PlastiCircle: *Improvement of the plastic packaging waste chain from a circular economy approach*

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PlastiCircle Deliverable

D6.1: Pilot planning

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Abstract

This deliverable describes the general structure of the pilots and the specific plans for each pilot city.

Partners

1. ITENE: INSTITUTO TECNOLÓGICO DEL EMBALAJE, TRANSPORTE Y LOGÍSTICA
2. SINTEF: STIFTELSEN SINTEF
3. Picvisa: PICVISA MACHINE VISION SYSTEMS SL
4. AXION: AXION RECYCLING
5. CRF: CENTRO RICERCHE FIAT
6. UTRECH: GEMEENTE UTRECHT
7. Las Naves: FUNDACION DE LA COMUNITAT VALENCIANA PARA LA PROMOCION ESTRATEGICA EL DESARROLLO Y LA INNOVACION URBANA
8. ALBA: PRIMARIA MUNICIPIULUI ALBA IULIA
9. MOV: MESTNA OBCINA VELENJE
10. SAV: SOCIEDAD ANONIMA AGRICULTORES DE LAVEGA DE VALENCIA
11. Possibly the new waste manager, Alba Iulia
12. INTERVAL: INDUSTRIAS TERMOPLÁSTICAS VALENCIANAS
13. ARMACELL: ARMACELL Benelux S.C.S.
14. DERBIGUM: DERBIGUM N.V.
15. PROPLAST: CONSORZIO PER LA PROMOZIONE DELLA CULTURA PLASTICA PROPLAST
16. HAHN: HAHN PLASTICS Ltd.
17. ECOEMBES: ECOEMBALAJES ESPAÑA S.A.
18. KIMbcn: FUNDACIÓ KNOWLEDGE INNOVATION MARKET BARCELONA
19. PLAST-EU: PLASTICSEUROPE
20. ICLEI: ICLEI EUROPASEKRETARIAT GMBH

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Publishable summary

PlastiCircle aims to improve the circular economy of plastics by developing a holistic process to reintroduce household packaging in the plastics value chain. This will be achieved by innovation in the four stages associated with treatment of plastic packaging waste: collection, transport, sorting and recycling.

To achieve this, local citizens will be involved from the start in the pilot cities. Filling-level sensors will be tested and installed in waste containers. The sensors communicate with the transport software and routes will be optimized.

Collection and transport pilot trials will be carried out in three municipalities (Valencia, Alba Iulia and Utrecht), allowing the preparation of post-consumer materials for use in subsequent processes of sorting and recycling.

In the Figure, we sketch roles and activities in the project.

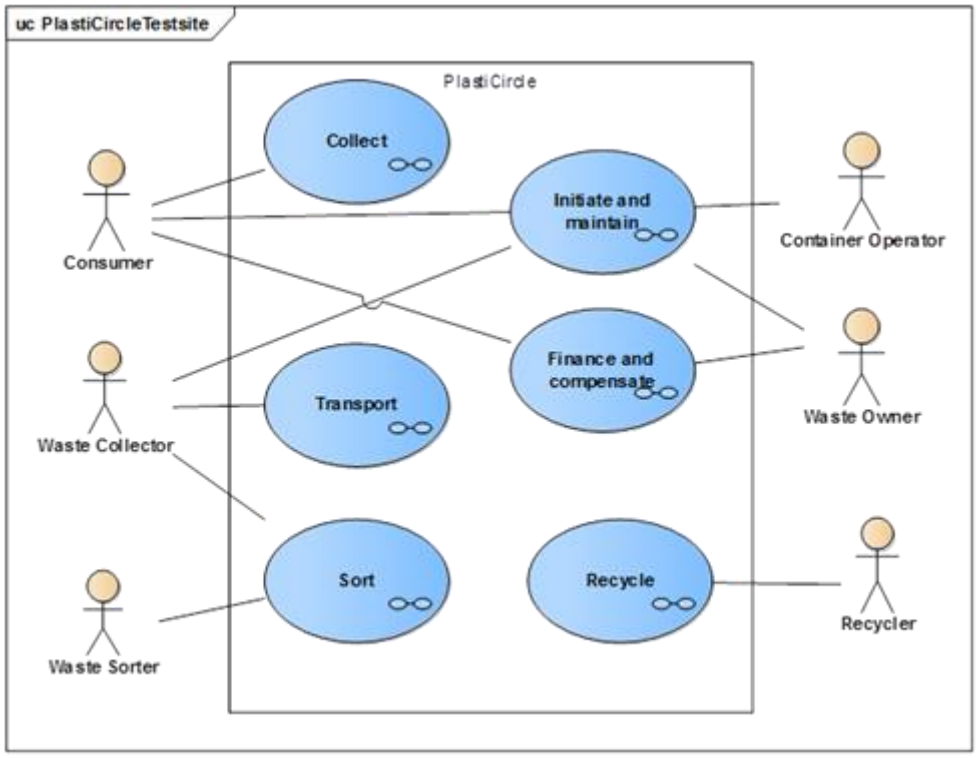

Figure Roles and activities in PlastiCircle

1. Introduction

The PlastiCircle project aims to develop additional end markets for recycled polymers derived from post-consumer household packaging waste. To achieve this, required technologies are developed in separate work packages: WP2 – collection, WP3 – transport, WP4 – sorting, WP5 – recycling.

WP6 is focused on integrating and validating the results from these four work packages with a view to achieve the following objectives:

[O6.1] Assure seamlessly integration of PlastiCircle Modules from WP2 to WP5

[O6.2] Assure the achievement of results on collection, transport, sorting and recycling

[O6.2] Test project developments of WP2 and WP3 in Valencia, Alba Iulia, and Utrecht

[O6.4] Demonstrate replicability of the test results in other cities after the project

Table 1 PlastiCircle WP6 partners

Partner	Role
SINTEF	WP leader
ITENE	Results from WP2 and WP3
Picvisa	Sorting
Axion	Sorting, waste characterization
Las Naves	Leader Valencia pilot
Utrecht	Pilot city
Alba Iulia	Pilot city
Velenje	Observer
SAV	Results from WP2 and WP3
ECOEMBES	Results analysis
Proplast	Recycling constraints
KIMbcn	Observer
PlasticsEurope	Observer
ICLEI Euro	Communication

In a first step, results coming from WP2 and WP3 must be compiled and examined (SINTEF) and related to requirements from the municipalities and the local situation. Each city – Valencia (Las Naves), Alba Iulia, Utrecht – will have defined together with their waste managers (SAV, POLARIS) the following information:

1) localization of the pilot (district),

2) involved actors (municipality staff, citizens, transport companies, and sorting facilities), with roles and responsibilities
3) time plan for the pilot: communication, technical installations and testing, duration
4) starting conditions. Characterization protocol for the waste – KPI's
5) technical requirements to be considered for each pilot
6) communication to citizens. Communication channels, events and time line for actions.
7) planning of logistics with transport and implementation of technical material and transport software
8) pilot blue-prints,
   - Present on a map/floor plans where the smart bins will be located
   - Provide CAD/visio drawings on any installations we will be carrying out in existing equipment e.g. bins, trucks and so on (or point to deliverables if available elsewhere)
   - Provide drawings/floorplans for any other installations of telecom/network equipment, computers in the premises of the local waste managers for each pilot
   - Map the Points of Interest e.g. truck starting point, sorting facilities, recovery facilities
   - Other drawings showing installations/interventions for the purpose of the pilots
9) phase in and phase out of equipment related to Valencia and, in a next step, the transition to Alba Iulia.

For Utrecht, the project is conducted in coordination with the city's own waste management project. They will not depend on the same technology from WP2 and WP3 on smart containers and transport optimization. This will allow to compare alternative solutions for technologies relevant for the PlastiCircle concept.

A sketch of three steps in pilot preparation – motivation, implementation and maintenance – and involved actors are described in Figure 1.

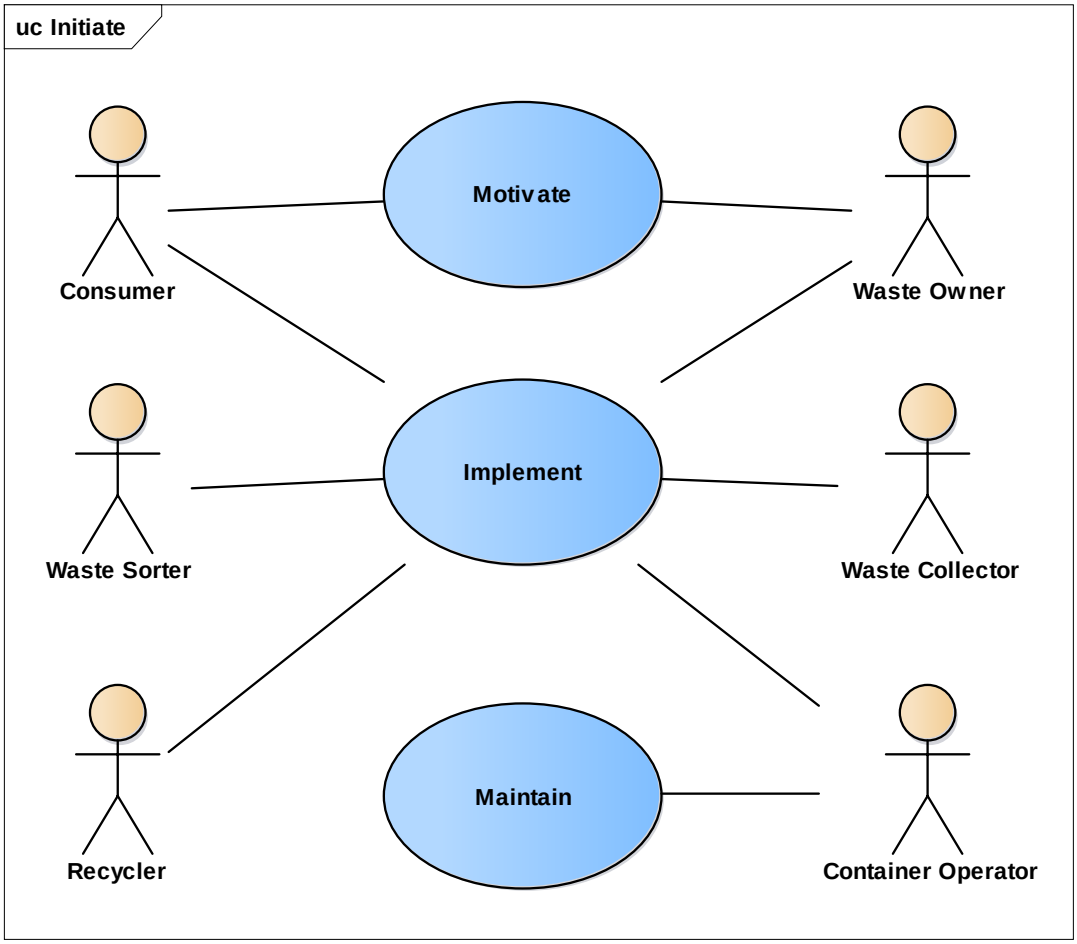

Figure 1 Three steps in pilot preparation

The collection activity can be visualized as in Figure 2 with the consumer interacting with the smart container and all being observed by the data manager.

