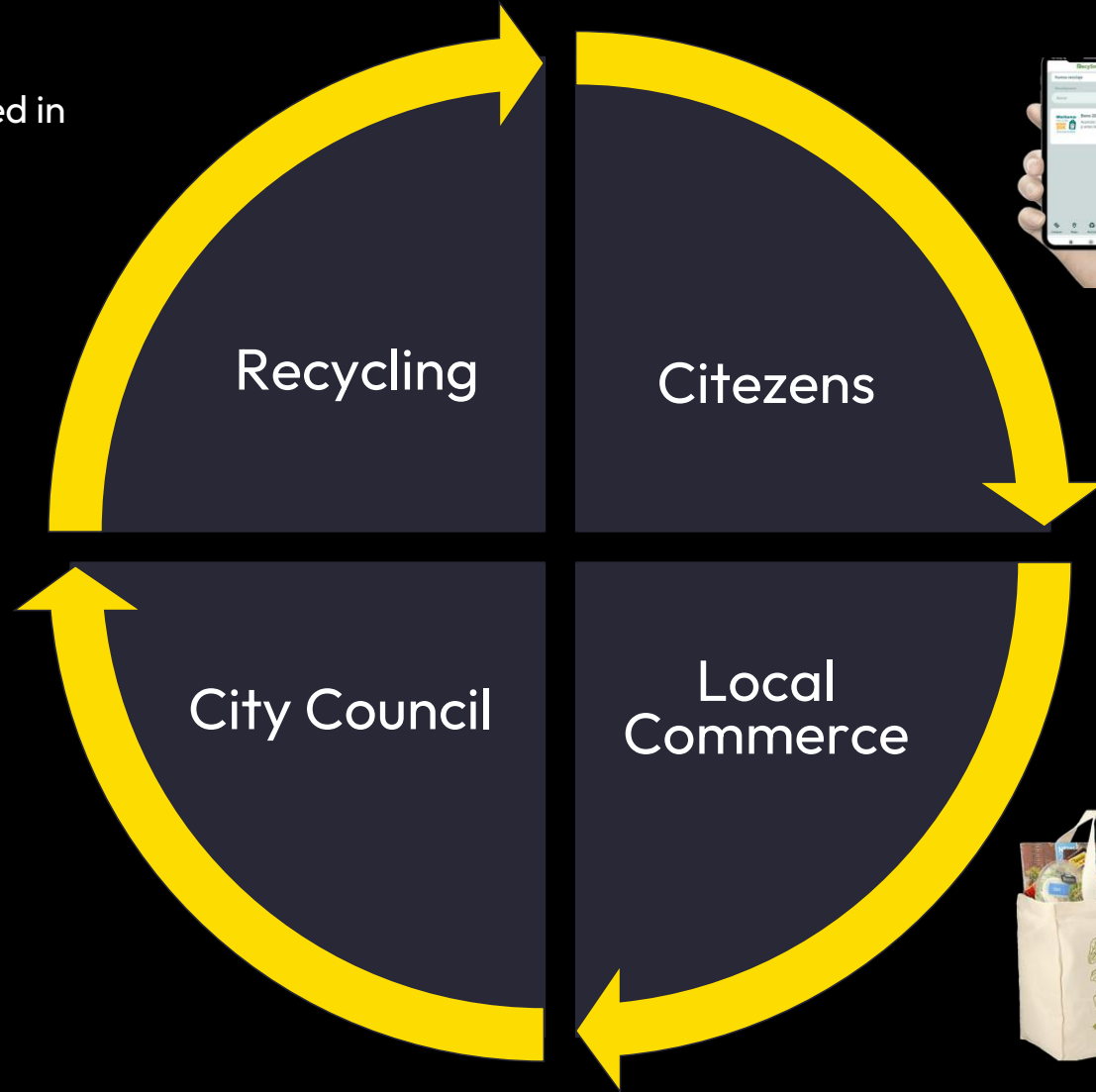
- **No cost** for shops, supermarkets and local businesses
- **It does NOT charge per pack** and **subscription** like other platforms (Too Good to go)

Meliana Project



Smart Rings Deployed in Meliana

35 RecySmart



Solución habilitada para todos los ciudadanos de Meliana.

