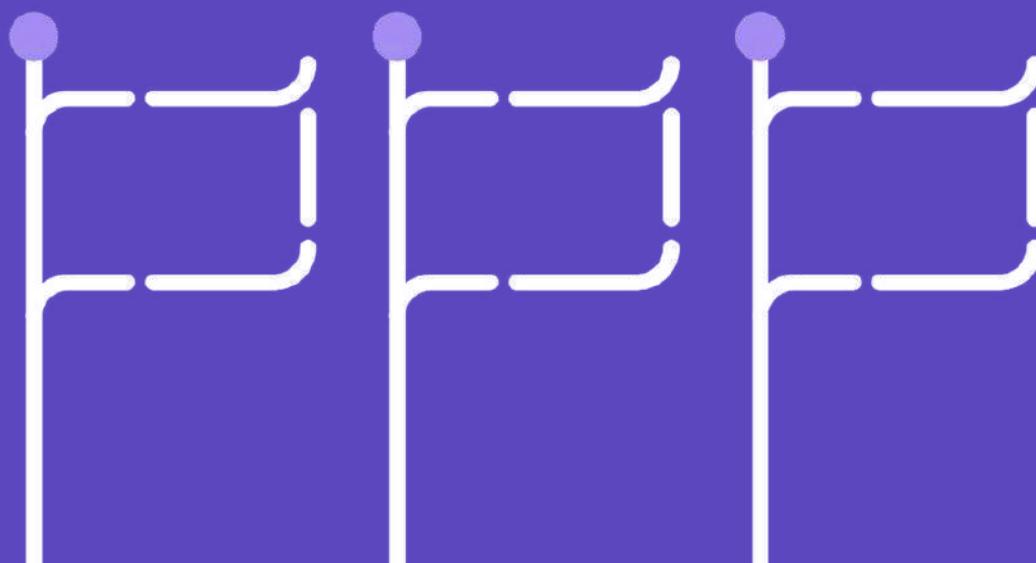


science  
meets  
regions

2023

#EUsci4Regio



# SIMIL

Pairing Scheme between policymakers and scientists

**We work to solve challenges and establish  
dialogue to improve the management of  
Municipal Organic Waste in Catalonia**

Final Report / 2023 Edition



**2023  
edition**

## **Municipal Organic Waste Management in Catalonia**

In Catalonia, Spain, the organic fraction represents 25% of the annual 3.5Mt of urban solid waste, which poses a significant threat to greenhouse gas emissions.

Local administrations, pressed to address this problem, have the opportunity to adopt emerging solutions that take advantage of the potential of organic waste to obtain energy and high-value products, enhancing its circularity, efficiency and economy.



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# INTRODUCTION



The SIMIL Programme is a bridge of connection between policy makers and scientists. This initiative part of the Science Meets Regions Programme of the Joint Research Center (JRC) is born from the need to promote bidirectional dialogue within the science-policy interface to address the complexities of contemporary environmental challenges with solidity.

This initiative aims to foster a two-way understanding, empowering municipalities, especially the smallest and rural ones, with the knowledge and tools relevant to their specific context. Policy makers need technical knowledge to keep abreast of innovative solutions, just as scientists need to be fully familiar with local realities. At this vital intersection between science and politics, collaboration is not only beneficial, but essential. SIMIL facilitates collaborative development of solutions, overcoming traditional barriers, to pave the way for more informed and therefore more effective policymaking.

This final report emerges as a valuable tool that represents the culmination of the joint process of dialogue and co-creation between representatives of the local administration and scientists during the first edition of the SIMIL Programme. It reflects the identified challenges, proposed innovative solutions, strategic actions, available technical resources and possible economic considerations. This guide becomes a valuable tool to facilitate decision-making and guide future initiatives in the municipal management of organic waste, thus consolidating the successes achieved during this first edition of the SIMIL Programme.

# THE Programme meme

## Face-to-face sessions



During the first edition of the SIMIL Programme, two face-to-face work sessions and three online sessions were held, aimed at raising and addressing a total of eleven main challenges on the management of municipal organic waste presented by representatives of the administration public

During the face-to-face sessions, a fruitful connection was established between the various professional profiles present, the generation of numerous interesting contributions and enriching debates that addressed the various issues and key aspects associated with each challenge was encouraged.

The face-to-face sessions were held at the BETA Technological Center, where four hours were dedicated to various participation dynamics. Each session opened with a short presentation by professionals from the world of waste, and featured a masterful talk by Josep M<sup>a</sup> Tost, former director of the Waste Agency of Catalonia.



# 3



Next, the diagnosis phase was launched with the first dynamic of work between the participants, researchers and experts, divided into four work tables to address the various challenges raised.

In this context, the work teams were constituted in a homogeneous and equitable manner, guaranteeing the representation of politicians and technicians at both municipal and supra-municipal level, as well as the presence of researchers and experts in the field.

The aim of this first dynamic was for the participants to share and question their experiences and concerns regarding municipal waste management.

Each group tackled three specific challenges with supporting documents that contained key information to facilitate understanding, reflection and the generation of proposals.

In this exercise, they took notes on their contributions and presented, analyzed, discussed and complemented all the tailor-made proposals that were generated.



In the following group dynamics, the participants were organized in a plenary format, where a representative from each table could present and detail the different contributions made on the challenges discussed.