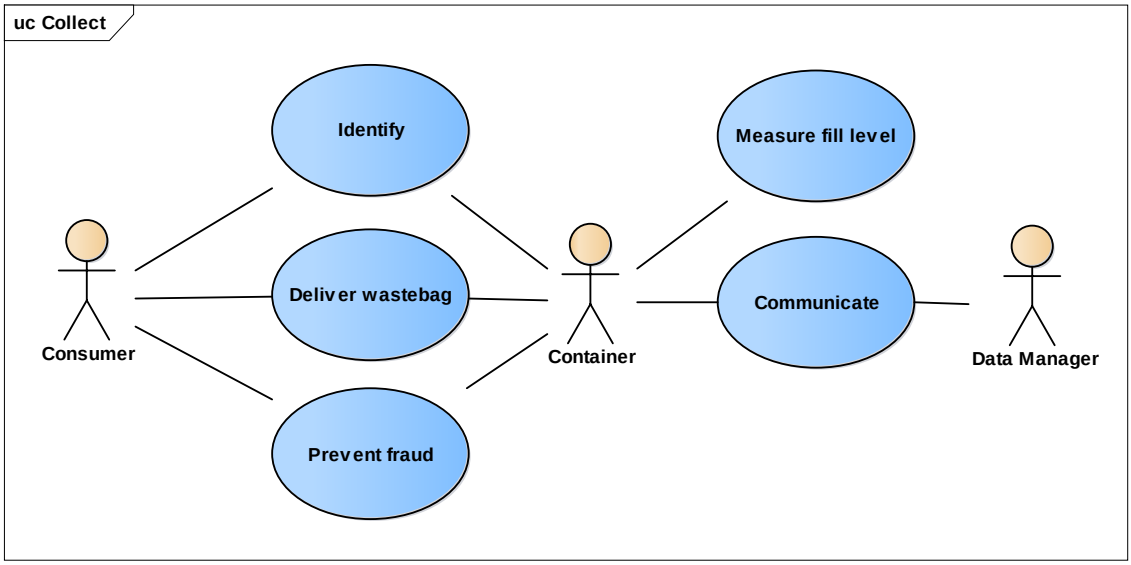

Figure 2 The collection activity sketched

The transport activity is sketched in Figure 3.

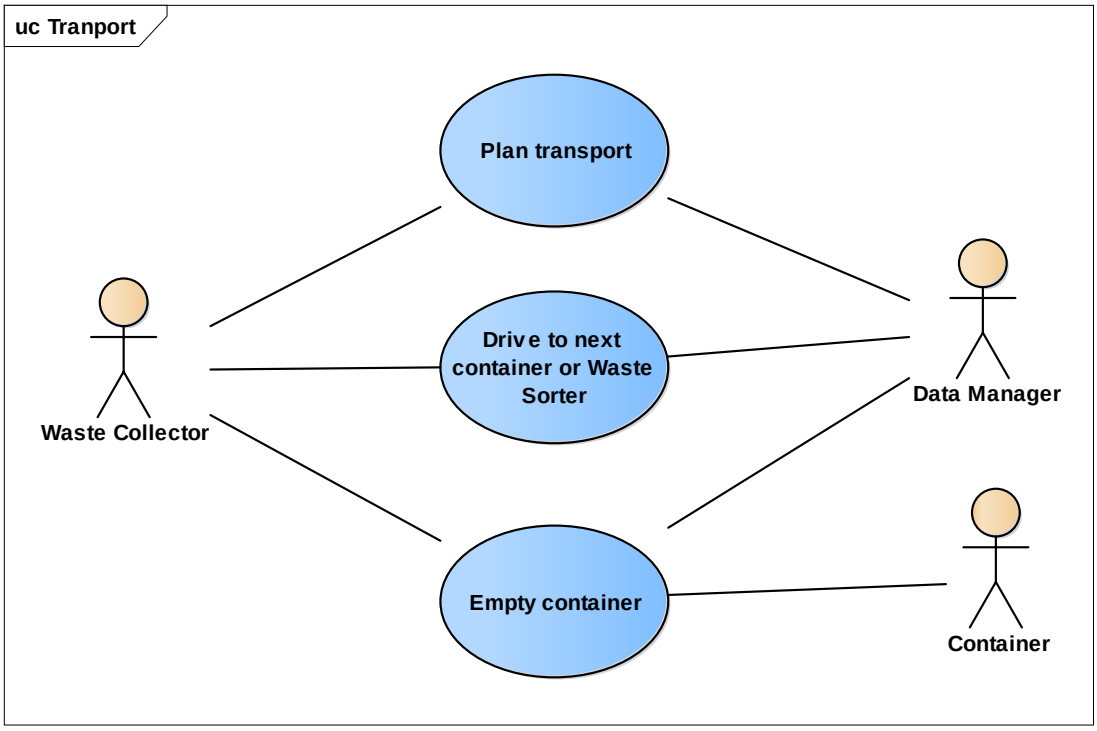

Figure 3 The transport activity sketched

For the pilots, the waste sorter will carry out waste characterization according to the protocol defined in the deliverable D3.5. Further, a determined amount of plastic waste will be selected after presorting for shipment to Picvisa.

2. Pilot structure

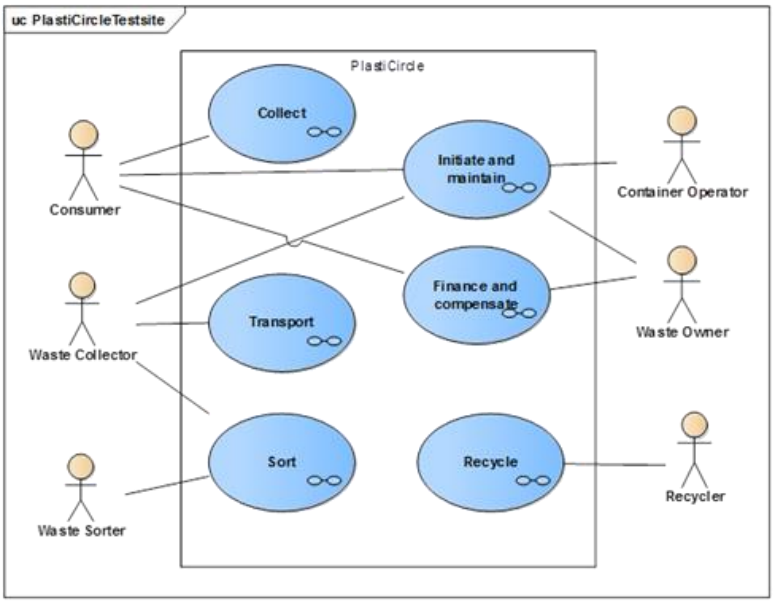

Figure 4 Actors and activities of a pilot

For each pilot, we first need to identify activities and involved actors including their roles. Schematically, the PlastiCircle project can be described as in Figure 4.

Details of the activities description in each pilot are given in Table 2.

Table 2 Pilot activities

Activity	Description	Involved
Location identification	Decide area of city for the pilot test	Municipality
Consumer information	Communication plan: Training, public events, web	Las Naves, Pilots, SAV, ITENE, SINTEF
Initiate	Recycling is initiated: Consumers and Waste collectors are informed Containers are placed, drivers are instructed, necessary software is installed.	Consumer, Waste Collector, Driver, Sorter, Recycler
Collect	Consumer brings plastic packaging waste to specialized container.	Consumer
Transport	Waste collector drives to selected yellow containers, collects plastic waste, and brings it to sorting facility.	Waste collector
Pre-sorting	Collected waste fraction from pilot identified for shipping to sorter. Decide on possible on-site testing	Pilots, SINTEF, Axion
Sort	Sorter receives waste from Waste Collector, processes it, and sorts in into valuable fractions.	Sorter
Recycle	Recycler receives sorted fractions from Sorter and uses them in production of various products. Analysis of fractions not used in WP5 products as feedback to pilots.	Recycler, Axion, SINTEF
Finance and compensate	Waste owner finances operation with fees from Consumer, sells sorted waste to Recycler, and compensates Consumer as agreed.	Consumer, Waste owner, Recycler

Different roles are identified related to the pilot activities as outlined in Table 3.

Table 3 Roles and actors in a PlastiCircle pilot

Roles		Actors	Comments, examples
Name	**Definition**		
Citizen	Responsible for delivering plastic waste to containers.	Any citizen, or organization	NN
Waste Owner	Responsible for financing and organizing of waste collection and sorting, and for communicating with Consumer.	Municipality	Cities of Valencia, Alba Iulia, Utrecht, Velenje
Waste Collector	Responsible for collection of waste from containers, and delivery to Sorter.	Waste owner or subcontractor	Polaris, SAV
Pre-sorter	Responsible for sorting 2-3 tons plastic waste from pilot	Waste owner or subcontractor	Utrecht, Alba Iulia, Valencia
Sorter	Responsible for sorting plastic waste into fractions of specific types of plastics.	Waste owner and Picvisa	Municipalities, Picvisa
Recycler	Responsible for using recycled, postconsumer plastic fractions as raw materials for new products.	Producer of pellets or goods based on recycled plastics.	Axion, CRF, Proplast, SINTEF, Interval, Armacell, Derbigum, Hahn
Material Tester	For testing of recycled materials.	Research institutions and test-labs	Axion, Proplast, SINTEF

To comply with the structures sketched above, for each pilot, responsible staff will be identified for each of the roles,

- Pilot manager
- Communication contact
- Waste owner
- Smart containers:

  - Contribution from ITENE, SAV
  - Local contact
- Transport:
  - available drivers and trucks
  - installation of software platform
- Waste characterization (according to D3.5)
- Pre-sorting (removing non-plastics)
- Shipment to Picvisa

For each pilot, the first step is to decide the actual location in the city. The involved personnel in all roles are then identified. Specific attention is paid to the communication to the citizens with identification of communication channels, public events and a time line for the planning and effectuation relative to the time period of the actual pilot.

To provide test material for the sorting at Picvisa, pre-sorting must be done where cans and cardboard packaging are removed from the packaging waste. The plastics waste then must be separated in films (2D) and bottles (3D) packaging. Only 2D waste smaller than A3 and bigger than 40-60 mm can be sorted by Picvisa at their pilot plant. Each pilot will send 2-3 tons of plastics packaging waste to Picvisa which one can expect to be up to 25 m^3 and thus will fit into one truck.

3. Pilot time-line

For the pilot time-line, we use the planned pilot start-up month as M0. Dates will be specified for each pilot.

Communication events will be planned prior to that as time is needed to organize the events and this must be dealt with on a local level.

M-2 Communication

- Decision on communication actions
- Preparation of communication material
- Organizing public events
- Staff training

M0 Installation of equipment

- Automatic label dispenser for user identification.
- Filling level sensor
- Transport software
- Test of each technical component and the integrated system

M0 Pilot start-up according to project plan

M0 KPI's defining starting conditions

M1-M3 Selection of material for Picvisa

M4-M6 Pilot finalization

- Public presentation of PlastiCircle
- Monitor and optimize technology platform

M6-M8 Data analyses and questionnaires to all involved parties

4. Communication plan

The communication plan for promoting participation in several pilots planned in the frame of the PlastiCircle European project has the focus in the support of a general vision of strategies and tools in all three cities engaged.

A key aspect for achieving citizen participation in all three cities consists in defining targets, tools and messages in order to maximize the scope and encourage citizen engagement with their participation by these three cities.

The PlastiCircle communication plan activities seek a wide range of public with a medium-high rate of engagement. Determining the audience profile will prove itself helpful when it comes to define the language to be used in the dissemination process, taking into account sociocultural factors and previous citizen participation experiences in this field in each district.

General goals of the **messages** to the audience in all three cities are:

<u>Principal messages</u>
- Inform on compensation system. The messages should explain the benefits from recycling plastic packaging to encourage participation.

<u>Secondary messages</u>
- Inform on the benefits for the environment of recycling plastic. Improving the air and the environment and preventing littering of the neighbourhood is an attractive point for foster the participation.

<u>General Messages</u>
- Explain that personal data are processed professionally.
- Promote knowledge in recycling in general inside the district.
- Increase citizen participation in the pilot.
- Communicating an image of a city becoming a more sustainable city with a

public administration concerned for the wellbeing of people and environment.

Tools of communication will be customized for every pilot, but we can define some tools that are frequently introduced as the most common ones.
The following are considered the most valuable tools:
- Local public transport
- Street furniture
- Social media
- Web support
- Flyers and other paper support
- Local marketing campaigns
- Advertisement management in classic media
- Institutional communication such as press releases
- Mailing
- Events, fora and conferences

In order to get to know the citizen participation flow and to test the state of communication actions, different mechanisms will be used to **monitor results** and the evolution of the strategy in each pilot.
Key points to monitor will be:
- Number of visits in web supports
- Number of followers and engagement in social media
- Number of people attending meetings organized such as events or conferences
- Number of people participating in surveys and polls
- Number of questions and requests received through email or on the phone
- Number of people registered and number participating in the project

The complete, present version of the communication plan is found in the Appendix.

Installation

Each waste container is equipped with a filling level sensor and, apart from in Utrecht, an automatic label dispenser, which dispenses a label once the user has been identified. For Valencia and Alba Iulia, this will be effectuated by SAV and ITENE.