~ 10k citizens



Custom vinyls and app for the visual identity of Meliana



Rewards: Vouchers redeemable at local businesses

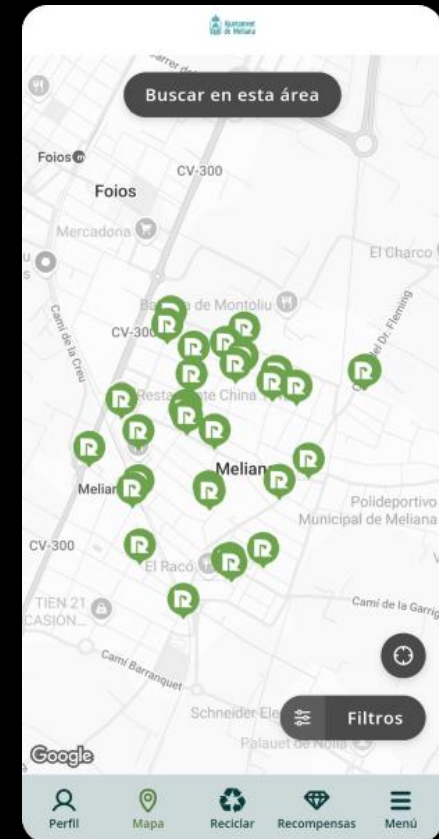


1st Phase- 2025



35 RecySmart deployed

- 20 glass
- 15 light packaging





Results

Diciembre 2024 - Octubre 2025



Users

+1.600



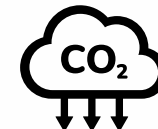
Rewards
exchanged

+ 1.000



Glass
containers

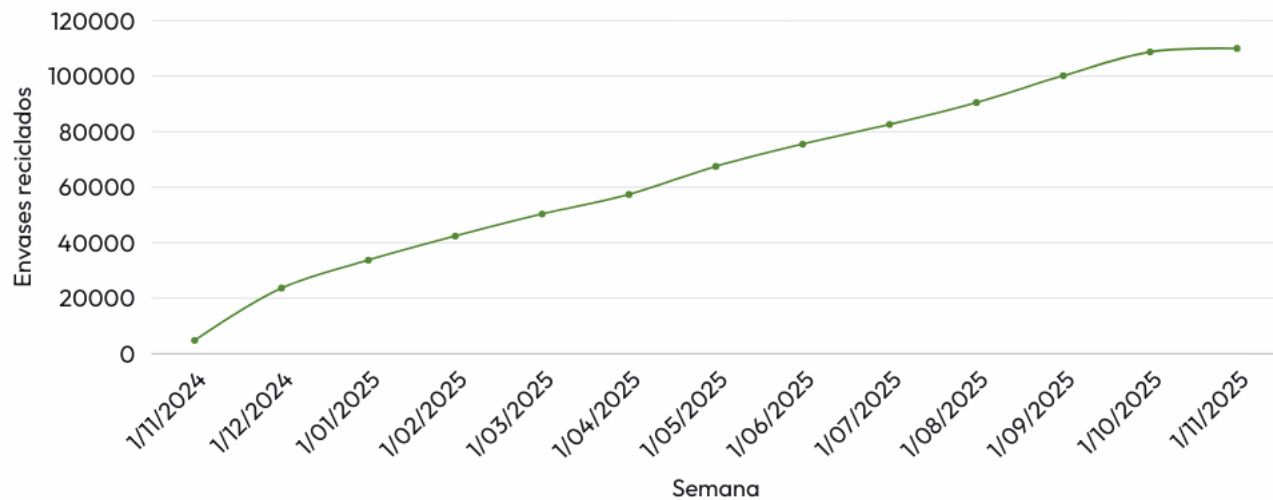
+110 k



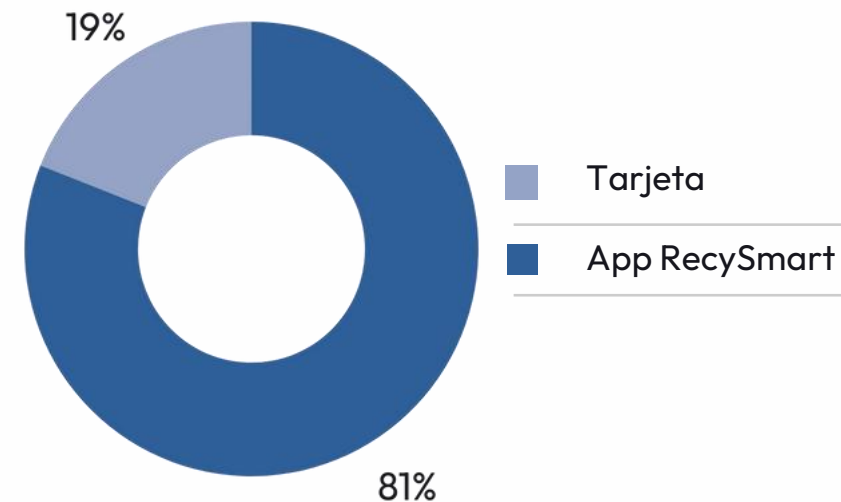
tn CO₂
avoided

+26

Evolución acumulada de reciclaje

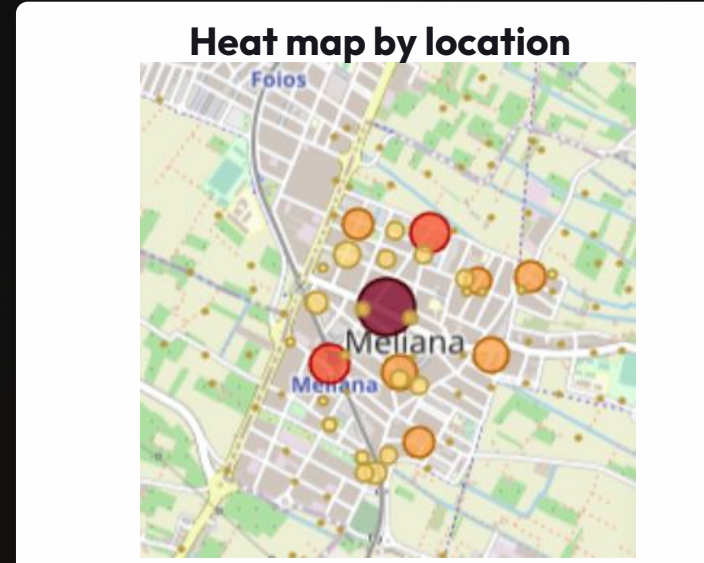
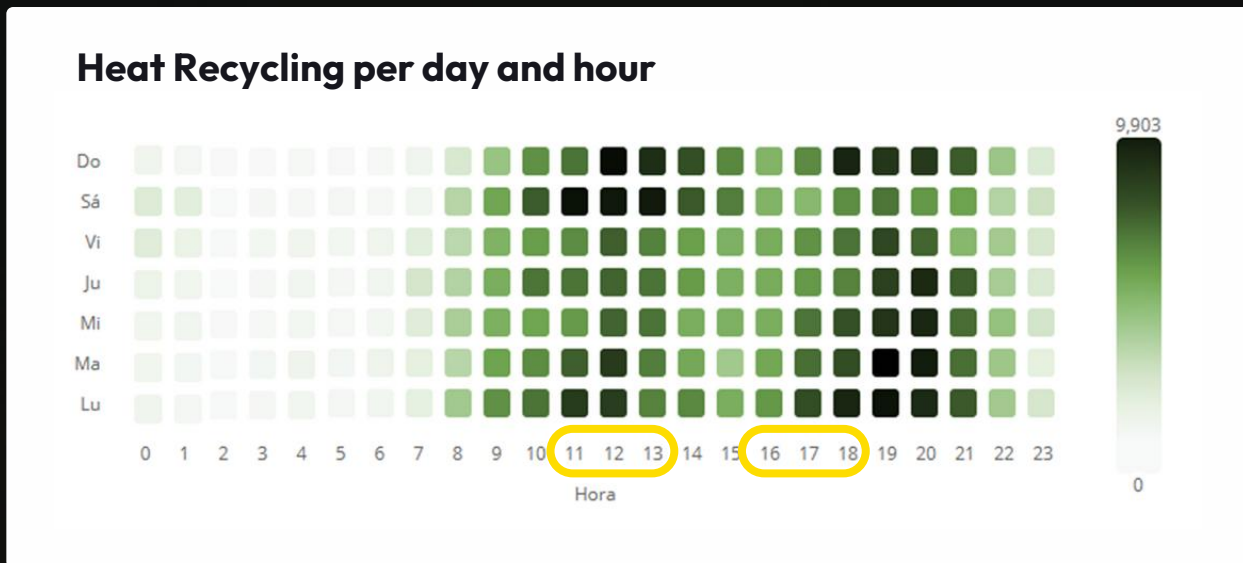
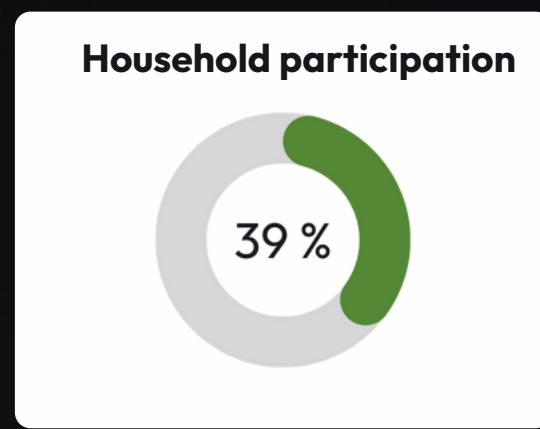
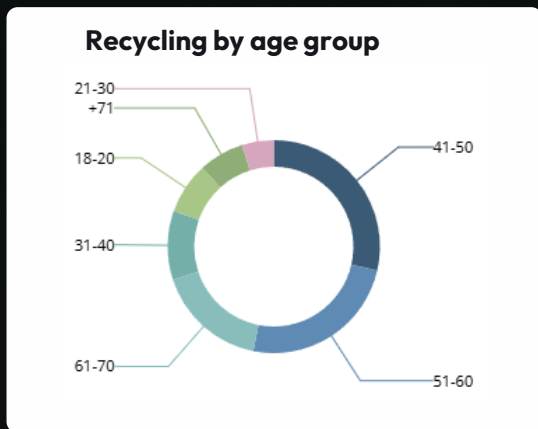


Tipo de conexión





Recycling Analysis





Packaging collection

Data from January to July



TN collected
2025

152

+28%

Glass collection rates

vs same period 2024

With a territorial coverage of 45% by RecySmart



Quality of material collected



Quality of material collected

¡ Also in light packaging !



17%





2n Phase – Project Expansion



+40
RecySmart

100%

Glass bins equipped



+70
Filling level sensors

- Increase the packaging recovery covering the full territory
- Collection **optimization** and **overflow** prevention
- Aggregating data from all municipal councils to set up the basis for the **PAYT tax system**

Success Case - Meliana

Quality of material collected

Contenedores sin RecySmart



Contenedores con RecySmart



RecySmart Bin in public spaces



Video

Guadalajara

Reward As You Throw (RAYT)

The project consists in the deployment of a RAYT scheme to reward citizens for their correct recycling actions with **public and private incentives**. The rewarded packaging will include plastic bottles, beverage cartons, metal cans, and glass.