This phase of discussion and debate made it possible to share ideas, comment on experiences and enrich and refute some of the contributions made during the session.



# Visit to a success case in innovation for the management of municipal organic waste

At the end of the second face-to-face session, a visit was made to a successful case in terms of waste management, where the participants could learn about and see in situ the self-composting system implemented in Les Masies de Roda since 2020, the root of the DECOST European research project, coordinated by the BETA Technological Centre. In this municipality, community composting represents the main way of treating organic matter. This self-composting system has allowed

during these years, up to 500 tons of organic matter and generated prunings have been treated, providing service to 2,420 inhabitants. This matter has resulted in a production of 250 tons of compost, distributed among the neighborhood itself.

DECOST has made it possible to treat all the organic waste produced in the town. Specifically, recycling of organic matter has gone from 15% to 31%, there has been a reduction in mixed waste from 53% to 18% and the waste fraction has been reduced by 75%.



# 5

# Online Sessions

A few weeks after concluding the diagnosis phase with the two face-to-face work sessions, the prognosis phase began, with the aim of co-defining and co-creating solutions and establishing actions to be developed to face the challenges raised above. This last part of the participatory process was developed through three online sessions.



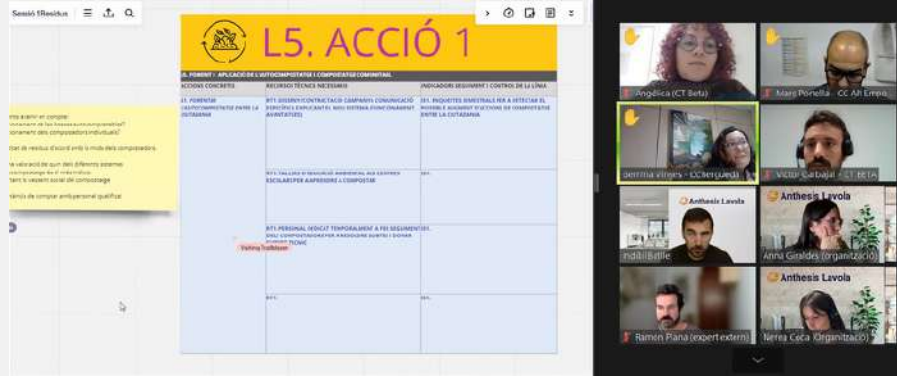
At the beginning of each session, the results obtained during the diagnosis phase were synthesized, in order to reconnect the ideas and results that had emerged during the face-to-face sessions on each of the eleven challenges.

Based on these challenges, a total of nine strategic lines were established on which the participants could work together. Through dialogue and co-creation, this session made it possible to identify the main necessary technical resources and solutions to successfully face all the challenges and guide future decision-making in these areas.

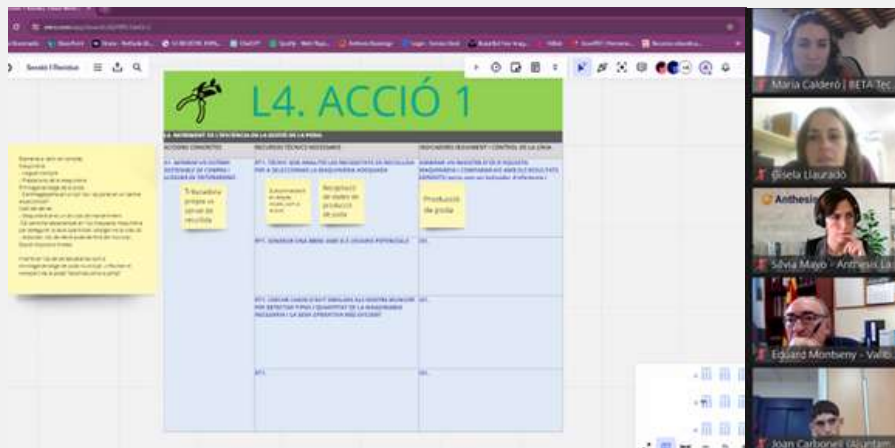
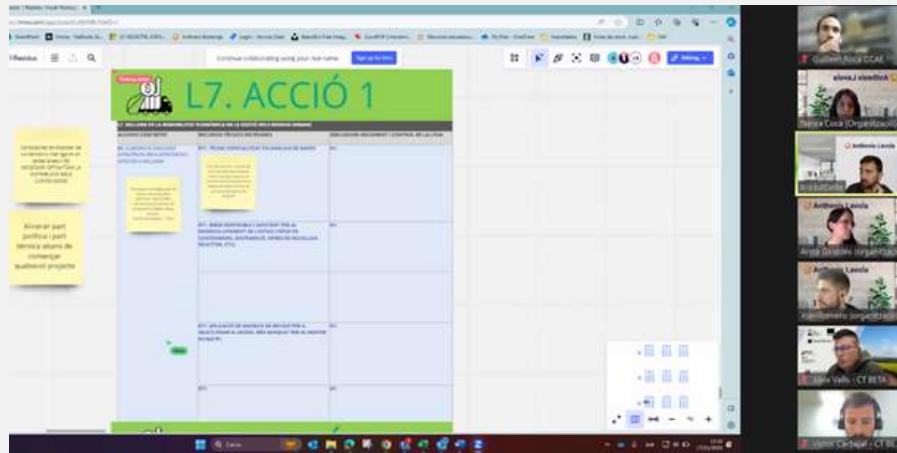




To speed up communication, the working groups were distributed in different virtual rooms, guaranteeing the same representation of politicians and technicians from the local and regional administration, as well as researchers and experts.