Table 4 Technical components for pilots

Component	Comment	Notes
Containers	Varies between pilots	Pilot city
Sensors	TST sensor	Material from Spain
Label dispenser	Communicates by LoRa to IoT platform via a gateway	Material from Spain
Transport software	Communicates with IoT platform	SAV, ITENE, SINTEF

5. Characterization and presorting

Presorting will include waste characterization according to the protocol defined in D3.5. A waste characterization team will be instructed accordingly. An individual macroscopic, manual characterization will be carried out for each waste bag. Basically, it will consist of an identification of the different types and amounts of waste present. This will be summed up in a control sheet as shown in Table 5.

Table 5 Example of sampling control sheet

Bag identification	Nº ITEMS	COMMENTS	%	SCORE
TOTAL	18		100	-
NOT PACKAGING WASTE (UNWANTED MATERIAL)	5	One spoon: to civic amenity One orange peel: to brown (organic container) Two batteries: to civic amenity o special container for batteries One cardboard box: to the cardboard container	28	
NO-EMPTY PACKAGING	1		6	
STACKED PACKAGING	5		28	
TOTAL NUMBER OF COMPACTABLE BOTTLES	2			
NO-COMPACTED BOTTLES	1		50	
			TOTAL	

	To be filled by the waste characterization team
	To be filled by ITENE

In the last preparation of the pilots, the bag filling level (required to be at least 60 %) was added as a parameter to the table above.

Characterization will be carried out before the pilot, to define starting conditions, and during the pilot to prove feed-back to the users.

Further handling of the collected waste includes resorting of a decided amount of plastic waste that will be shipped to Picvisa for sorting according to plastic types.
In a next step, these fractions will be further characterized.

A manual sort will be done by Axion, into the following categories:

- PET bottles (clear)

- PET bottles (coloured)
- PET trays (clear)
- PET trays (coloured)
- HDPE bottles (natural)
- HDPE bottles (coloured)
- PP bottles
- PP pots, tubs and trays
- PE films
- PP films
- Multilayer films
- Other

Since sorting process is quite complex and it needs experienced people – we will characterized samples of approx. 50 kg.

6. KPI's

Data are available referring to waste collection and recycling as found in the DoA of the project. During project execution we will focus on a more limited set of parameters.

In each pilot, the KPI's will be derived from

- the characterization protocol presented in D3.5

- the results that will come from Picvisa after sorting the pre-sorted materials

- the characterization of sorted fractions by Axion.

- transport: fuel, km's

A detailed list if KPI's is given under the description of the Valencia pilot.

7. Individual pilots

At this stage, the planning of the first pilot in Valencia is complete with final testing and acquiring information about the starting conditions as next steps. Most elements for the other pilots are in place and the establishment of the complete set of details will be effectuated closer to pilot start-up in the individual cities.

Valencia

For the pilot to be executed between M23, i.e. April 2019, and M30, Valencia has decided to establish the San Marcelino area as 'pilot neighbourhood'. The distribution of the containers around the pilot area has been identified. During the visit to the pilot district the project participants got a demonstration of container handling.

The first communication events have been organized demonstrating a positive interest in the project among the citizens.

1) Localization is the San Marcelino district in Valencia marked with a blue spot on the map below.

Figure 5 Location of pilot district San Marcelino in Valencia

2) Involved actors

Table 6 Roles in the pilot and responsible person in Valencia

Role	Responsible
➢ Pilot manager	Julián Torralba <julian.torralba@lasnaves.com>
➢ Communication contact	Mª José Perales <mj.perales@lasnaves.com> <joseafuentes@lasnaves.com>
➢ Waste owner	Ángela Perdones | SAV <aperdones@sav.es>
➢ Smart containers: o Contact from ITENE/SAV o Local contact	Miguel Angel Alférez <miguelangel.alferez@itene.com> Ángela Perdones | SAV <aperdones@sav.es> Julián Torralba <julian.torralba@lasnaves.com>
➢ Transport: o Overview of available trucks o installation of software platform	Mireia Calvo <Mireia.calvo@itene.com> Ángela Perdones | SAV <aperdones@sav.es>
➢ Waste characterization (according to D3.5)	Laura Blasco <laura.blasco@itene.com> Ana Moya <ana.moya@itene.com>
➢ Presorting (removing non-plastics)	Ángela Perdones | <aperdones@sav.es>
➢ Shipment to Picvisa	Luis Seguí <lsegui@picvisa.com> Ángela Perdones | SAV <aperdones@sav.es>

3) Time plan

- Communication: To spread the project to the citizens and encourage citizen participation in the pilot, Las Naves has designed a communication and dissemination strategy that includes the main messages to disseminate, the objectives to achieve, the

public to reach, the tools and the monitoring steps for the three pilots. Likewise, this document also presents a planning of the planned public activities for the next months.

  - February 2019: Pre-Campaign actions
  - April-May 2019: Engagement actions
  - May 2019: Deployment of the pilot and official presentation.
  - May-September 2019: Monitoring period
  - September 2019: End of the pilot and closing event.

- Installation: the smart devices with the user identification module, label dispenser and communication module were ready on 15th March. From 15th March to 31th March, empty boxes were installed in each of the packaging waste containers of the San Marcelino neighbourhood. The label dispenser with communication module was modified after initial testing to improve signal range and robustness. Final installation of the boxes with all modules together with the filling level sensors will be installed from 1st April to 20thMay.
- Training: two learning activities are planned, one focus on the trucks communication system and route optimization addressed to waste truck drivers, the second one will be based on the characterisation protocol addressed to drivers and operators.
  - Truck communication system and route optimization training will take place on April. The training will show to the drivers how to interact with the transport system, how they should follow the routes and how the route is defined based on the container filling level.
  - Characterisation protocol training will take place on April. The training will explain how to proceed in the collection of the packaging waste bags and how to apply the characterization protocol and the compensation system to each bag during all the pilot activity.
- Initial conditions: characterization protocol

A global characterisation will be done to measure the quality of the waste from the yellow container in San Marcelino. In the characterisation, the factors that will be taken into account are the quantities of:

- PET bottles (clear)
- PET bottles (coloured)
- PET trays (clear)
- PET trays (coloured)
- HDPE bottles (natural)
- HDPE bottles (coloured)
- PP bottles
- PP pots, tubs and trays

- PE films
- PP films
- Multilayer films
- Other
- Unwanted material
- Compacted bottles
- Stacked packaging
- None empty packaging

This characterisation will be done 3 times before the pilot starts, each time one bag from each container of San Marcelino will be selected and characterised so at the end a total number of 84 bags will be characterised (minimum to be representative of the neighbourhood should be 35):

- 11th January
- End of February
- End of March

- Pre-sorted, pre-pilot materials to Picvisa – April 2019
- Pre-sorted, late-pilot materials to Picvisa – July 2019
- Questionnaires to involved parties - November 2019

  Questionnaires have been prepared for the social assessment. These questionnaires will be merged with the other questionnaires to minimize questions to citizens.

4) Starting conditions. Characterization protocol for the waste – KPI's

During the pilot random characterizations will be done using the citizen's identified bags. Workers from SAV will fill the following table with the information from each bag:

Table 7 Template for waste characterization protocol

	Nº ITEMS	COMMENTS	%	SCORE
TOTAL			100	-
NOT PACKAGING WASTE (UNWANTED MATERIAL)				
NO-EMPTY PACKAGING				
STACKED PACKAGING				
TOTAL NUMBER OF COMPACTABLE BOTTLES				
COMPACTED BOTTLES				
BAG FILLING LEVEL< 60%	YES/NO			
			TOTAL	

	To be filled by the waste characterization team
	To be filled by ITENE

The selection of the bags will be done according to the following table. For instance, in the first week 5 bags from the first 8 container will be taken. This table can be recalculated according to the final number of containers and weeks.

Table 8 Plan for selection of waste bags from different containers

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
C1	5			2	5			2	5			2
C2	5			2	5			2	5			2
C3	5			2	5			2	5			2
C4	5			2	5			2	5			2
C5	5			2	5			2	5			2
C6	5			2	5			2	5			2
C7	5			2	5			2	5			2
C8	5			2	5			2	5			2
C9		5		2		5		2		5		2
C10		5		2		5		2		5		2
C11		5		2		5		2		5		2
C12		5		2		5		2		5		2
C13		5		2		5		2		5		2
C14		5		2		5		2		5		2
C15		5		2		5		2		5		2
C16		5		2		5		2		5		2
C17		5		2		5		2		5		2
C18			5	2			5	2			5	2
C19			5	2			5	2			5	2
C20			5	2			5	2			5	2
C21			5	2			5	2			5	2
C22			5	2			5	2			5	2
C23			5	2			5	2			5	2
C24			5	2			5	2			5	2
C25			5	2			5	2			5	2

For the environmental evaluation of our project, the selected environmental key point indicators (KPI) are described below:

- **K1: Distance travelled**: the existing distance from a starting point (A) to a point of arrival (B) of the planned route and the units will be kilometres (km).
- **K2: Time travelled:** it is the time since the vehicle leaves the waste manager depot, until it returns to the facilities once the route is completed. The units are minutes (min) or hours (h).
- **K3: Collections performed:** number of containers collected during the route. The unit will be the total number of containers served.
- ***K4: Relative CO_2e emission***
  K4.1 = CO_2e/Tonne collected.
  K4.2 = CO_2e/ driven distance (km)
- ***K5: Performance***
  K5.1 = energy cost/ tonne collected
  K5.2 = (personal & energy) cost / tonne collected
  K5.3 = % inappropriate materials RSU containers.

- **K6: Fuel consumption:** amount of fuel consumed by the vehicle to carry out the programmed route. The units are litres of diesel (l).

KPIs FOR CITIZENS' CHARACTERISATION: The results will be based on characterisation performed to the citizens' waste bags, the main objective is to improve the citizens characterisation taking place at home.

- **K7: % Not packaging waste**: Global percentage of unwanted material found in the characterised bags, before and after the pilot.
- **K8: % No empty packaging**: Global percentage of number of packaging that still contain product inside
- **K9: % stacked packaging**: Global percentage of heaped packaging (one packaging inside of another)
- **K10: % compacted bottles**: Percentage of the number of bottles compacted.
- **K11**: **% collection rate**: fraction of plastics packaging waste collected. Global characterization of packaging waste from San Marcelino will be subcontracted by SAV.
- **K12: Compaction level in container** – kg/m^3
- **K13: Filling level in containers**. Today's estimate compared to measurements from filling level sensors.

Table 9 KPI's related to the Valencia pilot

KPI	Before pilot	During pilot	After pilot
K1: Distance travelled			
K2: Time travelled			
K3: Collection performed			
K4.1: CO2e/Tonne collected			
K4.2: CO2e/driven distance			
K5.1 = energy cost/ tonne collected			
K5.2 = (personal & energy) cost/tonne collected			
K5.3 = % inappropriate materials RSU containers			
K6: Fuel consumption			
K7: % Not packaging waste			
K8: % No empty packaging			
K9: % Stacked packaging			
K10: % Compacted bottles			
K11: % collected			
K12: Compaction - kg/m3			
K13: Filling level			

Results related to WP4 – sorting – as described in 3) above, will also be presented

with pre-pilot and pilot values.

Considering the goal of collecting ≥ 87 % of packaging, due to lack of complete statistics for the pilot neighbourhood, one will focus on changes during the pilot period of the content of the content of the yellow container.

5) Technical equipment and requirements for the pilot

Users will receive NFC cards for identification at the container. The NFC reader will be included in the same module as the label dispenser. In this way, the dispensed label will be associated with the user ID, time etc. The module sends the information by LoRa, Low Power Wide Area Network, to a gateway installed in the pilot neighbourhood – Figure 6 and Figure 7. The installation of gateway required permission from the city.

Figure 6 LoRa components installed in the container module

Figure 7 Communication from the label dispenser unit

TSwasTe has been chosen as filling-level sensor. This is a stand-alone device supporting different network technologies: GPRS, Sigfox, WiFi or ZigBee. Data from the filling level sensors will be sent to the cloud server by GPRS. This was tested successfully in April in Valencia. One of the same sensors was also tested and concluded to work in Alba Iulia with the Spanish SIM card. Data received in the cloud served is stored in a PostgreSQL database to be visualized in the IoT

platform.