It includes **500 RecySmart** devices in the existing **glass and light packaging side-loading bins** to motivate and involve the **entire population and more than 200 local businesses**.

Both the City Council and the Waste Manager rely on Candam's full technology ecosystem to implement an effective incentive system of its own:

RecySmart Citizen App + Candam EcoMarket + Candam Backoffice



- Guadalajara, Spain
- Mar 2024
- 400 RecySmart
- Plastic bottles, metal cans, beverage cartons, glass containers
- Partners: City Council of Guadalajara, Valoriza Servicios Ambientales (Sacyr Group)
- LIFE 2022 funded project



Guadalajara | Cents4pack

Public Sector



Citizen's campaign



Local Businesses' campaign



Rototank Rotourban



Ros Roca Barcelona



400 Recysmart installed
(200 light packaging + 200 glass)

"One of the most remarkable aspects of this project is that it not only aims for environmental improvement but also supports the local economy through recycling."
— Jesús David García Galve, Environmental Councillor, Guadalajara City Council

"RecySmart is a perfect tool that enables local authorities to know who is recycling and whether they are doing it correctly."
— Jesús David García Galve, Environmental Councillor, Guadalajara City Council

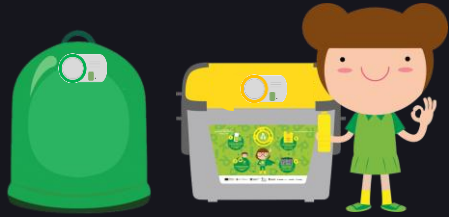
RESULTS AND IMPACT

- Light packaging collection **increased by 18.1%**, resulting in an additional 175 tons/year compared to the baseline.
- Glass recycling improved by 3.8%, adding around 32.4 tons/year.
- These figures translate into more than **200 tons of CO₂** emissions avoided and **2,314 m³ of water saved**, contributing meaningfully to climate and resource conservation goals.