During the sessions, all the participants proposed concrete solutions on the strategic lines proposed, with the support of facilitators who stimulated and recorded the various contributions that were emerging.



At the end of this first dynamic, the various groups met together to present the actions, resources and other key aspects that complemented the strategic lines worked on.



# THE CHALLENGES

Next, the challenges raised by all the participants and the results obtained during the working dynamics of the face-to-face sessions are presented, highlighting the most relevant contributions made by the participants and experts. This collaborative exercise of diagnosis has made it possible to create a synthesized framework of all the knowledge generated and shared about positive and negative experiences, interests and concerns regarding each of the eleven challenges.

**Challenge 1. Analysis of alternative collection models**

**Challenge 2. Analysis of alternatives in waste prevention**

**Challenge 3. New technologies in service control**

**Challenge 4. Transparency and communication with citizens**

**Challenge 5. Implementation and improvement of a door-to-door system**

**Challenge 6. Promotion and Management of Biogas**

**Challenge 7. Promotion of self-composting and community composting**

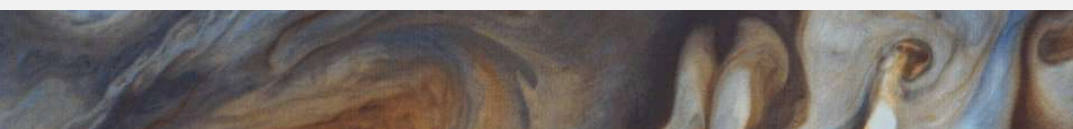
**Challenge 8. Improvement actions in the municipal management of pruning**

**Challenge 9. optimisation of the model and service**

**Challenge 10. Viability economic in municipal waste management**

**Challenge 11. Evaluation of the environmental impact of selective collection and CO2 reduction methods**

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# Challenge 1.

## Analysis of alternative collection models

### Positive and Negative Experiences

Most of the positive experiences shared during the work sessions have highlighted Door to Door (PaP) and closed containers as optimal systems to achieve high levels of municipal selective collection, with an improvement in the quality of organic waste.

However, several contributions highlight negative experiences with these systems, such as defamation actions on social networks by citizens opposed to the systems, as well as the increase in "waste tourism" and the lack of infrastructure and capacities for a development successful of the systems. Regarding the PaP, situations with an increase in the presence of rats and wild boars have been reported.

### Interests and Concerns

Both the Door-to-Door (PaP) system and the closed container model have generated significant interest among participants, who have registered a significant list of concerns and needs related to their implementation. The difficulties in sanctioning inappropriate behavior or the incorrect use of these systems are highlighted, as well as a lack of economic information that could motivate people's participation. The need for political will is also highlighted as an initial element to implement any system and transmit its benefits to citizens effectively.

Certain concerns arise related to the complexity of application in large territories, the variability of effectiveness according to the area of the municipality and the relationship with tourism. In relation to the improvement proposals, comments and observations made on this challenge, it highlights, first of all, the difficulty of obtaining positive results in a stable and continuous manner in the implementation of PaP systems and closed containers, since it could lead to a relaxation by citizens. In this sense, other proposals are suggested, such as the importance of carrying out information campaigns with posters and environmental informants at the beginning or development of a new collection model. In addition, it is considered essential to convey to the public the economic costs derived from the service. As the last outstanding proposal, a general interest is detected in the implementation and management of IT platforms as an essential tool for the control and optimisation of municipal waste collection.



# Challenge 2.

## Analysis of alternatives in waste prevention

### Positive and Negative Experiences

Regarding the positive experiences reported by participants on waste prevention, there was a significant contribution in terms of volume and diversity. Among these contributions, some stand out such as the application of eco-design in certain everyday products and the realization of services and reuse activities at waste disposal sites, with the involvement of social services to ensure their development. Likewise, other proposals should be highlighted such as the design and implementation of environmental education programmes in schools and institutes in the field of waste. In a specific way, the life cycle of products could be explained with the aim of making new generations aware of the importance of waste prevention in our day-to-day life.

### Interests and Concerns

There were also some negative experiences that need to be considered in facing this challenge. On the one hand, it is corroborated that consumers lack a variety of consumption options that allow the generation of waste to be prevented. It is argued that food has an increasingly short shelf life and that products sold in bulk have very high prices. On the other hand, certain local entities report a lack of political will to finance social projects related to reuse. In this sense, the lack of spaces and human resources to develop these types of activities was also commented on.

The main concerns raised were the constant increase in bulky waste and data protection. The latter is a factor that needs to be considered when implementing reuse activities, especially for certain WEEE that contain personal information. Participants provided various suggestions for improvement and observations in response to negative, positive experiences and concerns. Firstly, the need for a regulatory change in the regulation of the production of light packaging was highlighted, and for the in-depth analysis of the entire production chain of the products, from raw materials to distribution and consumption. Other suggested actions included communication campaigns for comprehensive education, environmental awareness visits to landfills and treatment plants, and improvements in appliance preparation and repair services and activities to extend their useful life.



# Challenge 3.

## New technologies in service control

### Positive and Negative Experiences

The positive experiences show the potential of technological resources in the control of the waste collection and cleaning service. As examples, the greater control of services contracted or performed, access to data to improve the system, identification of users for the application of a fair rate and the possibility of providing rapid feedback to citizens.