6) Communication to citizens

For citizens, their involvement in the project is sketched in Figure 8 and consists of:

- registration and receiving an NFC card,
- using the NFC card at the label dispenser,
- attaching the label to the bag,
- its content being characterized and,
- the compensation according to the results of the characterization.

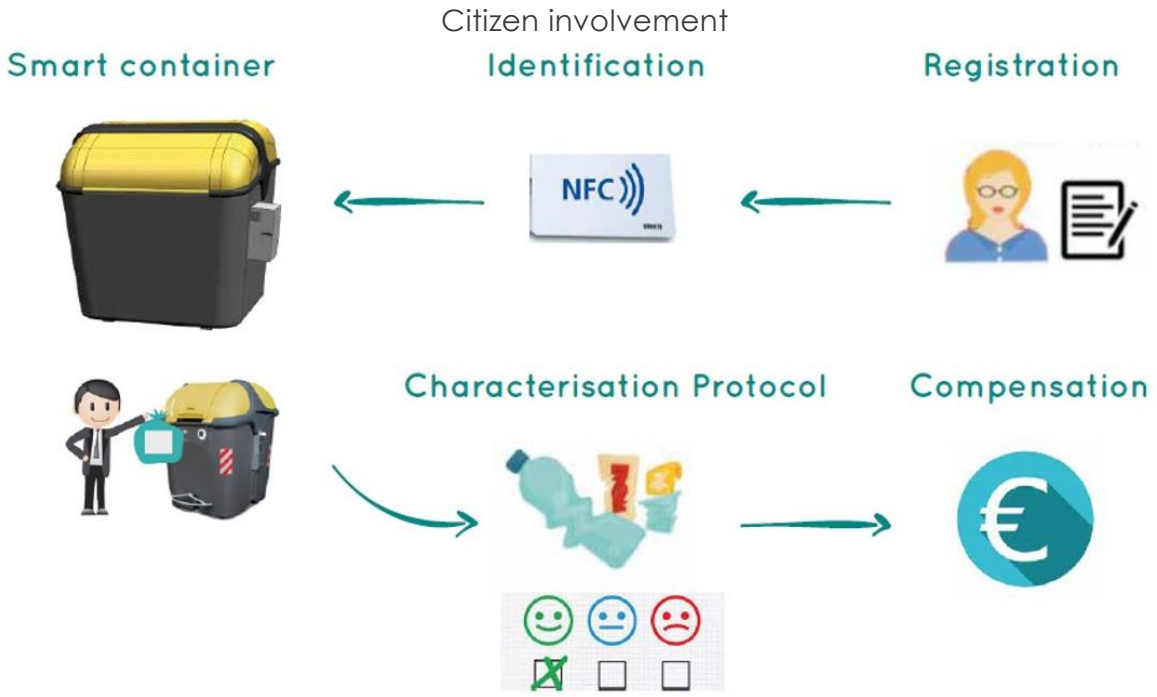

Figure 8 Citizen involvement in PlastiCircle

The citizens will be informed through several communication events:

- Events: Las Naves has designed 8 activities to develop from the month of February to the month of September. In this way, there are dissemination activities to do, before and after the beginning of the pilot (scheduled in the first week of May), and engagement activities throughout the development of all the pilot.

  Specifically, Las Naves arranges the following activities:

  - 4 activities for adults (dissemination and engagement)
  - 1 children's workshop,
  - 1 activity for teenagers,

- 2 events for journalist and citizenship in general
- 1 technical profile event for entities of the sector.

In addition to these specific activities, Las Naves add two more local actions.

A fixed action is planned to inform citizens on the same day of the week during a period of two hours in the same place (probably the neighbourhood association) and, the second one, an intensive action of two weeks previously to the official presentation of the project for engagement of citizens.

Specific events scheduled are:

April 3rd: Training of monitors.

April 11th: Workshop at Colegio Público of San Marcelino.

April 17th: Exhibition at Centro de Salud San Marcelino.

April 24th: Exhibition at Avenida Pio XI.

May 17th: Official presentation, Plaza de la Iglesia.

May 18th: PlastiCircle and sports, Club Baloncesto Petraher.

May 27th: Visit from the PlastiCircle partners, Plaza de la Iglesia.

June 5th: Workshop with the neighbourhood association. Parque de la Rambleta.

September 14th: Official closing of pilot with distribution of the main prizes, Plaza de la Iglesia.

- Communication material: In summary, Las Naves is going to evolve a local communication campaign with corporate material to distribute in the neighbourhood and in the mass media. Specific:
  - Flyers to distribute among the neighbours and district entities
  - A3 sized posters to distribute among associations of the neighbourhood and local markets.
  - Mupis (purchase spaces in the most popular streets).
  - Banners for communication campaigns (radio channel, local television and social networks as twitter or Facebook).
  - Corporate material or merchandising to deliver to the people who participate in the training and awareness actions and to reward people who participate in the pilot.
  - Furthermore, Las Naves is going to develop a web page. The purpose of this web page is to inform citizens and encourage the engagement - https://supermarcelina.com/

Compensation strategies have been designed to stimulate recycling and circular economy. Citizens will receive ecopoints as they actively participate in the demo action. From the beginning of the pilot there will be an available list of

gifts sorted by the amount of points that every user needs to have to obtain them.

During the duration of the campaign the participants can consult at any time how many points they have obtained and decide whether to redeem them for a gift or to keep gathering points to obtain more valuable gifts.

The types of gifts will be:

a. Objects and products of different category made of recycled material (preferably packaging): from office material to sport wear
b. Free passes related to public services: public transport, public sport centre, season pass in public theatres.
c. Discounts in public market.

The press release, describing the San Marcelino pilot is given in appendix A1. In appendix A2 we display the information leaflet describing the pilot.

7) Planning of logistics with transport and implementation of technical material and transport software.

The preliminary transport system includes the cloud platform, route optimization, characterization protocol and compensation procedure, traceability and driving guidance. It is planned to be finished at the beginning of March in order to test it in real conditions at the end of March, make possible changes during April and collect the defined KPIs before starting the pilot activity the 1st of May in San Marcelino (Valencia). For this reason, the cloud platform will be ready at the beginning of February to stablish the communication between the platform, the truck traceability system and the route optimization before March.

Table 10 Pilot activities and timing

Activity	Timing
Cloud platform, route optimization, traceability system working individually	March
Communication between all the system working	1st March
Test preliminary transport system	March
Preliminary transport system improvements	Beginning of April
KPIs initial measurement and training	April

Pilot start	15th of May

8) Pilot blue-prints - maps

- Figure 9 shows the positions of smart containers in San Marcelino

Figure 9 View of the San Marcelino neighbourhood showing the locations on the packaging waste containers

- CAD/visio drawings on any installations we will be carrying out in existing equipment e.g. bins, trucks and so on are presented in D2.2

  To make it more accessible to the final user, the smart device will be in the lateral part of the container. In the case of the container in the Valencia pilot, the disposition of the device will be like the one shown in the Figure 10.

Figure 10 CAD drawing of the packaging waste container in Valencia with the installed smart device and the actual container

Figure 11 Smart device which integrates the user identification module, label dispenser and communication module

The information sticker to be attached to the label dispenser in Figure 11 is shown in Appendix A3.

- Drawings for other installations of telecom/network equipment, computers in the premises of the local waste managers for the pilot.

  The smart devices will send the information by LoRa to a gateway installed in the San Marcelino neighbourhood. The data received in the gateway is transmitted by GPRS to the cloud server. Data from the filling level sensors are sent to the cloud server by GPRS. Data received in the cloud served is stored in a PostgreSQL database to be visualized in the IoT platform. Figure 12 shows three options for locating the gateway.

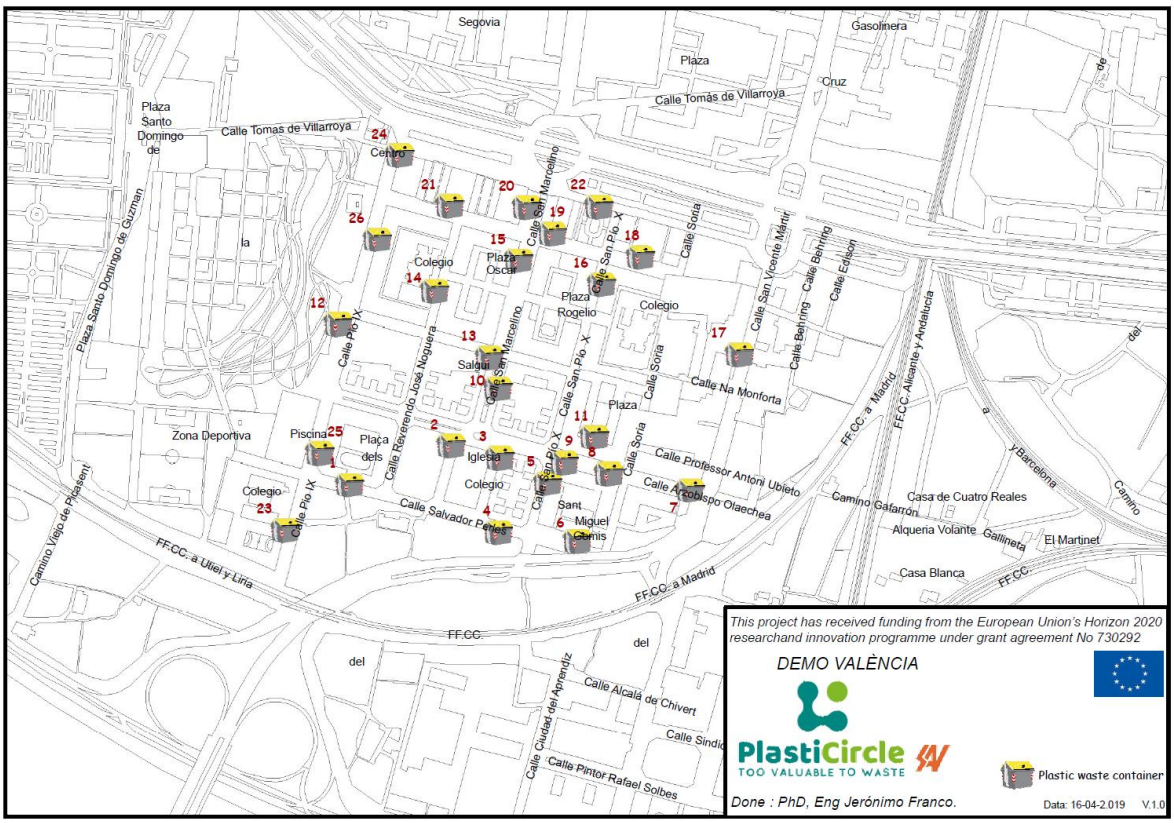

Figure 12 San Marcelino with possible locations of the gateway

- Map the Points of Interest e.g. truck starting point, shorting facilities, recovery facilities

  Trucks will start and finish the journeys in the SAV plant showed in the following map. Plastic material to be pre-sorted and to be sent to PICVISA for the sorting will be stored in the SAV facilities – Figure 13.

Figure 13 Image showing the San Marcelino neighbourhood with the location of the packaging waste containers and the SAV plant

- Other drawings showing installations/interventions for the purpose of the pilots

9) Phase in and phase of equipment

Phase out of equipment related to Valencia will, in a next step, be coordinated with the transition to Alba Iulia and installation there in due time before this pilot starts in M31.

Utrecht

PlastiCircle will be executed between M27, i.e. August 2019, and March 2020 in parallel with the city's own waste management project. Technical equipment as sensors will be the same in the internal project as in the part reporting to PlastiCircle.

During this pilot the following subjects will be tested:

- How can we challenge consumers to separate plastic waste form residual waste in a more effective (quantity and quality) way?
- Is it possible to close the loop from plastic waste to a product?
- What type of collection, regarding to quantity and quality, is preferable; centralized underground containers, door to door collection of mini-containers or civic amenities?
- Is it possible to predict the ideal moment of collection in case of centralized underground containers or civic amenities?
- How can we optimize the collection routes to save distances, the uses of fuel e.g.?