Torrelavega | School's competition

Public sector



- 14 Schools involved
- 2.700 students
- Rewards to the most recycling students and schools
- 20 Recysmart
- Glass and Light Packaging

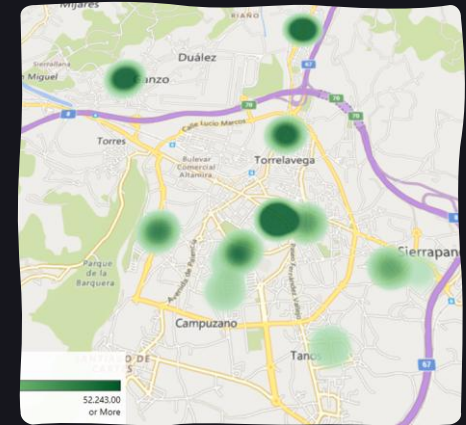


+1,400
Users

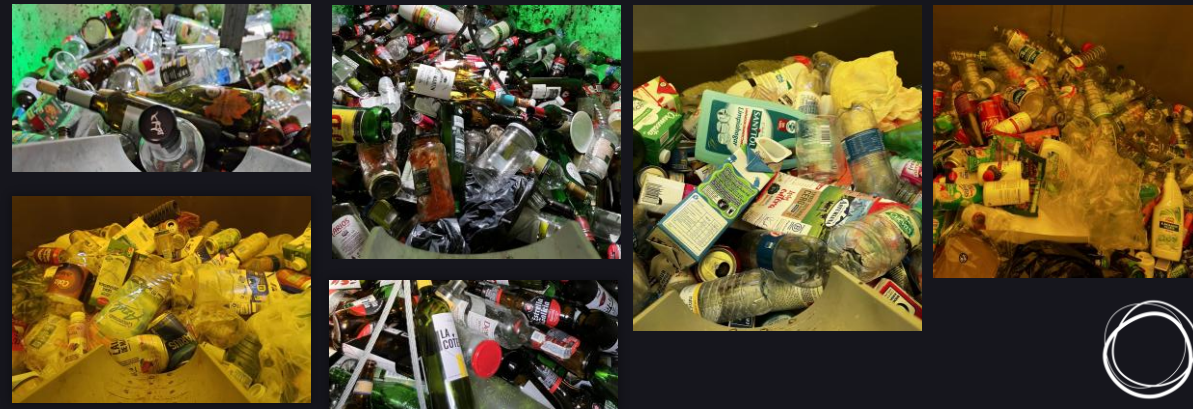
52%
Participation



575,000
Packaging recycled



+45
tn CO2 avoided



Torrelavega | School's competition

Public sector



RESULTS

[VIDEO](#)



Mafra | Portugal

Video

In the city of Mafra, there was already a RAYT that worked with RVM and the Cartão Mais card and application. The reward for citizens is that for each returned packaging they receive cash (in a digital wallet) that can be used for different discounts at participating local stores.

The Mafra City Council discovered that they could equip **40 containers with RecySmart with the investment of 1 RVM.**

The project builds on the upgrade of the existing RAYT with the **installation of 20 RecySmart** devices in existing bins for light packaging and glass fractions and the integration into the existing program of the devices. Therefore, citizens have the option of recycling their plastic bottles, metal cans, beverage cartons and glass containers in smart bins or some of them in RVMs with the same card and app.



- Mafra, Portugal
- Jul 2024
- 20 RecySmart
- Plastic bottles, metal cans, beverage cartons and glass containers
- Partners: Sociedade Ponto Verde, City Council of Mafra, Tetra Pak, AIVE (Glass Recycling Industry Association), OVO Solutions, Sotkon, Tratolixo



SMART LOCK FOR USER IDENTIFICATION



SMART LOCK FOR USER IDENTIFICATION



The electronic locking mechanism that can be installed to most containers on the market.
The opening is activated via Bluetooth through a citizen application or with the use of NFC cards.

The technology also makes it possible to **identify the personnel** involved in the management of waste collection, detect the use of the containers and control the different contributions and the filling status of the urban bins.

SMART LOCK– VALUE PROPOSTION

ACCESSIBILITY

- Prevents unauthorized users from using it
- Enables a high degree of source sorting and lower waste generation rates
- Promotes waste recycling
- Addresses sustainability concerns of citizens, businesses, and governments

NEW BUSINESS MODEL FOR USERS AND PROVIDERS

- Pay-As-You-Throw (PAYT)
- Differentiated rates
- Promotes public awareness and rewards waste collection

OPTIMIZATION OF RECYCLING AND COLLECTION TASKS

- Cost reduction and operational improvements
- Reduction of the carbon footprint of collection tasks
- Advances in planning the implementation of urbans bins.

SAFETY AND HYGIENE

- Traceability of city cleaning and street hygiene conditions
- Reduction of safety risks such as fires or vandalism
- Compatibility with any type of container and waste

SMART LOCK FOR USER IDENTIFICATION



PAYT MODUL – PAY AS YOU THROW (KPIs)

- Use of card/user within a selected date range
- Data on card usage
- Activated/deactivated cards
- Citizen usage tracking indicators
- Time restrictions
- Behavior-based restrictions

PRINCIPAL FUNCTIONS

- User identification for contribution control through whitelists
- Emptying verification, route optimization
- Detection of misplacement, fire, and tipping
- Detection of obstruction, dirt, and blockage
- Real-time alarm transmissio

MAIN CHARACTERISTICS

- Remotely configurable
- Robust IP68 enclosure
- Autonomy: 150,000 openings (1 lithium battery)
- Wireless communication technologies: NB-IoT, WiFi, and BLE
- NFC identification technology and mobile app, user registration and contribution
- Feedback via sound and light
- FOTA (Firmware Over-The-Air) update via WiFiGPS for unattended management (optional)