The negative experiences relate to the malfunctioning of the chips in the community composters in Masies de Roda and the pedals of the containers, blocked if the chip was not passed correctly. A concern about privacy and the dissemination of personal data through these applications was also reported.

### Interests and Concerns

Regarding the concerns or needs to be expressed, the participants made numerous and specific contributions of great interest to be able to address this challenge. On the one hand, the operational and cost complexity that this technology can represent was reported, where its correct operation will be key to not discouraging the public. In this line, some contributions showed the concern of the picaresque that can be generated with these new technological systems, this as a perception of a low social acceptance regarding the monitoring of waste individually. On the other hand, other issues of great relevance were exposed such as: the capacity and resources needed to process large volumes of data, doubts about who is in charge of processing this data at consortium level and how to implement or develop an App in municipality scale.

Regarding the improvement proposals, various contributions are raised. A gradual implementation of these applications, the progressive increase of municipal budgets for new technologies, and modifications to municipal ordinances to ensure compliance with data protection requirements are suggested. Other initiatives include the removal of containers from transit areas to prevent illegal dumping, the installation of video surveillance cameras in conflict zones and the creation of a platform at regional level.



# Challenge 4.

## Transparency and communication with citizens

### Positive and Negative Experiences

Regarding the positive experiences reported by the participants regarding transparency and communication with citizens, there was a limited contribution in terms of volume and diversity, which shows the need to explore and work on this challenge in greater depth in the face of design of specific proposals. Among these contributions, some stand out such as the creation of a "WhatsApp" group as a tool for direct communication with citizens, talks where information is given on the "why" of the things that citizens are asked to do and the use of cameras and penalties.

The negative experiences were focused on situations related to the organization of information days with low-quality experts and on the lack of knowledge on the part of the administrations about the achievement of results in accordance with the economic investment made.

### Interests and Concerns

During the work time dedicated to this challenge, certain concerns were raised, where certain perceptions stand out. On the one hand, there is a firm belief in the need to inform citizens rigorously about the system implemented in their municipality, as well as the causes and consequences of what they do as citizens. In this sense, the need to increase the level of communication with people has also been exposed. On the other hand, the idea was reported that the technology used is not always useful and should be easier to use.

Finally, the participants were also able to provide some observations about this challenge. A prominent comment refers to the difficulty for policy makers to explain in a clear and concise way all the costs associated with waste management. In this case, it is proposed, as an improvement, the implementation of dual systems, such as apps, cards, key chains or numerical codes, on the new collection models associated with technological resources.



# Challenge 5.

## Implementation and improvement of a door-to-door system

### Positive and Negative Experiences

Undoubtedly, some of the positive experiences reported in the work sessions have shown how the PaP is presented as the best system to obtain high levels of selective collection at municipal level. In addition, it has been detected how the application of bonus systems for participation in the case of organic favors the efficiency of this system.

However, some examples have also shown limitations according to the territorial scope of application. It has been observed how initial acceptance by citizens can be difficult. It is considered that bad practices lack consequences or sanctions, a fact that makes it difficult to properly implement the system. On the other hand, it can be seen the high cost it presents for municipalities with a limited budget. With a more logistical nature, it is the existing deficiency in many rural towns derived from the great distance between the waste collection point and the center of the population.

### Interests and Concerns

With regard to the correct implementation of the PaP, certain concerns have arisen that must also be taken into account when co-creating concrete solutions for these exposed needs. Therefore, it is necessary to clarify aspects such as the number of fractions that the PaP can include, the different systems or variations it presents, the action of political opposition to the PaP model in certain governments, as well as the concern of losing or not obtaining the data monitoring and control when the service is outsourced.

A proposal for improvement brought to bear on this challenge has to do with the installation of community composters. It is also worth noting an observation made by the participants related to the PaP system, which refers to the possibility of finding solutions that help reduce the physical effort of the staff who work there.



# Challenge 6. Promotion and Management of Biogas

## Positive and Negative Experiences

With the positive experiences provided by the participants, it was established how biogas, being produced almost 365 days a year, helps stabilize the renewable energy mix that depends on weather conditions, and energy self-consumption at municipal level. It is also seen how the use of rural digesters leads to a decrease in emissions and the generation of energy for farms. Likewise, the role of biogas plants as generators of jobs in rural territories is highlighted, thus representing an element of territorial dynamism.

Three contributions stand out in terms of negative assessments of this challenge. First of all, the existing bad image surrounding biogas generating facilities due to society's lack of knowledge was reported. Next, the problem that exists in Masies de Roda to find a place to set up these facilities was explained. As the last negative experience, reference is made to the lack of knowledge to dimension and manage the construction and operation of these types of projects.

## Interests and Concerns

Regarding the main concerns expressed by the participants, the need to find benchmarks and success stories on which to base the projects, as well as the establishment of tools to model them, both at the local and territorial level, stands out. In this way, it would be possible to emerge from "bottom to top" with projects that end up presenting a greater integral character. It also highlights the need to identify European funds that promote initiatives related to biogas and the difficulties that local bodies encounter in administrative procedures. Finally, the participants reported the need to apply good digestate management in the production of Biogas, as well as the importance of biofertilizer certification.