Pre-sorting will be subcontracted, and the Utrecht pilot will provide 2-3 tons of packaging to Picvisa both before and after the pilot.

During the pilot, Utrecht will make use of the door to door collection of mini-containers and of the underground containers with capacity 3-5 m^3. The pilot is planned to be executed within one of the 5 routes of the western part of the city for the door to door collection, and on the other hand, in an area of 2.000 households, which will suppose the use of approximately 40 underground containers.

<u>Distinction from Utrecht's internal project</u>

- funding of local project: There is no external funding of the local project.

- equipment used in each of the two projects: the same type of equipment will be used. Only equipment used in containers dedicated to PlastiCircle will be financed by the PlastiCircle

- Developments needed:
  - Separation of communication actions and material for the two projects: Separate handling is prepared.
  - Financing compensation of participants: Will be done by the city of Utrecht

- How results from PlastiCircle will be compared with local project: KPI's are defined for the two projects and these will be compared when they coincide.

- How to benchmark local results with PlastiCircle solution: Coincident KPI's will be used for benchmarking

1) Localization of the Utrecht pilot

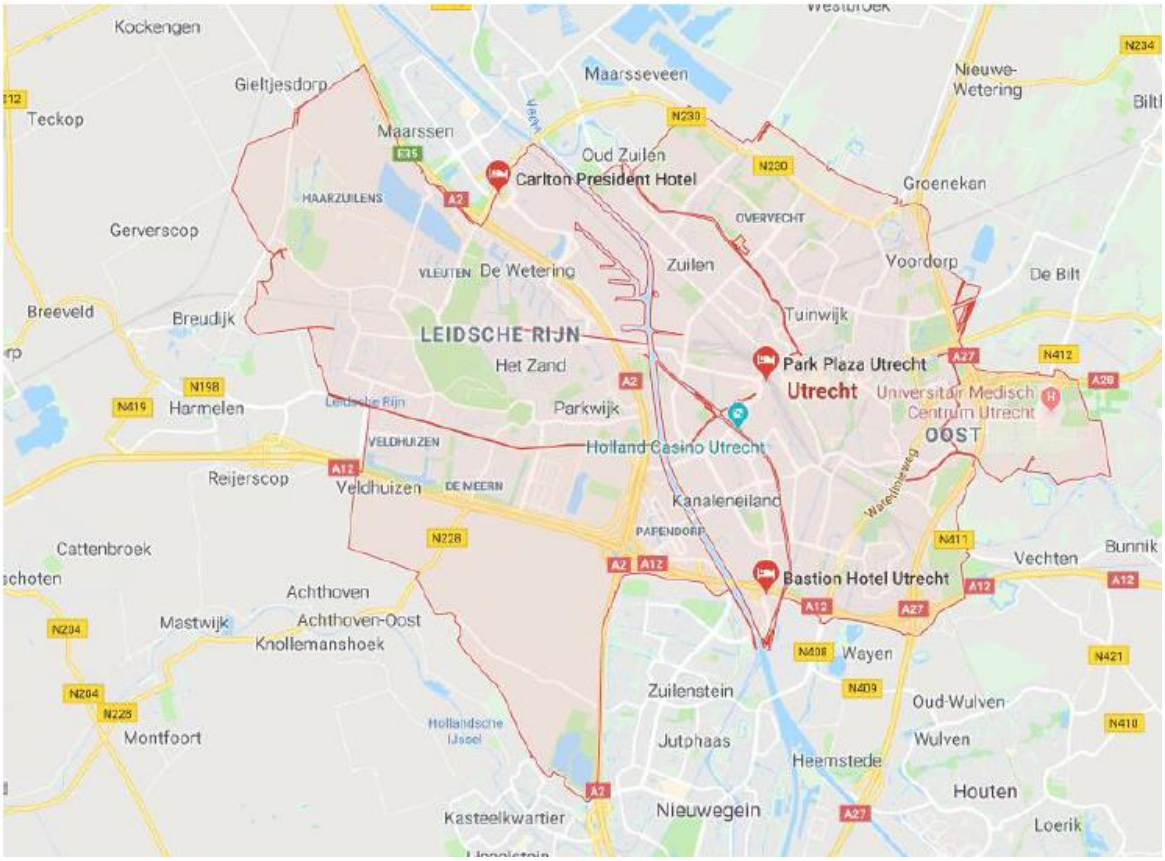

Figure 14 Map of pilot area in Utrecht

There are almost 200 underground containers for household packaging waste in Utrecht. These containers (capacity 3 to 5 m³) are widely distributed in the city. Approximately 1.000 tons per annum. Containers are emptied 1 to 7 times per week.

43 of the underground containers are in the pilot area – Figure 14. The costs of these sensors (€ 165 per sensor and € 2 for data communication) will be charged to the project.

From Utrecht, the pilot consists of 3 groups:
1. Main pilot area in the western part of the city (door to door collection of mini-containers)
2. Reference area in the western part of the city (door to door collection of mini-containers)
3. Reference area in the eastern part of the city (mechanically separation of plastics packaging after collection)

The communication will be focused on group 1; group 2 is used as reference group.

2) Involved actors

The chart in Figure 15 shows the overall organization of the pilot in Utrecht.

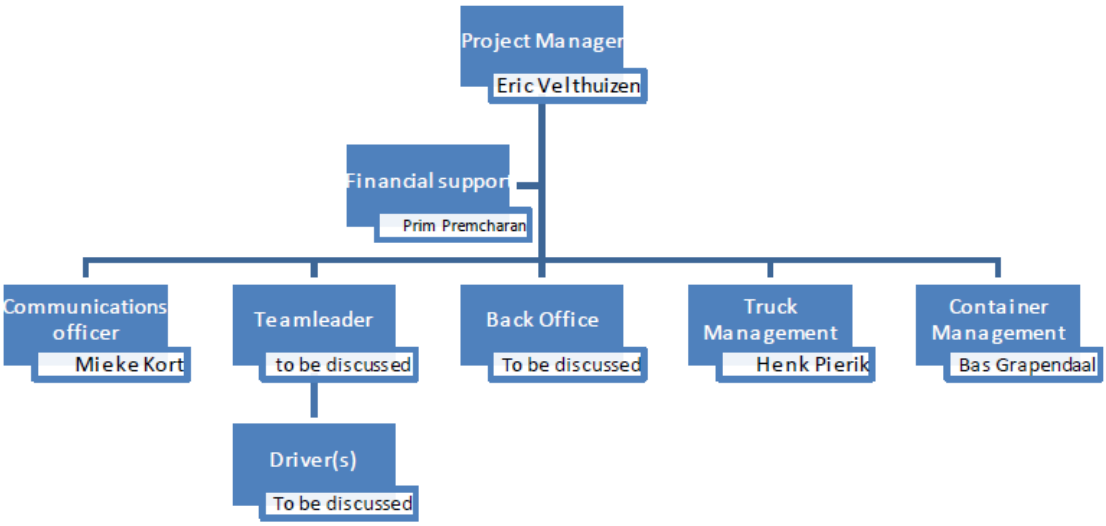

Figure 15 Organization of the Utrecht pilot

In addition, listed in *Table 11 Roles and responsible* will be decided.

Table 11 Roles and responsible

Role	**Actor**
➢ Smart containers: o Local contact	Already tested
➢ Presorting (removing nonplastics)	Subcontracted: a third party (NEDVANG) is legally responsible
➢ Waste characterization	According to D3.5
➢ Shipment to Picvisa	Being negotiated

3) Time plan

Table 12 presents the time plan for the Utrecht pilot.

Table 12 Timing of Utrecht activities

➢ **Period**	➢ **Description**
February 2019	Finalizing proposal
March 2019	Finalizing budget and implementing financial amendments
April 2019	Development of pilot groups (e.g. empirical, statistically)
May 2019	Development of method of analyses
May 2019	Determination of pilot areas
June 2019	Development of communication (e.g. feedback, brochures, website, reports)
July 2019	Deployment of staff, vehicles
September – December 2019	Period of pilot
September 2019	Collected and pre-sorted material to Picvisa
December 2019	Collected and pre-sorted material to Picvisa
December 2019-January 2020	Questionnaires to involved parties

4) Starting conditions. Characterization protocol for the waste – KPI's

Collection rates need to increase to 87%

5) Technical equipment and requirements for the pilot

Utrecht has already designed the smart collection of underground containers. All RDF containers are containing a sensor which measures the filling degree.

Anti-fraud measures are needed and will be designed and implemented during the preparation of the pilot. A further instruction by ITENE is needed.

Utrecht will not compensate each citizen in the pilot area who dumps waste in a container, underground or mini. Instead of that, the neighbourhood will be compensated in general by improving playgrounds or parks. If possible,

this will be done based on the collected plastics. These will be discussed with the local area manager and the communications officer.

6) Communication to citizens

Utrecht needs to design the communications towards citizens. This will be done this spring together with PlastiCircle's communication officer. Execution will start at the beginning of the pilot.

- Events
- Communication material

7) Planning of logistics with transport and implementation of technical material and transport software.

Utrecht already designed innovative / efficient transport and has started with implementing in October 8th, 2018. The software and the algorithms are supplied by an external company.

8) Pilot blue-prints - maps

Basically, Utrecht will point 2 areas as pilot areas a) and b).

a) Plastics packaging are collected door to door with the use of minicontainers
b) Plastics packaging are collected in underground containers.

The map in Figure 16 shows the position of the 43 smart underground containers in the pilot area

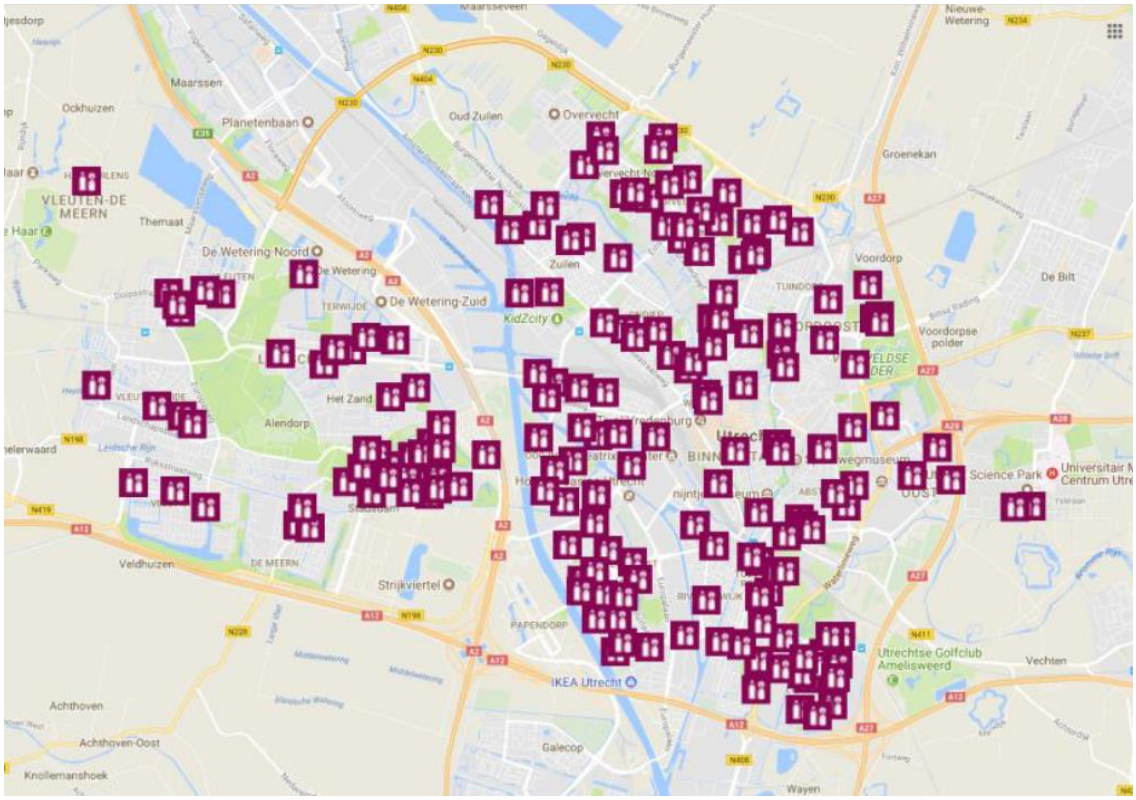

Figure 16 Positions of the smart underground containers

The map in Figure 17 shows area for door-to-door collection of mini-containers.