SMART LOCK FOR USER IDENTIFICATION – DEPLOYMENTS

INTERNATIONAL PROJECT - 1,400 units in NYC with Contenur and FCC

PROJECTS DEPLOYED

- 2,000 units in Santa Cruz de Tenerife with Valoriza and Contenur
- 46 units in Murcia with Ecoembes
- 100 units in Mancomunidad Txorierri (Bizkaia)
- 350 units in MMIZM (Barakaldo, Bizkaia)
- 500 units in LYMA Getafe
- 100 units in Lepe with Contenur
- 100 units in LIPASAM Sevilla with Rototank
- 100 units in UTE Lugo
- 170 units in Collado Villalba with Valoriza
- 50 units in Pontareas
- 50 units in Ribeira

WASTE MANAGEMENT PLATFORM



Collection and Rewards Management Module -> **PAYT**

Pay-As-You-Throw is a municipal waste pricing system based on the **polluter pays** principle, according to which citizens pay according to the amount of waste they produce

WASTE MANAGEMENT PLATFORM

Functions

-Gestión de servicios:

- Rutas dinámicas
- Gestión de residuos
- Gestión de residuos
- Gestión de tareas
- Gestión de contratos
- Módulo de facturación
- Catálogos L.E.R.
- Sistema de información geográfica (GIF)
- Integración con sistemas ERP y CRM externos
- Integración directa con "arcGIS" y "Google Maps"

• Gestión de recursos humanos:

- Gestión de empleados
- Gestión de conductores
- Formación de equipos y gestión de turnos

• Gestión de equipamientos:

- Gestión de contenedores (almacenamiento, movimientos, entregas y limpieza)
- Gestión de barredoras y limpieza
- Gestión de combustible

• Informes:

- Volúmenes recogidos
- Rutas (ejecutadas/previstas)
- Incidencias
- Horarios de trabajo
- Stocks de contenedores
- Puntos de Recogida
- Servicios realizados
- Ocupación de la flota
- Consumo de combustible
- Operaciones diarias
- Operación de KPI's

• Operaciones de los camiones:

- Localización de camiones en tiempo real
- Situación del camión (en movimiento/parado)
- Velocidad instantánea, media y máxima
- Distancia recorrida (total y parcial)
- Dirección
- Informes de Eficiencia (kilos recogidos / km recorridos)
- Niveles de CO2 de cada recogida
- Índices de ocupación
- Programación de recogidas
- Rutas previstas y rutas reales

• Consola del camión y botones del panel de informes:

- Residuos y limpieza diarios
- Contenedores sucios, dañados, bloqueados o destruidos
- Tipo de recogida no diferenciada o selectiva
- Reprogramación automática

Hardware necesario:

- Consola de camión (específico de industria o dispositivo Android)
- Botonera para registrar incidencias
- Equipamento GPS
- Lector Can bus



Available modules:

- Módulo PAYT
- Módulo Gestão de Mantenimiento
- Módulo de Gestión de Optimización de Rutas Premium
- Módulo Business Intelligence
- Módulo Gestión de Servicios
- Módulo Gestión de Pedidos
- Módulo de Gestión de contenedores (RFID)
- Módulo de sensores de llenado en contenedores
- Módulo de accesos condicionados en contenedores
- Módulo de sistemas de pesaje
- Aplicación móvil Bee2Waste Ciudadano
- Aplicación móvil Bee2Waste Servicio Operacional
- Power BI

Design of the **Fair Rate Model**

PAYT Sense™

Leveraging RecySmart data and AI to predict waste generation, identify behavioral patterns and enable fair, accurate and transparent PAYT systems while improving collection operations across municipalities.

DOMESTIC RATE (Smart Bins)

- Data generated by citizen
- Data generated by horeca
- Total population
- Verticality of the city
- Density of inhabits / Km2
- Number and type of horeca
- Socioeconomic profile

➔ **PAYT Sense™** ➔

AI

**CLUSTER
A**

**Fixed Fee
(x%)**

Fixed amount depending
on the number of
residents, water
consumption, m², etc.

**CLUSTER
B**

**Variable fee
(x%)**

Contributions

**CLUSTER
C**

**Collection
growth**

**CLUSTER
D**

**Optimization
collectoin**

Proceeds



Compliance with new **legislation**



Increased **recycling rates**



Waste management **cost savings**



Cross-platform **connectivity**



Increased **environmental awareness** and **improved** recycling habits



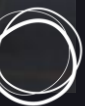
Fight against **littering**



Communication with the citizen



Aligned with the **SDGs**





Smart Waste Collection

Waste monitoring

Remote control of containers and data-driven waste collection

- Real-time container filling sensor
- Detailed container inventory, digital interactive map, sensor configuration

Fill sensors allow us to:

- Remote Container Monitoring
- Prevents container overflow
- Plan data-driven waste collection
- Tracking citizens' recycling habits
- Verification of waste collection thanks to built-in RFID
- Accelerometer to check type of emptying: Side loading, bilateral loading, etc



The Solution includes **Smart Sensors**, **Smart Waste Management System** for operators, and **Citizen App** for citizens.

Case Study

MADRID: Implementation of 11,100 sensors

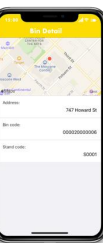
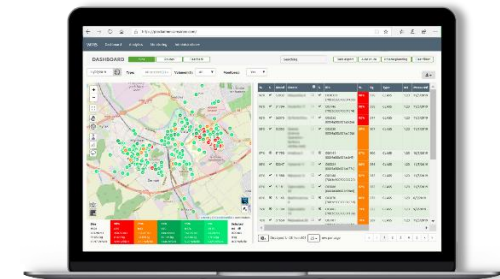
Candam with VALORIZA SERVICIOS MEDIOAMBIENTALES SA of SACYR, ACCIONA and Ingesan OHLA will help the Madrid City Council to improve the efficiency of the waste collection service by installing 11,100 filling sensors and Sensoneo's powerful Smart WasteManagement platform to achieve Optimized Dynamic Routes.