In line with what was said above, the improvement proposals were focused on improving the communication of information to the administrations and citizens, on facilitating the procedures for starting and developing this type of project, and on establishing meetings with the territory (entities, companies, etc.) to facilitate an improvement in the viability of projects at all levels.





# Challenge 7. Promotion of self- composting and community composting

## Positive and Negative Experiences

With regard to positive experiences, in one of the work tables the recent example of the management of community composting in Masies de Roda was presented. In addition, other positive aspects of these types of processes were highlighted, such as the increase they entail for the quality of the organic fraction and the ability to close the biological circle and recover nutrients.

Several negative experiences with community composting were also reported.

The first refers to the frustration when trying to implement a composting system for the entire municipality, which was not possible due to limitations at county level. A second negative example relates to the low interest of the citizens of Cabanelles in starting a self-composting system, where composters were given away, but most were returned. The latest experience is linked to the consequences of poor management of composting plants, sometimes causing the proliferation of rat pests.

## Interests and Concerns

Participants also expressed some concerns and nuances about this challenge. On the one hand, the logistical issue of how to guarantee that the entire municipality can manage organic matter through domestic or community composting was raised. On the other hand, other aspects were pointed out, such as the possibilities of compost as a final product and how the variability of rural tourism affects the proper functioning of these systems.

Several proposals for improvement emerged. In general, it is suggested that decisions to promote community composting should be made at the municipal level, not the county level, and that pilot tests must be carried out to legitimize the initiatives. Other suggestions include the creation of composters for municipal facilities and markets, as well as their installation in community and public spaces such as stairwells and buildings. The importance of carrying out educational tasks on the correct practice of composting and the establishment of stricter regulations for visitors to rural tourism houses is also highlighted.



# Challenge 8.

## Improvement actions in the municipal management of pruning

### Positive and Negative Experiences

Below, the main positive experiences reported by the participants regarding the municipal management of pruning are highlighted. A relevant example is the municipality of Roda de Ter, which uses a door-to-door (PaP) system that allows the weekly collection of easily manageable prunings. In addition, the management of pruning through individuals or at a waste disposal facility is facilitated. Other successful initiatives have been recorded, such as the transfer of small shredders between neighbors with registered composters for personal use (via a responsible declaration) and the option of renting shredders for municipalities. Other beneficial experiences for certain municipalities were also shared, such as the hiring of an urban green advisor with technical and academic training to report on the pruning management process and other aspects related to municipal waste.

In relation to negative experiences, the following stand out: lack of involvement and awareness of a considerable part of the population; presence of inappropriate in pruning waste; difficulty managing large volumes of pruning; progressive decrease in the number of individual composters due to the lack of municipal staff to carry out routine monitoring; changes in pruning management due to changes in cream regulations.

### Interests and Concerns

Regarding this challenge, certain concerns were raised, where the concern about illegal dumping of pruning residues stands out, as well as the fact of knowing whether the grass can be mixed with the pruning. In this sense, some of the contributions confirmed the possibility of being able to mix it and deposit it in the compactor if it is not an excessive amount and it mixes well.

In line with what was said above, the proposals for improvement were focused on actions such as the increase of civic agents and environmental educators who make visits to houses that mismanage pruning, the carrying out of economic studies on the feasibility of buying or renting a mobile industrial shredder, and the purchase of small shredders adapted to the needs of the municipality that can be used among the neighbors.



# Challenge 9.

## Model and service optimisation

### Positive and Negative Experiences

On the positive experiences of the participants, a number of diverse opinions on the optimisation of the model and the service have been collected. The effectiveness of the use of geolocalised collection vehicles with built-in scales and the cost savings resulting from the implementation of the PaP in an urban municipality such as Roda de Ter stand out. The geographical subdivision of the territory is also highlighted as an efficient technique to address specific proposals, and it is suggested that there is an improvement in the recycling index with adequate control.

However, negative views were also expressed about certain features of the model. One of the attendees made a small criticism suggesting the need to apply a single system of selective collection fractions throughout Catalonia. It is also pointed out that the PaP model may be economically unfeasible for municipalities that have a small area of extension, raising the option of implementing the model only for some specific fractions. Finally, some indignation is expressed at situations that occur in tourist areas, where there are large containers that cannot be filled, assuming the same economic cost.

### Interests and Concerns

Different concerns arise in different areas. There is concern about the alterations to the model caused by tourist activity and the increase in costs associated with the Door to Door (PaP) system in some municipalities compared to selective collection with containers. On the other hand, one of the participants believes that waste collection and street cleaning services should not be managed together, as they are very different services.

The participants made proposals for improvement to optimize the service, including the reduction of selective collection fractions from 5 to 3 to facilitate the population's task and minimize collections and the possibility of reducing the number of bins. A participant also suggested the implementation of a community composting system in three blocks of flats in Roda de Ter.



# Challenge 10.

## Economic viability in municipal waste management

### Positive and Negative Experiences

In the face-to-face work sessions, relevant positive experiences were identified in the economic viability of municipal waste management. Some municipalities reported efficient fiscal actions, such as reimbursement of fees for installing composters, incentives in the form of bonuses to adopt other collection models, and the transition of payment for collection from container to payment per ton. The comparative circles of good practices, such as those in Barcelona, were perceived as useful resources for councils, providing references for managing municipal waste and reducing costs. A positive technical experience was the change from 5 to 4 fractions in some municipalities, with improvements in waste collection and treatment. However, problems are pointed out in economic profitability, such as the perception that some rural municipalities face the complexity of waste management without taking into account their particularities, with rural Catalonia being harmed. From the public administration, it is considered that citizens are not fully aware of the real cost of each waste, with rates that do not always cover the cost of the service. A last negative experience highlights the lack of necessary data from outsourced companies, making it difficult to control and analyze services to improve operational and economic efficiency.

