TRANSFORMATIVE ACTION

"Improving the efficiency of the waste collection service through the optimisation of the technological project RFID"

TIANA CITY COUNCIL, SPAIN

Agendas Adressed

Climate change

Pathways followed

The Socio-Economic Transformation

- ☐ Capitalise on local economy and production
- ☐ Create and close local value chains
- ☐ Apply innovative financing approaches
- ☐ implement sustainable procurement principles
- ☑ Pursue a shift towards a circular economy

The Technological Transformation

- ☑ Wisely select and apply smart technologies
- ☑ Accelerate sustainability and innovation through public procurement
- ☐ Guarantee equal access to information & digital services
- ☐ Support open data standards
- ☐ Prepare policies for socio-cultural changes due to innovation

SUMMARY

Tiana's municipality in order to improve the efficiency of the door-to-door waste collection system and to work with more reliable data, has implanted a new collection system based in the RFID technology.

This transformative action has been launched by the municipality of Tiana and apart from improve the efficiency of the door-to-door waste collection system, aim to reduce the greenhouse effects emissions associated with the management of municipal waste, as more kgs of waste we collect, less C02 emissions will be emitted.

CONTEXT

Tiana's commitment to preventive waste management goes back to 2000 when it was the first municipality in Catalonia to implement the door-to-door collection of organic waste and the residual waste fraction. This led to a drastic change in municipal waste management.

Some problems associated with the model implemented appeared after some years:

- Saturation and misuse of the emergency areas.
- Increased improper fractions collected in container.
- Misuse of community container and multifamily container and difficulty to track participation and incidents.
- Manual control of citizen participation with nocturnal monitoring by the municipal technician.
- Manual control of the incident, which involve a very long time resolution.
- Bad image of the street at the time of the contribution, since there was standardization system contribution.

In 2013 a survey carried out among the 12% of Tiana's population, determined that 72% of the citizens appreciated the introduction of a tax associated to waste generation. Three actions were raised:

1. Linking the contribution of all Households, including multifamily blocks.

2. Homogenization of the contribution system.

3. Implementing technologies to automate monitoring of incidents and encourage participation.

IN ACTION

The new model of waste collection implies:

- To provide citizens with waste bins of 20 liters for organic fraction and not usable fraction
- To add TAGs to bins linked to the address (will not work with personal data).
- To read all bins collected via RFID.
- Automation of the issue tracking on board button linked to the reading of bins.
- To monitor of households who make regular use of the system door to door involves minimizing waste escapes to the emergency areas and street containers.
- Incident detection and rapid action.
- To monitor the efficiency of the collection service.
- To improve the public image, especially the non-use fraction.
- To implement a tax associated to waste generation

The aim is to increase the participation of citizens in the collection of the organic fraction and the general waste.

A communication campaign was launched on 29th March 2014 and ended on 27th May.

First of all, Tiana's municipality mailed information to all households. An information point was established with a team of three environmental educators and a coordinator that delivered the kit and gave the proper information to users about the new model of containers and associate the data users with TAG.

Moreover, a door-to-door information was done to those citizens who hadn't gone to the information point. For those who weren't at home, we mailed them and directed them to the information point.

The main goal of the campaign was to deliver the kit to 100% of households in Tiana.

Using the technology in the organic waste bins, the city council of Tiana can work more efficiently and with more reliable data.

The technology implemented is:

1)TAG RFID UHF

Issuer liabilities with unique code is detected by the reader reading distance.
• You can schedule delivery and assign a code identifying the waste bins and the user.
• Work with UHF (865.6 / 928.6 MHz)

2) DEVICES RECEIVERS on board

Antenna high frequency (UHF) via Bluetooth connection with device management or system on board.
· System multi-reading unlimited high frequency UHF Reading distance of up to 5 m and moving up to a speed of 300 km / h.
· Allows entry the incidences associated with GAD.

3) Data analysis. MANAGEMENT SOFTWARE

- Export data in multiple formats.
- Export data in GIS.
- Automated and customized reports often required day, monthly, etc.

The organic waste bins are taken by the neighbours from their kitchen to the street. They have integrated a TAC that is associated with each home. This TAC is read by the trucks that transport the waste bins through a RFID antenna. It is a high frequency antenna and if they are some incidences with the waste bins, as the garbage it is not collected or removed correctly, it can be reported and be marked by the workers.

These organic waste bins are also equipped with an anti-animal system.

RESULTS

The main results of this transformative action are:

- Greater participation of residents in the door to door collection, in terms of organic fraction as the non use waste.

-Increased the number of homes participating in the door to door collection.

-Improving the image of the public zone.

-Decreased presence of abandoned bags at public zones.

-Reducing the number of waste deposited in the emergency areas, especially bags of non use waste.

In 2015, the municipality of Tiana collected 700.280 Kg of organic waste with the door-to-door waste collection system that represents a 16% of the total waste collected.

If we analyze the evolution of the amount of organic waste collected among the years 2013-2014-2015, we observe that 2015 is the year with more kg collected. Besides, the biggest difference in the amount of kg collected was from 2013 to 2014, with an increase of 55 tones.

We can summarize that the implementation of the RFID technology since 2014 have had really positive results in the amount of kg of organic waste collected.

IMPACT

In order to assess the impact of the objectives mentioned in the summary, we have developed several indicators:

1–Percentage of municipal waste collected destined to recovery and recycling treatments.
(To measure our general goal of reducing the greenhouse effect emissions in the municipality of Tiana associated with the management of municipal waste)

To measure our specific goal of improving the efficiency of the municipal waste collect service, we have developed three different indicators:

- Percentage of traceability of the door-to-door collection process.
- Participation index of the door-to-door selective collection service.
- Number of incidences in the collection service (abandonment of bags on the streets, overflow in emergency areas)

In order to measure the expected results, we will use the following indicators:

- Number of vehicles in the collection fleet equipped with the reading system of RFID Technology.
- Percentage of households using new containers equipped with a chip for door-to-door collection.
- Evolution of the quantity of waste collected for organic waste and general waste.
- Percentage of inappropriate waste in the organic and general waste fractions.
- Evolution of the number of incidences on the street due to the system waste collection.

CHALLENGES AND LESSONS LEARNED

The main challenges identified:

- To decrease the Co2 production in Tiana’s municipality.

- To improve the taxation system for the waste collection.
- That citizen becomes more responsible in the management of the waste that they generate.
- Use the big data information to better address the awareness campaigns about waste reduction.

Some lessons learned:

- The need to implement a system to hold the bins in order that they don’t move because of the weather conditions.
- To properly analyse all the information collected with the RFID system we need to increase the resources for the information management.