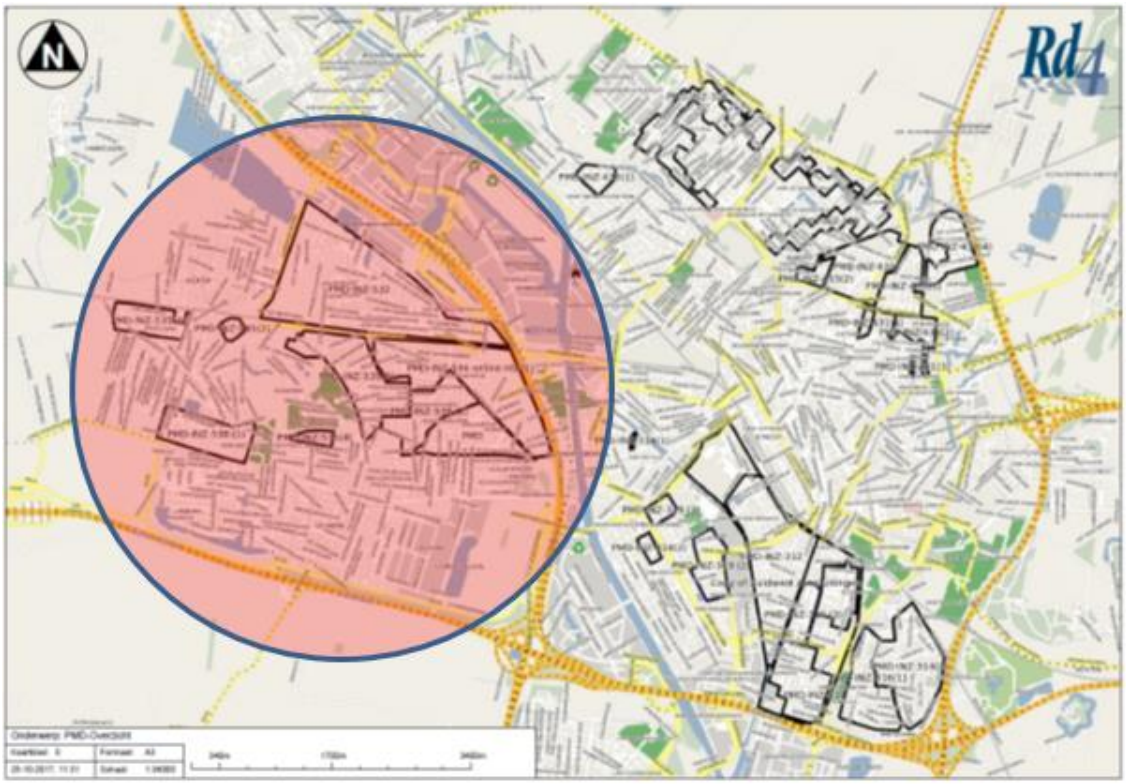

Figure 17 Area for door-to-door collection of mini-containers

- CAD/visio drawings on any installations we will carry out will be included.
- Drawings for any other installations of telecom/ network equipment, computers in the premises of the local waste managers for each pilot will be provided.
- Map of the Points of Interest e.g. truck starting point, sorting facilities, recovery facilities will follow.

9) Phase in and phase out of equipment

Equipment dedicated PlastiCircle in Utrecht will also serve for comparison with the local waste management project.

Alba Iulia

The Alba Iulia pilot will mainly be in 2020 starting M31, i.e. December 2019, till M38.

At this stage, general features of the pilot can be presented. To get the full picture, one must wait for a decision on the waste management which is on bid. It seems that a decision is possible that from beginning of autumn 2019 there will be another local waste management company (instead of Polaris). Tasks related to the local pilot will be discussed and then agreed at a later stage.

Metal and plastic Eurocontainers (1,1 m^3) on wheels are used for waste including plastics will be chosen. With a new waste manager involved, new containers of the same type will be installed. Often waste is mixed, requiring proper training for citizens before pilot phase for improving sorting.

As container lid is opened, a lateral sensor is required for level measurement. During operation, the containers washing procedure was also applied, requiring practically waterproof level sensors.

This procedure must be also considered in developing the container ID and other modules (like labelling and communication). Depending on other municipal projects, is possible that part of containers from the pilot area to be moved underground

For the transport, technical data on actual waste trucks (Iveco) and Farid were provided, as needed for route optimisation and driving behaviour applications.

Manual sorting is done today and will be used in the project. Materials are mingled, and PET and plastic bags are majority.

For Alba Iulia, the citizen's level of consciousness regarding the environment and waste collection and reuse is an important issue. This will be considered in the planning of communication actions.

With the main concern related to citizens behaviour, one will analyse ways to adapt a model used for changing citizens behaviour regarding mobility means of transport, MaxSumo (http://www.epomm.eu/index.php?id=2602) which complies a 7-step project development and evaluation. and we can include communication in this local plan.
Step 1: Define the scope of projects and set overall goals
Step 2: Define the target groups
Step 3: Define the services that will be provided by the project and the option(s) offered
Step 4: Review all assessment levels, chose what levels to monitor and define targets and indicators for the chosen assessment levels
Step 5: Define suitable methods for collecting data for the chosen assessment levels
Step 6: Monitor the chosen assessment levels
Step 7: Evaluate the project and explain observed changes

This behaviour change monitoring can be combined with indicators already defined for the evaluation of the PlastiCircle project.

1) Localization of the Alba Iulia pilot

The pilot is centred around the Vasile Goldis zone. The map in Figure 18 shows truck routes taken from the Polaris car fleet GPS software. The starting point is in the upper right corner and position of the waste containers as blue crosses.

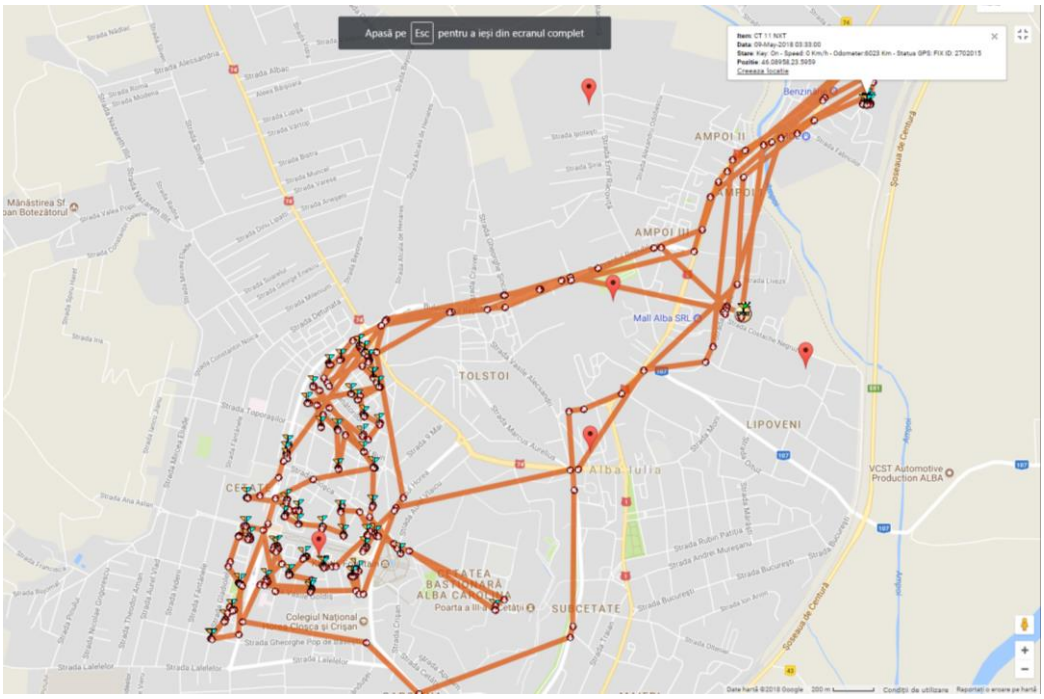

Figure 18 Pilot area and present truck routes

2) Involved actors

Table 13 Roles and persons in the Alba Iulia pilot

Role	**Responsible**
➢ Pilot manager	Valentin Voinica
➢ Communication contact	Valentin, Cristina
➢ Waste owner	Polaris (?)
➢ Smart containers: o Contact from ITENE/SAV o Local contact	Valentin Voinica
➢ Transport: o Overview of available trucks	Polaris (?) SAV

○ installation of software platform	
➢ Waste characterization (according to D3.5)	Polaris?
➢ Presorting (removing non-plastics)	Polaris (?)
➢ Shipment to Picvisa	Polaris (?)

3) Time plan

- Communication:
- Installation > SAV and Polaris or equivalent
- (Training: drivers, sorting, …) Polaris or equivalent
- Initial conditions: characterization protocol: Alba and Polaris or equivalent
- Pre-sorted, pre-pilot materials to Picvisa
- Pre-sorted, late-pilot materials to Picvisa
- Analyses
- Questionnaires to involved parties, citizens, administrators. Actors in transport, sorting. Announced on social media

4) Starting conditions. Characterization protocol for the waste – KPI's.

The KPI's presented for Valencia will be the basis for monitoring this pilot.

5) Technical equipment and requirements for the pilot

TST filling level sensors will be transferred from Valencia and installed with the assistance from SAV. Already a sensor has been successfully tested in Alba Iulia ensuring that the GPRS communication works with the Spanish SIM card.

6) Communication to citizens

Compared with the other pilots, Alba Iulia must put the accent on informing citizens on the benefits of the separate waste collection, and usage of containers.

A goal is targeted communication to the pilot district which is a quite small area of the city.

To reach as many citizens as possible for this pilot, one analyses using more offline communication efforts (leaflets, billboards, meetings, newspapers, questionnaires) and collaboration with apartments associations as critical. Online campaigns address a minority (young, using smartphones and social media) and must be sponsored for impact. Therefore, online methods will be used mainly for project promotion, impact on other citizens or evaluation.

A detailed communication plan will be developed in accordance with the general communication plan for the project covering:

- Events
- Communication material
- Press & Social media
- Meetings with administrators and citizens

7) Planning of logistics with transport, implementation and testing of technical material and transport software.

   This work will be coordinated with Valencia at the end of the pilot there.

8) Pilot blue-prints - maps

- The position of 43 smart containers in the pilot neighbourhood are shown in Figure 19 of the pilot district.

Figure 19 Pilot district with container positions

- CAD drawings on any installations we will be carrying out in existing equipment e.g. bins, trucks and so on are presented in D2.2 and the figure found in the description of the Valencia pilot. Figure 20 shows a type metallic container to mounted be employed in Alba Iulia with mounted label dispenser and filling level sensor. The image to the right, shows a plastic container from Alba Iulia with a mounted label dispenser.

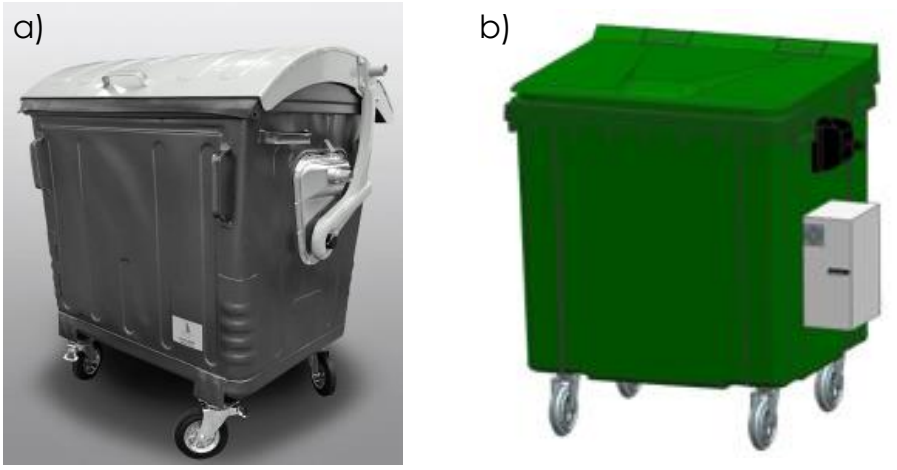

Figure 20 Actual container (a) and CAD drawing (b)

The containers will send signals to a dedicated receiver. It is possible to use GSM/3G networks, or a network dedicated to IoT like LoRA or Sigfox. In Alba Iulia, there are 4 GSM/3G networks and a LoRA network in the pilot phase. Documentation will contain communication methods from container to dispatch and from dispatch to trucks.