### Interests and Concerns

Needs for technical knowledge were highlighted, such as the cost of the economic study and the application of new forms of modeling to accurately measure costs, as well as the optimal criteria for applying the fair rate. Also concerns about the perception of the fair rate as a source of scams or the difficulty of applying it with closed containers, and the need for data for proper economic studies and subsidies for changes to more effective systems. The improvement proposals included communicating the cost of waste treatment to citizens, designing and implementing an APP to encourage citizen participation and facilitate data collection, learning in data collection and processing for decision-making, the proposal of ordinance models by the Waste Agency of Catalonia to address technical issues, and the use of translucent bags to ensure correct separation, taking Belgium and Italy as examples.



# Challenge 11.

## Assessment of the environmental impact of selective collection and CO2 reduction methods

### Positive and Negative Experiences

During the treatment of this challenge, some positive comments emerged on the subject of the environmental impact of selective collection and the carbon footprint. It was commented that the optimisation of the transport routes as well as the decentralization of some of the fractions, such as the organic, makes it possible to achieve a reduction in the equivalent emissions of CO2 derived from logistics (avoiding transport to a landfill or treatment facility). With regard to the organic fraction, it is believed that more encouragement should be given to its treatment to avoid transporting it to a controlled deposit. Finally, reference was made to compostable bags as an essential tool to simplify processes and save treatment steps.

On the negative side, the lack of political initiative both locally and from the Generalitat, as well as the problems arising from weak governance, was underlined. Emphasis was placed on the need to control packaging regulations at distribution level to avoid complications in waste management. During the session, questions were raised about the optimisation of the service, the optimal functional scope to manage waste and the control of mass events, such as concerts and festivals, with the door-to-door system.

### Interests and Concerns

Finally, the attendees formulated and reflected on how this environmental impact derived from waste management could be improved. It is expressed the need to move towards having real knowledge about the impact caused by waste management, both in the environmental and economic sphere as well as in the social sphere, since this information would be of great help in taking decisions. Other ideas refer to the use of new technologies (derived, for example, from incinerators) as well as the decentralization of the anaerobic digestion of the organic fraction.





# THE STRATEGIC LINES

Next, nine strategic lines are presented, worked on during the three online sessions, which respond to the challenges raised previously. These knowledge guidelines bring together the main contributions and solutions co-created between representatives of the local administration and expert scientists, highlighting the main technical resources needed, determining factors, monitoring and control indicators and additional links of interest.

- L1. Model selection and optimisation of collection and cleaning services.**
- L2. Promotion of the main alternatives for waste prevention.**
- L3. Implementation and development of a door-to-door system.**
- L4. Increased efficiency in pruning management.**
- L5. Promotion and application of self-composting and community composting.**
- L6. Development of communication and awareness processes in the field of waste management.**
- L7. Improvement of economic profitability in the management of urban waste.**
- L8. Promotion and profitability of Biogas.**
- L9. Implementation of assessment methods for the environmental impact of selective collection and reduction of CO<sub>2</sub>.**

# L1. Model selection and optimisation of collection and cleaning services.

## ACTION 1. INITIAL DIAGNOSIS OF THE MUNICIPALITY AND TECHNICAL-ECONOMIC ANALYSIS OF THE CURRENT COLLECTION MODEL

### Technical resources needed

R1: Human resources. Availability of technical personnel for the analysis or creation of the necessary database on which to carry out the strategic diagnosis. Or, consider hiring an external service or joint collaboration with a supra-municipal body.

R2: Specific knowledge. Access to reliable and up-to-date databases to obtain the following information: Urban structure of the municipality; Demography and spatial distribution; Commercial activities and large generators; Regulatory framework; Evolution and trends in waste collection; Services, equipment and personal media; Economic balance of the current service.

Additionally, access to information about other success stories to carry out comparative studies and detect opportunities for improvement; Catalog of good practices and bad experiences that provide knowledge to make decisions.

R3: Financial capacity to hire advice: search for funding from the public funds themselves, or look for and apply for subsidies for this service.

### Other determining factors

One of the main factors that will determine the success when designing a strategic diagnosis is the experience you have in terms of carrying out these types of studies, as well as the correct way of how they should be done 'structure or which elements of analysis should be incorporated.

The price range of these studies ranges from €6,000 to €10,000.

On the other hand, the funding we have is also a key element for the development or contracting of these types of services. So, the ability to obtain or seek funding becomes a transcendental mechanism for carrying out these studies.

### Links of interest

[Methodological guide for the preparation of local plans for the management of domestic and similar waste in the province of Valencia](#)

[Online technical conference: Aid order for the promotion of the selective collection of municipal waste](#)



## A2. DIMENSIONING AND COMPARISON OF COLLECTION MODEL ALTERNATIVES

### Technical resources needed

R1: Dimensioning of the collection models: Technical staff with the ability to dimension the collection model or, as these are complex studies and processing a large volume of data, assess their hiring.