The implementation will be carried out in two batches distributed as follows:

- **Lot 1: Implementation of 7,100 sensors**
- **Lot 2: Implementation to reach 11,100 sensors**

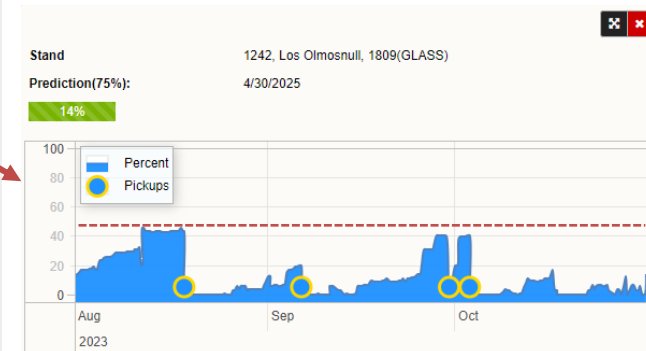
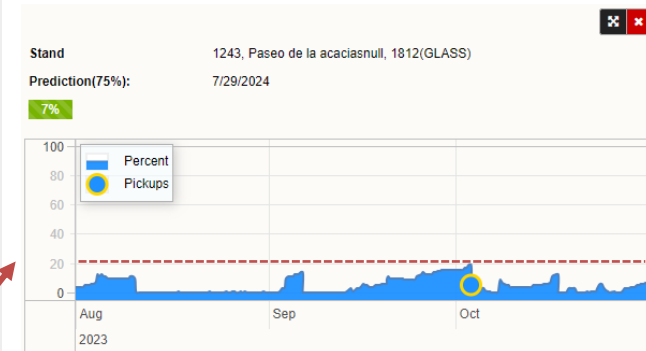
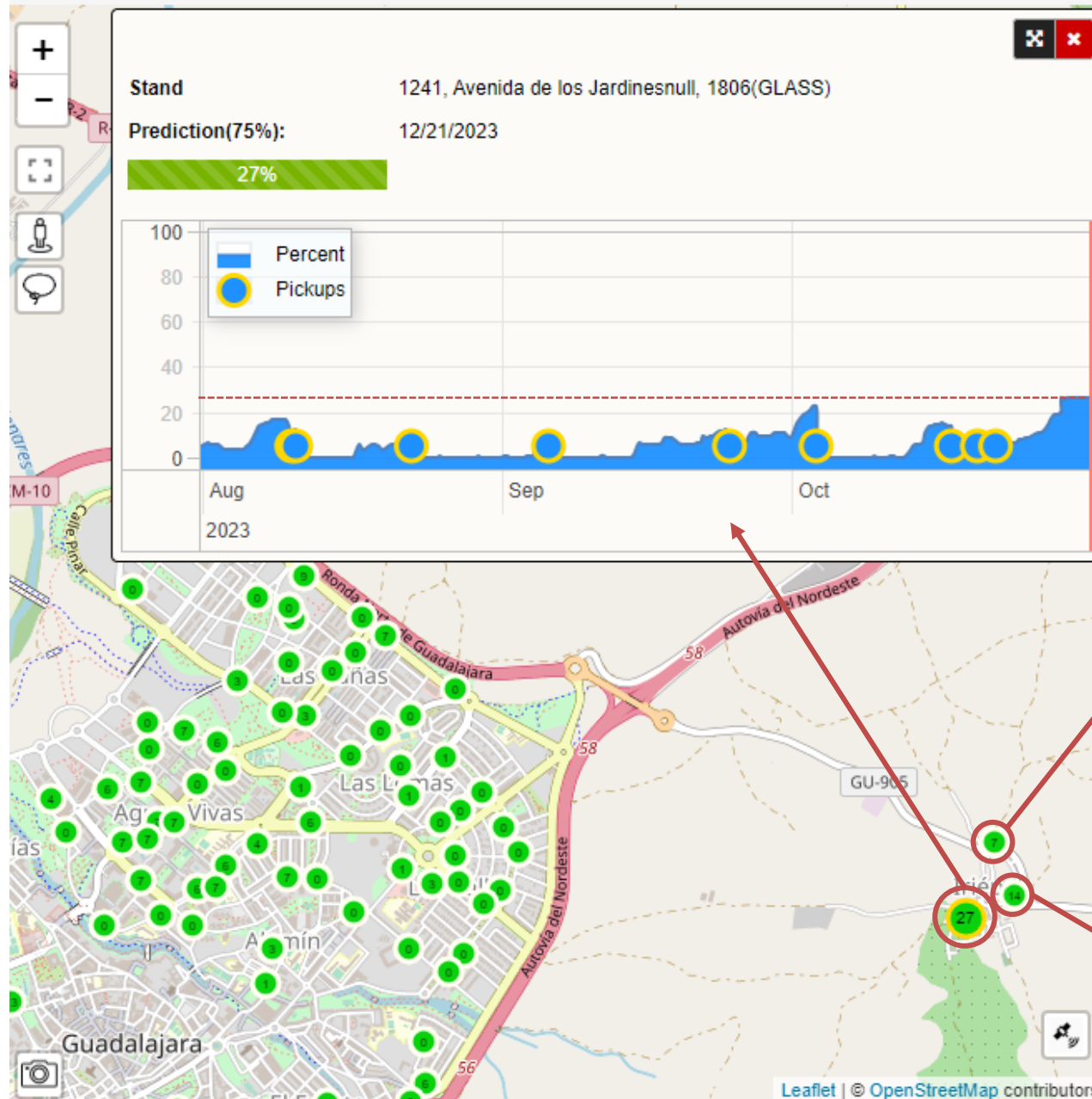
It is the largest implementation in Europe so far.