In Alba Iulia, where the container lid usually is open, ultrasonic sensors must be mounted on lateral side, and must be waterproof. The sensors will be tilted an angle to allow measuring the vertical filling level. This will be implemented using available mounting adaptors.

- Provide drawings / floorplans for any other installations of telecom/ network equipment, computers in the premises of the local waste managers for each pilot.

- Map the Points of Interest e.g. truck starting point, sorting facilities and recovery facilities. In the map of the pilot district, the starting point is where different routes converge on Livezii street. At his moment, waste is sent to the sorting and dump facility in Targu Jiu, but the goal is to have the local integrated waste facility in Galda functional before pilot start which was previously visited by the project.

9) Phase in and phase out of equipment

The transition of equipment from Valencia to Alba Iulia and the phase there in will be scheduled towards the end of the Valencia pilot and will be done in due time before pilot start in M31.

8. Conclusions

The work in WP6 is well on track. Details of the technologies to be implemented in the pilots are already documented in deliverable reports from WP2 and WP3. The first communication events have been organized in Valencia.

All technical components have been acquired and tested.

In Utrecht, that will run the pilot in parallel with the city's own waste management project, technologies on smart containers and transport software have been installed and tested. Special communication events for PlastiCircle are being planned and comparison between the local project and PlastiCircle is being prepared.

In Alba Iulia, due to the process with the waste management on bid, the final details of the pilot organization will be concluded during the autumn 2019. Technical equipment for the smart containers will be shipped from Valencia when that pilot has been finalized.

Alba Iulia is preparing a seven-step process for project development and evaluation by adapting a model used for changing citizens behaviour.

Appendices

A1. Communication strategy for implementing pilot projects in Valencia, Utrecht and Alba Iulia

1. Communication and dissemination strategy

The dissemination plan for promoting participation in several pilots planned in the frame of the PlastiCircle European project has the focus in the support of a general vision of strategies and tools in all three cities engaged that could be put in place so to disseminate the pilots in an appealing way for the population. It will at all times be conceived inside the communication and dissemination plan for the PlastiCircle project.

This theoretical frame, suitable for all three cities where the project will be developed - Valencia, Alba Iulia and Utrecht - has the goal of offering some guidelines to set the path to follow in order to grant this project as much citizen acceptance and participation as possible.

A transversal aspect in every point of this communication strategy consists in a citizen-focused approach that, in addition to benefiting from the project incentive, it will help for a better environment and to increase personal satisfaction when improving the neighbourhood.

Therefore, a key aspect for achieving citizen participation in all three cities consists in guaranteeing a proper management of general dissemination activities, by defining targets, tools and messages in order to maximize the scope and encourage citizen engagement with their participation by these three cities.

It is advisable to adapt this general frame locally to every pilot city, and to do so, communication managers of every city will be trusted to design and put in place more precise and specific local plans under the supervision of the leader of the communication work package.

For the purpose of achieving citizen participation in the different pilots, the document brings useful information on key messages, visual identity, and suggestions in order to implement dissemination and citizen participation tools, as well as monitoring.

Thanks to a proper communication management, the goal is to establish a citizen opinion in favour of the project, so they will back the innovation applied in order to

guarantee a correct development of the project, including replication of results of the latter in other cities.

This plan is an alive document, it evolves constantly as it starts at the beginning of the project and will evolve as it goes on.

During the early stages of the project, the strategy will concentrate in creating citizen awareness on the goals established by the project, with a special focus on the importance of recycling of plastics packaging.

Depending on the audience to be targeted, in each city and every neighbourhood, very specific actions will be developed and diversified by offering suitable messages and information according to the various audiences.

It is recommended that public communication activities targeting citizens should have at first a strong impulse in order to involve population. To do so, an interest for the link between plastic and environment should be awaken, as well as the feeling of belonging to the neighbourhood and to the city, or the willingness of becoming a direct transformation agent of the city.

Every PlastiCircle public and private entity play a key role in this challenge for implementing the communication strategy, as they set the basis in their environment, which makes people involvement easier.

Information stands in neighbourhoods will be a key as well, as they represent a tangible tool when it comes to engaging people in city transformations. For that purpose, every local communication manager, should provide all the materials they will be needing for their dissemination tasks.

More specifically, the project communication leader will be in charge of disseminating the strategy along with the guidelines and suggestions through the established channels to the rest of associates for its proper implementation.

2. Goals

The PlastiCircle communication and dissemination strategy has the goal of generating a favourable opinion among citizens concerning the project, what will maximize awareness and citizen engagement in this project.

These actions will help to increase citizen participation, so some citizen compensation strategies can be studied to stimulate recycling and circular economy.

Transversal goals of the communication plan for all three cities can be labelled as specific, main, general or secondary. It is important to highlight the fact that depending on the cultural specificities of each city and the recycling habits of every neighbourhood, these objectives are to be adjusted to fit the reality of every city.

We describe hereafter the big picture for the most important ones:

Specific
- Inform on the benefits for the environment of recycling plastic.
- Increase knowledge on circular economy.
- Increase citizen participation in the pilot.
- Inform about positive incentives the project offers to the participants.

General
- Increase awareness on how the institutions involved in this project are engaged for a positive transformation of the city.
- Boost the feeling of people of belonging to the neighbourhood, as well as their active role in its improvement.
- Show an image of a transforming city towards a more sustainable and friendlier smart city.

3. Audience

The PlastiCircle communication plan activities seek a pretty wide range of public with a medium-high rate of engagement.

On the one hand, we find entities and people involved in pilot cities, also those who don't participate directly but are interested in disseminating the initiative as they share the same or similar interests.

Regarding this audience, different associations, networks and platforms at a local, national and European level should be considered, as they gather an audience interested in smart cities, environment and sustainability.

At the local level, every city can make the difference inside its audience between general citizens and neighbours of the district where the pilot is to be developed (for instance, the Sant Marcel·li (San Marcelino) district in Valencia).

Determining the audience profile will prove itself helpful when it comes to define the language to be used in the dissemination process, taking into account sociocultural factors and previous citizen participation experiences in this field in each district.

Broadly speaking, it is recommended to separate the population in two groups of audience in order to put in place two separate working flows. A first flow oriented to people with a more technical and professional profile who belong to entities of the field, then a second flow more general public-oriented.

At a local level, the audience is to be strategically adapted following some demographic criteria, but it is recommended that every city creates a grid with a list of associations, entities and companies to whom information could be sent so they involve themselves and help with dissemination.

As for the three cities involved, we can announce that PlastiCircle communication plan actions will target an audience that lives or works in the neighbourhood where the pilot will be held. In second place, it seems interesting to consider as an audience those people with a medium-high degree of engagement who developed a high sensibility for environment or who have a special interest in plastic recycling, no matter where they live or work.

A key audience can also be found in those people who recently participated in a day, project or session on this topic, especially those who received some kind of aid or acknowledgment on behalf of the public administration.

The outline would look like this:

- Neighbours of the district in general in all three cities.
- People who work in the district or who frequently interact with the neighbourhood.
- Neighbours aware of the environment and of plastic recycling.
- People interested in reducing single-use plastic.
- People and entities who benefit from the increase in plastic recycling or engaged at a personal or professional level.
- Neighbours with strong feeling of belonging to the district who wish to become an active party in its improving.
- People who wish to benefit from compensations agreed in the pilot.

Depending on the audience, every city will need to adapt the message so it will range from a more technical and complex language to a simpler and more understandable one.

For that matter, people responsible for project communication at the local level should be very clear on what are the messages to be launched, the target audience and the meanings and media.

4. Messages

Communication plan activities are designed to enable project information to reach different levels of audience targeted in an easier way.

Despite the fact that at a local level messages should be further adjusted in order to reach a local audience, it seems important to set a direction in the speech of messages to guarantee a consistency in communication between all the cities involved in the PlastiCircle project.

Messages are a fundamental way of boosting positive impact and expected results in the audience. Also, some of these messages can be used for graphic material to be designed at a later stage.

Messages should promote a positive opinion among neighbours of the district regarding the pilot in order to increase awareness and citizen engagement in the project.

Messages should explain citizens the economic and environmental benefits of participating for free. Likewise, it seems important to let them know that, by participating in this pilot, they will play a main role in it, and therefore we invoke directly their emotions and their feeling of belonging to a neighbourhood and a city.

General goals of the messages in all three cities are:

- Inform on the benefits for the environment of recycling plastic.
- Inform on compensation system.
- Explain that personal data are processed professionally.
- Promote knowledge in recycling in general inside the district.
- Increase citizen participation in the pilot.
- Communicating an image of a city becoming a more sustainable city with a public administration concerned for the wellbeing of people and environment.

Regardless of the contents of the message, we should not forget to focus as much as possible in a style suitable for the target audience. Therefore, we should consider that language used in dissemination for general citizens will differ from the one applied to other actions focused in technical or professional profiles.

Meaning that, for all three pilots, depending on the audience, the language used must switch from a more technical register to a simple and understandable one. Even so, when possible, a simple language should be prioritized, and clarity and attractive messages should come first.

Each city should also consider that messages must be adapted to the support to be used. Language is not the same in a leaflet distributed in district shops than in a poster to be displayed in a congress or an ad in traditional media.

Every PlastiCircle project public and private entity play a key role in this challenge for the implementation of the communication strategy, as they set the basis in their environment, which makes people involvement and trust easier.

Before building messages that could be considered as a baseline for adapting key messages, it seems convenient to define keywords that will be repeated in messages.

A keyword could be "plastic recycling" or "environment", among others.

With these words and others alike, we can start building catchy sentences for dissemination material.

For instance: "Would you like to help improving packaging recycling in the neighbourhood?", "Look for the benefits of recycling the plastic you throw away every day", "Help us improving the environment with PlastiCircle".

5. Tools

Tools will be customized for every district, but we can define some tools that are frequently introduced as the most common ones.

For instance, local public transport in every city can be introduced as a perfect channel to disseminate information about neighbours' meetings in every district. As they are a loyal audience, we can get a wide coverage of the city population depending on the lines they choose, and this allows us to categorize properly our target geographically and demographically speaking.

Another action to strengthen the previous one could consist on managing ads in MUPIS, we can negotiate in order to purchase spaces in the most interesting zones inside pilot districts, such as strategic transit zones.

Once inside the district, distributing in a moderate way some flyers to district entities and associations can also prove itself useful.

Flyers can also be distributed in neighbour associations, companies related to environment, community centres, schools and so on. Entities should act as representatives of civil society in every district.

For instance: social services community centres, day-care centres, local markets, activity centres for the elderly, centres in state university or high schools.

Also, we can ask for permission to stick A3-sized posters in the previously stated locations.

As for media, it could be interesting to insert an ad in the most listened radio channel or in the best-selling newspaper in every district.

Due to the public profile of this action, it is not advisable to insert ads in environment-specialized media, as they are not widely spread. In fact, it is quite costly compared to the impact it can generate.

Otherwise, we can choose to send communications generated by calling mass media and specialized media who agree to publish for free.

Social media will become a main vehicle, and through the @circ_economy profile we will provide coverage by the means of the #PlastiCircle hashtag.

In this case it is important to ask for help to sector entities in order to disseminate actions, as well as to the most popular district entities.

Another suitable tool thanks to its categorization capacity is Facebook. Its capacity to categorize by postal code and by interest profiles makes it a key tool to reach population.

Last but not least, information stands in neighbourhoods will be a key as well, as they represent a tangible tool when it comes to engaging people in initiatives that require high citizen engagement. For that purpose, every local communication manager, should provide all the materials they will be needing for their dissemination tasks. As a suggestion, these actions could be framed in local marketing campaigns where messages will be customized as much as possible with plays in headlines and words to make them appealing and easy to remember (for instance, in Valencia we could use the slogan "Sant Marcel·li passes concerning plastic").