R2: Study of alternatives: Knowledge to develop mechanisms that facilitate the selection of the most suitable model for the municipality.

R3: Attendance at training events and technical advice that allow local bodies to outline the needs required by the collection system.

### Other determining factors

One of the key factors when selecting an alternative collection model at municipal level is to reach a consensus between politicians and technicians on the requirements and priorities necessary for the selection of the most appropriate model. In order to fulfill this objective, there are work methodologies that allow the selection of the model that best suits our municipality through pre-selected parameters.

One of the tools to help select the optimal alternative is the decision matrix. This makes it possible to evaluate key points that will allow to assess and select the optimal municipal waste collection model. It represents a process that facilitates alignment between politicians and technicians for decision-making through previously defined parameters (Economic cost, reduction of inappropriate, etc.).

The price range of these studies ranges from €7,000 to €10,000.

### Links of interest

[Explanatory document of the study of alternatives and the decision matrix](#)



## A3. IMPLEMENTATION OF NEW TECHNOLOGIES FOR SERVICE optimisation

### Technical resources needed

R1: Have technicians with knowledge about data analysis.

R2: Have knowledge about subsidies for the acquisition and implementation of new technologies.

A3: Know the main functions and modules of these technological tools offered in the market in order to select the most suitable services.

### Other determining factors

The main factor that influences the execution of this line is both the knowledge of the benefits that these new technologies bring us, as well as the political conviction and determination to implement them.

The approximate €/year range for a medium-term contract (6 years) is:

- Monitoring and control of the service:
  - 25,000€ (<30,000 inhabitants)
  - 65,000€ (<200,00 inhabitants)
- Inspection and quality control
  - 15,000€ (<30,000 inhabitants)
  - 25,000€ (<200,00 inhabitants)

### Links of interest

[Example of a technological platform for the management and control of urban services through data registration and analysis](#)

# L2. Promotion of the main alternatives for waste prevention

## A1. HAVE A WASTE PREVENTION PLAN

### Technical resources needed

R1: Technical team for drafting the prevention plan or evaluating external contracting.

R2: Meetings between politicians and technicians to analyze and define the elements to be incorporated in these types of studies.

R3. Knowledge of current regulations for the definition of the objectives and tasks of the Waste Prevention Plan.

### Other determining factors

Below are some of the factors to take into account when preparing these types of studies:

- Current environmental legislation.
- Type and amount of waste generated.
- Citizen participation.
- Environmental education and awareness.
- Evaluation and improvement of waste facilities.
- Collaboration between administrations and competent entities.

The price range of these studies normally ranges between €4,000 and €8,000.

### Links of interest

[News about the key aspects of the new Waste Prevention and Management Plan \(PPGR\) 2023-2030 for Castilla-La Mancha](#)

## A2. INFORMATION AND AWARENESS CAMPAIGNS FOR WASTE PREVENTION

### Technical resources needed

R1: Determine the user profiles that campaigns should target.

R2: Setting up indicators to evaluate the impact and effectiveness of campaigns.

R3: Involve the figure of the environmental educator for the development of workshops and citizen awareness activities.

### Other determining factors

Concern for the health of the environment. Some of the factors to consider in the design of prevention environmental communication campaigns are:

- Consider communication as a continuous and permanent cost.
- The identification of the audience on which the campaign is directed, adapting the type of message to its specific characteristics.
- Organization of events, meetings, workshops, etc.
- The objectives of the campaign and the indicators for evaluating the success of implementation.
- The selection of the transmission medium (eg: message, television, social networks, etc.).
- The design of the message in a clear and concise way.

The price range for campaigns focused on waste prevention ranges from €5,000 (for a population of 500-1,000 inhabitants) to €20,000 (for a population of 5,000-20,000 inhabitants).

### Links of interest

[Structure and development of awareness campaigns and citizen participation at Anthesis Lavola](#)

[100 ideas to work on prevention. Waste prevention campaigns \(Diputació de Barcelona\)](#)

[Technical conference: "Improving prevention and selective collection in public buildings"](#)

### Monitoring and control indicators

- Number of families who have collected the informative material.
- Evaluation of its use in shops.

## A3. PROMOTION OF GOOD PRACTICES IN THE AREAS OF REUSE AND WASTE PREVENTION

### Technical resources needed

R1: Creation of a space in the rubbish dump where the reuse of products between citizens is allowed. Some users leave the reusable products and others take them away.

R2: Technical staff trained to carry out tasks as part of the reuse circuit.

R3: Encourage responsible purchasing and ZeroWaste practices through bonuses and aid from agencies and governments.

R4: Regulate second-hand markets.

R5: Promoting the reduction of food waste.

### Other determining factors

Some of the main factors that can influence the implementation and development of reuse activities and preparation for reuse are:

- The quality and condition of the products that are intended to be reused.
- Demand and utility when selecting products to be reused.
- The guarantee of safety and usefulness of reused products.
- The logistics of collection, storage and distribution of reused products.
- Raising public awareness of the importance of preparing for reuse and encouraging their participation.

### Links of interest

[Success case of Reuse and Preparation for Reuse at the Viladecans Waste Collection](#)

[Guide to support the application process for the prevention and preparation aid for the reuse of municipal waste 2022](#)

### Monitoring and control indicators

- Number of products exchanged.
- Weight calculation based on equivalences with reused products.