[Link to the news](#)



GUADALAJARA

Insights

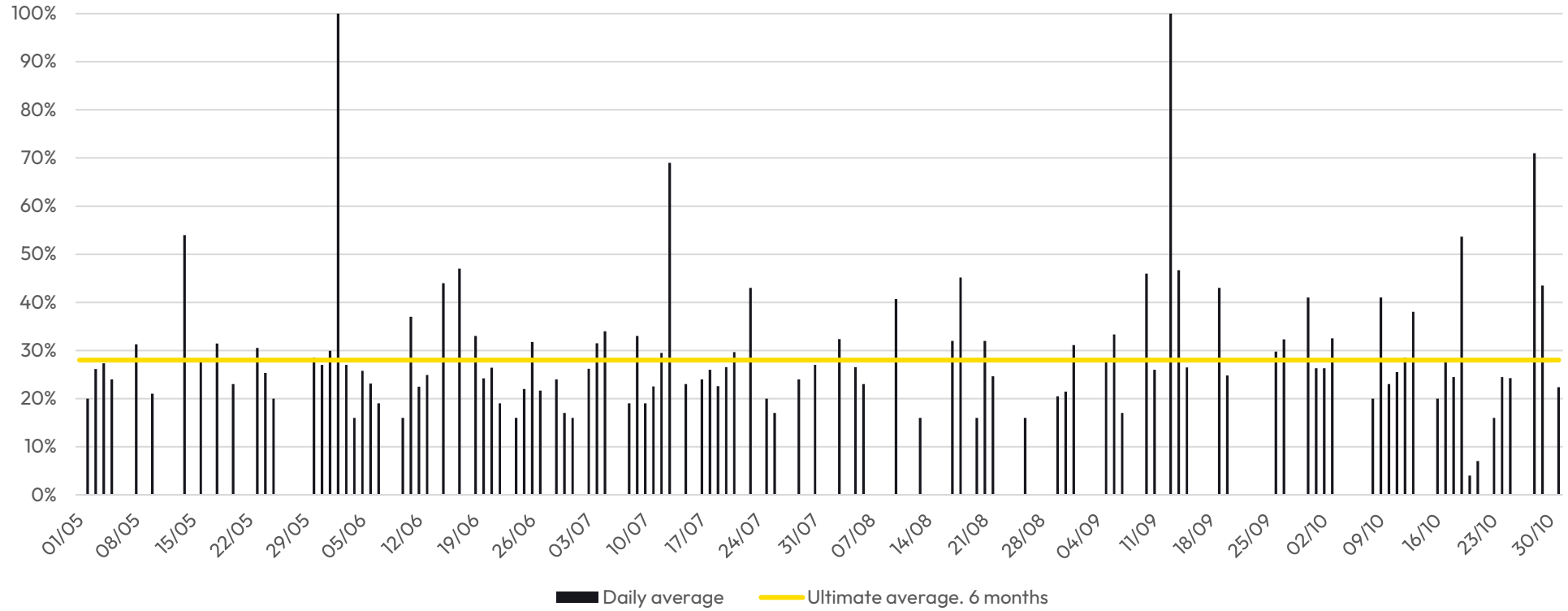


((SENSONEO))

GUADALAJARA

Insights

Average fill levels when collecting Glass



748 pick-ups
6 months

0% < Fill Level < 25% - 395 (53%)

25% < Fill Level < 50% - 300 (40%)

50% < Fill Level < 75% - 32 (4%)

75% < Fill Level < 100% - 21 (3%)



Computer vision

Current challenges in waste recycling

SAFETY

Hazardous materials pose risks to workers.



CONTAMINATION

Non-recyclable materials mixed with recyclables



COSTE

Inefficiencies lead to higher operating costs



EFFICIENCY

Manual sorting is time-consuming and error-prone



COMPLIANCE

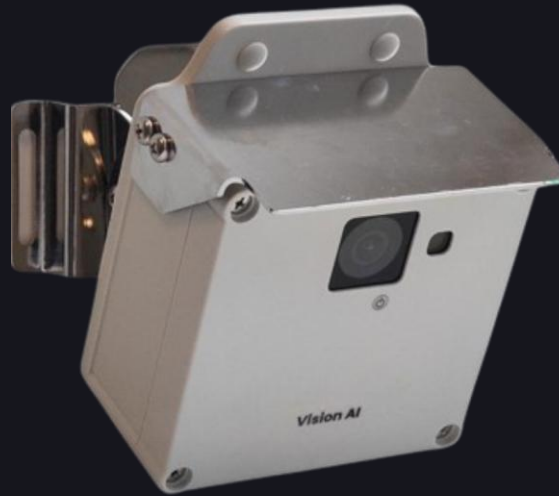
Comply with regulatory standards

Candam Vision AI Solution

Transforming waste management through advanced artificial intelligence

Higher purity:

- Up to 99% purity in recycled materials.
- Higher quality results.



Environmental impact:

- **40% reduction** in waste in landfills.
- Support sustainability initiatives.



Cost savings:

- **30% reduction** in sorting costs.
- Lower elimination rates.