Complementary actions could also be considered in strategic centres in the neighbourhood with the needed specific profiles.

Conclusions on most valuable tools:

- Local public transport
- Street furniture
- Social media

- Web support
- Flyers and other paper support.
- Local marketing campaigns.
- Advertisement management in classic media.
- Institutional communication such as press releases
- Mailing
- Events, fora and conferences
- Citizen participation tools detailed in point 7

6. Monitoring

In order to get to know the citizen participation flow and to test the state of communication actions, it is recommended to use different mechanisms to control results and the evolution of the strategy in each pilot.

These mechanisms must be documented in a studied time frequency, at the beginning of the project, mid-term and at the end. By doing so, in case of detecting that actions do not show the expected results, correction actions can be applied in order to improve results.

The project leader will ask project associates from time to time to provide qualitative and quantitative information about actions put in place that are linked to citizen acceptation and participation in this project.

This feedback also includes data obtained by non-online media, such as the number of people attending events, workshops, conferences and local promoting activities.

When it comes to online resources, some interesting data that can help with obtaining useful information are the number of users of the webpage, number of followers and engagement in social media, people who subscribed to some communication channel such as newsletters or people who answer surveys or participate in fora.

Elements to study must be previously defined and agreed upon, as well as their timing in order to trace better the evolution since the starting point until next communication reports.

Conclusions on key points to monitor:

- Number of visits in web supports
- Number of followers and engagement in social media
- Number of people attending meetings organized such as events or conferences.
- Number of people participating in surveys and polls.

- Number of questions and requests received through email or on the phone.
- Number of people registered and number participating in the project.

7. Citizen participation platform

So, to involve citizens in a positive way, a common citizen participation platform will be managed and adapted to each pilot.

The said platform should allow to inform citizens about actions going on so people can understand what will be done in their district, and so they may freely choose their participations and the degree of engagement they wish.

Once citizens are informed, it is recommended that the tools used allow people to search for data on several topics. The information obtained (through online surveys, for instance) will allow to provide an analysis that will help to improve decision-taking inside the project.

This platform, apart from informing and analysing, should also allow people's participation and let then engage if they wish in a simple, accessible and democratic way, and to do so we should get all the information available about their preferences on procedures and different options, including possible alternatives and advisable solutions (though voting, for example).

In addition to making possible to obtain citizen information in order to analyse it, manage it and taking it into account, it is also a positive aspect the fact that users can interact between them freely regarding topics introduced by associates.

All these tools will be included inside the open source free citizen participation software platform Consul. A digital platform that, being an open source software, allows any new institution to use it and freely modify it costless.

Through this tool, cities may put in place different participative processes that could be extremely interesting to PlastiCircle, as citizen proposals, debates, citizen interviews, surveys, polls...

Aspects that the platform should include:

- It should allow informing citizens about the project.
- Appealing and intuitive in order to reduce the risk of digital gap.
- Must be costless, accessible and democratic.
- Should be a space for people to express their opinions on the project (through surveys, photos, polls and so on).
- Data provided by people thanks to their participation should be easily analysable.

- Must allow several ways of getting information on participants (through questions, surveys...)

Communication Team, Las Naves.

AJUNTAMENT DE VALÈNCIA

LAS NAVES

A2. Press release – Valencia

El proyecto europeo "PlastiCircle" arrancó en junio de 2017 y finaliza el 31 de mayo de 2021

ReciPlàstic convierte Sant Marcel·lí en el escenario innovador para mejorar el reciclaje de plástico y la economía circular

/ "ReciPlàstic" es la marca local del proyecto europeo PlastiCircle, que coordina ITENE y que tiene prevista alrededor de 9 acciones informativas a pie de calle y distribuidas por todo Sant Marcel·lí para fomentar la participación y la concienciación ciudadana.

/ Un total de 28 contenedores amarillos de Sant Marcel·lí dispondrán de un dispositivo tecnológico para identificar cada usuario con su bolsa de envases ligeros y así poder llevar un registro de los ecopuntos de cada persona.

/ El registro para participar se abrirá el 17 de abril y se podrá empezar a depositar bolsas desde el 1 de mayo hasta el 31 julio.

La ciudad de València está a punto de arrancar el proyecto piloto de reciclaje de plástico y economía circular en el barrio de Sant Marcel·lí que, bajo la denominación local de "ReciPlàstic", va a promover un innovador proceso de participación ciudadana, al que seguirán las ciudades de Alba Iulia (Rumanía) y Utrecht (Holanda), todo ello en el marco del proyecto europeo PlastiCircle, financiado por el programa Horizonte 2020.

Durante este período de pruebas, que se extenderá entre el 1 de mayo y el 31 de julio, los ciudadanos que se hayan registrado previamente en la página web del proyecto piloto podrán depositar sus bolsas con residuos de envases ligeros en alguno de los 28 contenedores amarillos del barrio de Sant Marcel·lí. Estos contenedores llevarán un dispositivo tecnológico adosado, diseñado para emitir una etiqueta con un código de barras identificativo del usuario.

El usuario deberá pegar esta etiqueta en la bolsa que deposite en el contenedor, lo que permitirá saber cómo cada ciudadano ha separado sus residuos para compensarle por esta acción mediante una serie de ecopuntos, que serán canjeados posteriormente.

La puesta en marcha de esta iniciativa incluye un proceso de difusión y captación de participantes a pie de calle y, como preparación previa, esta mañana Las

Naves ha acogido un taller formativo para capacitar a los monitores que estarán en contacto con la ciudadanía sobre los aspectos clave a transmitir, entre ellos, cómo registrar a las personas interesadas, cuál es la programación de actividades previstas o qué tipo de recompensas podrán obtener los participantes por separar mejor sus residuos.

El concejal de Innovación del Ayuntamiento de València, Roberto Jaramillo, ha explicado que esta iniciativa europea cuenta con todo el respaldo municipal ya que "se espera obtener buenos resultados que ayuden a resolver el desafío mundial que supone hoy en día la completa gestión de los residuos de plástico, con el impacto medioambiental que ello supone".

El 17 de abril se habilitará el registro de participantes a través de la página web, que será el portal de referencia donde estará toda la información relativa al proyecto, y desde la cual las personas interesadas podrán registrarse en el proyecto, participar en diversos procesos participativos, consultar el número de sus ecopuntos, leer las noticias del proyecto o contactar con los responsables del proyecto para todas las dudas y aclaraciones pertinentes.

Proyecto europeo PlastiCircle

El proyecto europeo "PlastiCircle", en el que se enmarca este piloto, arrancó en junio de 2017 y finalizará el 31 de mayo de 2021. Coordinado por ITENE (Instituto Tecnológico del Embalaje, Transporte y Logística), entre los socios españoles del consorcio también se encuentran Las Naves, SAV-LAVEGA (concesionaria para la recogida de residuos), INTERVAL (Industrias Termoplásticas Valencianas), ECOEMBES y la Fundación KIMbcn (Knowledge Innovation Market Barcelona). En total, el consorcio europeo está integrado por 20 instituciones tanto públicas como privadas de España, Noruega, Alemania, Holanda, Reino Unido, Italia, Bélgica, Rumanía y Eslovenia.

València, 3 de abril 2019
GABINETE PRENSA LAS NAVES

A3. Information leaflet – Valencia

¿Qué tipos de residuos puedo tirar al contenedor amarillo?

SÍ depositar en el contenedor amarillo ENVASES LIGEROS

- Botellas
- Latas de bebidas
- Latas de conservas
- Bricks
- Envases de lácteos
- Vasos, platos y cubiertos desechables
- Botes de productos de aseo
- Botes de productos de limpieza
- Bolsas de plástico en general
- Envoltorios de plástico
- Platos, bandejas y papel de aluminio
- Bandejas y cajas de corcho blanco
- Tapones de plástico, mejor dejar la botella cerrada con el tapón
- Aerosoles
- Cajas de fruta

NO depositar en el contenedor amarillo PRODUCTOS DE PLÁSTICO QUE NO SEAN ENVASES

- Juguetes
- Electrodomésticos
- Biberones
- Utensilios de cocina y cubiertos desechables
- Pilas
- Guantes de goma
- Moldes de silicona para repostería
- Botes o tarros de barro
- Tapones de corcho natural
- Cajas de plástico de CD y DVD
- Fundas de móviles, tabletas, etc.
- Bolígrafos
- Mecheros
- Cubos de fregar
- Cajas y envases de plástico de medicamentos (van al punto SIGRE)

Recomendaciones

Cuando se pueda, compacta tus envases
No tires envases llenos
No tires envases encajados en otros

PlastiCircle TOO VALUABLE TO WASTE

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730292

www.supermarcelina.com

AJUNTAMENT DE VALÈNCIA · LAS NAVES · AGRICULTORES DE LA VEGA DE VALENCIA · ITENE · ReciPlàstic SANT MARCEL·LÍ

¿Qué es ReciPlàstic SANT MARCEL·LÍ ?

Es una iniciativa que nace del proyecto europeo PlastiCircle y que tiene como finalidad fomentar el reciclaje de plástico en todas las fases del proceso a través de un modelo de economía circular.

El barrio de Sant Marcel.lí de València ha sido seleccionado para ser el entorno donde se va a realizar el piloto desde su inicio el 1 de mayo hasta su finalización el 31 de julio.

Pasos para participar:

① Regístrate
- ✓ A través de la web www.supermarcelina.com
- ✓ Presencialmente en la Asociación de Vecinos de Sant Marcel·lí todos los miércoles desde el 8 de mayo hasta el 11 de septiembre de 17h. a 19h.
- ✓ En cualquiera de nuestras exposiciones que encontrarás a pie de calle de mayo a septiembre. Puedes consultar la programación en la web

② Una vez te hayas registrado se te dará una tarjeta asociada a tus datos.

③ Coge tu tarjeta PlastiCircle y busca el contenedor de envases ligeros (amarillo) más cercano de tu barrio.

④ Acerca tu tarjeta a la zona indicada en el dispositivo, recoge la etiqueta, ponla en tu bolsa e introduce la bolsa en el contenedor.

Verás que en un extremo del contenedor hay un dispositivo con unas instrucciones. Aprieta el botón situado en un lateral. Pasa la tarjeta por el lector, recoge la etiqueta, pega la etiqueta en la bolsa de envases ligeros con tus residuos e introdúcela en el contenedor.

⑤ Mira cuántos ecopuntos tienes y descubre qué premios puedes ganar.
Consúltalos en la página web www.supermarcelina.com

⑥ ¡Elige tu premio!

¿Cómo puedo canjear los ecopuntos por premios?

Al acabar el piloto podrás elegir el premio que más te guste canjeando los ecopuntos que conseguirás reciclando. Cuanto más y mejor recicles, más ecopuntos. ¡Así de sencillo!

Para ello, solo tienes que entrar en el apartado "participa" de la web www.supermarcelina.com, o acercarte a cualquiera de nuestros puntos informativos para que nuestros monitores te actualicen la información de tus ecopuntos.

Ante cualquier duda, consúltanos en
supermarcelina@lasnaves.com
96 391 04 77

A4. Sticker for container module in San Marcelino – Valencia

ReciPlàstic
SANT MARCEL·LÍ

¿Cómo puedo participar?

1. Pulse el botón situado en un lateral del dispositivo
2. Acerque la tarjeta de PlastiCircle a la zona señalada de este dispositivo
3. Recoja la etiqueta adhesiva que sale del dispositivo
4. Pegue la etiqueta en la bolsa que contiene sus envases ligeros para reciclar
5. Deposite la bolsa de envases ligeros dentro del contenedor

¡Muchas gracias!

Com puc participar?

1. Prema el botó situat en un lateral del dispositiu
2. Acoste la targeta de PlastiCircle a la zona assenyalada d'aquest dispositiu
3. Agafe l'etiqueta adhesiva que eix del dispositiu
4. Pegue l'etiqueta en la bossa que conté els seus envasos lleugers per a reciclar
5. Deposite la bossa d'envasos lleugers dins del contenidor

Moltes gràcies!

PlastiCircle
TOO VALUABLE TO WASTE

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