Operational efficiency:

Safety:

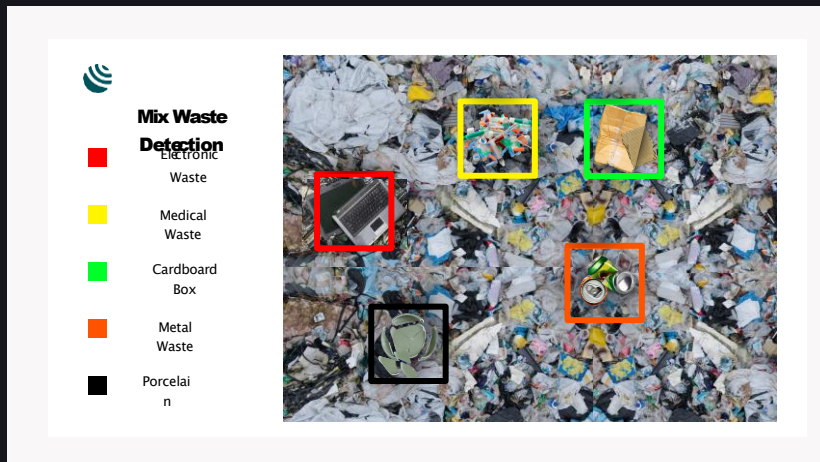
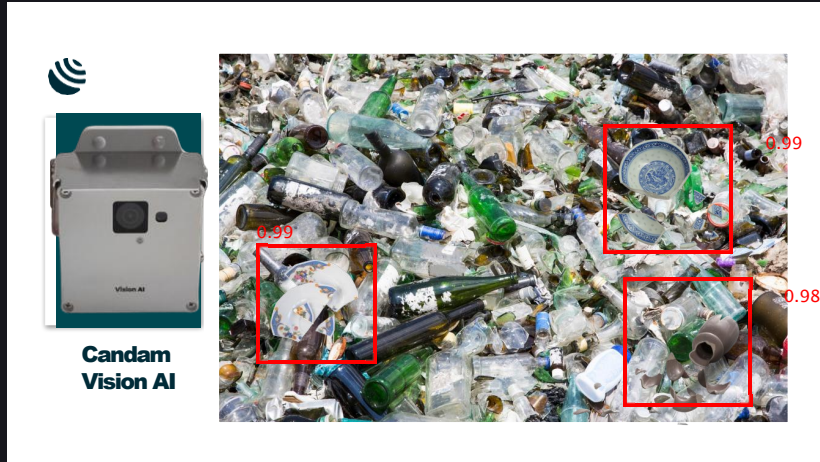
- **50% faster** processing times.
- Reduction of manual work.

Compliance:

- Ensures regulatory compliance.
- Improved reporting for audits.



Successful use cases



1. Fill level in containers

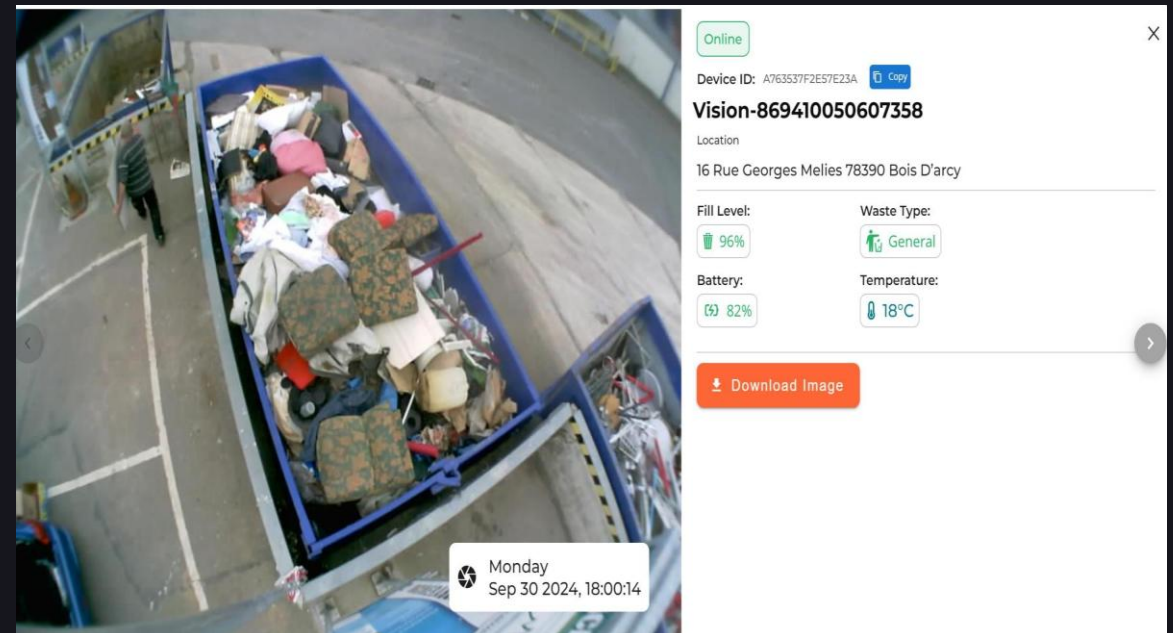
PROBLEM: Collecting large containers from the waste sorting centre is hugely expensive. Companies want to move to on-demand collection of these containers, which are sometimes full on one side and empty on the other.

SOLUTION

- **AI detection:** converts the image into fill level and allows companies to select the exact full containers that need to be picked up.

PROCEEDS

- **Reduced picking costs:** allows you to select only properly filled containers for picking, thus reducing picking costs and potentially operating costs by around 30-40%.



2. CSP Contaminants in Glass Waste

PROBLEM: CSP elements in glass waste reduce the quality of recycling.

SOLUTION

- **Real-time detection:** Identifies CSP contaminants immediately.
- **Automatic alerts:** notifies staff for immediate removal.

PROCEEDS

- **Higher quality glass:** Higher purity of recycled glass.
- **Reduced costs:** Less manual sorting required.
- **Compliance:** Meets regulatory standards for glass recycling



3. Plastic in food waste

PROBLEM: Plastic pollution in organic waste affects the quality of compost.

SOLUTION

- **AI identification:** differentiates plastic from organic materials.
- **Seamless integration:** Works with existing sorting systems.

PROCEEDS

- **Improved compost quality:** ensures the purity of compostable waste.
- **Regulatory compliance:** Complies with the latest EU regulations.
- **Environmental protection:** reduces plastic pollution.





From sound to insight- **recycling the future**

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