## A4. INCORPORATION OF SUSTAINABLE PUBLIC PROCUREMENT CRITERIA

### Technical resources needed

R1: Staff with knowledge about more sustainable options (materials, production systems, provenance, useful life, environmental impact, etc.).

R2: Hiring of advice to select and draft the key criteria to be incorporated into public collection contracts.

### Other determining factors

Some of the main factors that will determine success in terms of the selection and incorporation of sustainable public procurement criteria are:

- Knowledge of new needs and environmental regulations.
- Knowledge of the hiring criteria that can improve the environmental scenario of our municipality.
- Comprehensive knowledge of all the elements (human and material resources) incorporated in the collection services to be able to evaluate them and in this way, define the environmental criteria for each of them.

The price range for sustainability reports ranges from €8,500 to €14,000, and mobility plans from €6,000 to €10,000.

### Links of interest

[CO2 compensation of services](#)

[Company mobility plans](#)

[Sustainability reports](#)

## A5. ESTABLISH A PAYMENT SYSTEM BY GENERATION

### Technical resources needed

R1: Define what the objectives of the payment per generation system are (eg reduce the amount of waste generated).

R2: Identify the waste that will be included in the payment per generation system.

R3: Define the rates that will be applied according to the amount and type of waste.

R4: Communicate and explain to citizens how the new system works.

R5: Access system to the data needed to implement a payment per generation.

R6: Technical team to configure and develop the system or consider outsourcing.

### Other determining factors

Some of the main factors that influence the correct implementation and development of a generation payment system are:

- Will and political consensus.
- Inform citizens in detail about the change in model.
- Use of technological tools that allow thorough monitoring and control of the data necessary to apply the payment criteria by generation.

### Links of interest

[Communication technology between citizens and councils. Improvement of the separate collection at the source of waste through citizen co-responsibility.](#)

[Guide for the implementation of payment systems for the generation of municipal waste](#)



# L3. Implementation and development of a door-to-door system

## A1. DIMENSIONING AND CONTROL OF THE COLLECTION SERVICE

### Technical resources needed

R1: Technical staff with the capacity to dimension the PaP model or, as these are complex studies and deal with a large volume of data, value their hiring.

R2: Specific diagnosis on those elements involved in the entire collection process.

R3: Definition of the necessary material and human resources, as well as the establishment of a calendar and appropriate frequencies for the correct development of the service.

R4: Plan exceptional collection scenarios (eg: reduced mobility of the elderly) and provide alternatives.

R5: Select and apply those work methods or technological resources that allow obtaining constant and updated data from the services to be able to monitor and implement improvements.

### Other determining factors

Some of the factors that directly influence the sizing of urban collection services are:

- Dimensioning of the containers to avoid the accumulation of waste.
- Design of the collection service taking into account several criteria: the morphology of the buildings, roads and sidewalks; socio-economic features of the municipality; proximity to the user; containers and collection frequencies that ensure proximity and to avoid overflows; convenient collection system adapted to all types of public; clear identification of containers (colors, shape, etc.); time and ease of collection.

### Links of interest

[Practical guide for door-to-door collection in municipalities of up to 5,000 inhabitants](#)

### Monitoring and control indicators

- Collection results by fraction (quantity and quality: inappropriate).
- Record of bad practices during the first months of implementation of the PaP system.



## A2. ACTIONS TO CONTROL AND AVOID BAD PRACTICES

### Technical resources needed

R1: Surveillance and control of the public road to identify offenders and the most critical areas on which to act with priority.

R2: Monitoring data extracted from inspections that allow the control of users who use the service.

R3: Updated municipal ordinances to sanction bad practices.

### Other determining factors

Some of the main factors that can influence the implementation and success of a system of actions to control and avoid bad practices are:

- Will and political consensus.
- Establish a trial and information period before starting the sanctions process.
- Explain to citizens the purpose of these control and penalty activities.

### Monitoring and control indicators

- Installation of cameras.
- Number of incidents per month.
- Ratio of sanctions with respect to the number of incidents.
- Number of incidents.





## A3. IMPLEMENTATION AND COMMUNICATION CAMPAIGN OF THE PAP SERVICE

### Technical resources needed

R1: Staff capable of designing the door-to-door system implementation campaign, or through external contracting.

R2: Environmental educators who inform about the collection model through talks and/or physical informative support material (schedules, letter by post, etc.)

R3: Digital space intended for the publication of information and direct communication with users.

### Other determining factors

The Door to Door system is presented as one of the most effective for improving selective collection. However, it presents two factors that must be taken into account, as they influence both its implementation and its correct development:

- Will and political consensus.
- Sufficient financing due to its high economic cost.
- Constant and fluid interaction with the citizen about the doubts and needs that arise with the change of model.

The range of economic cost per inhabitant for the implementation and communication of the PaP service ranges between €5 and €7, regardless of the size of the municipality (including material and informational work).

### Links of interest

[How to do an awareness campaign? \(Metropolitan Area of Barcelona\)](#)

### Monitoring and control indicators

- Number of attendees at information and environmental awareness events.
- Carrying out surveys to verify that the population has understood the system well.
- Number of participants in each collection with respect to the total number of users.

# L4. Increased efficiency in pruning management

## A1. CREATE A SUSTAINABLE PURCHASE AND RENT SYSTEM OF PRUNING MACHINERY

### Technical resources needed

R1: Reliable and up-to-date database. Some examples:

- Amount of pruning generated in the municipality.
- Potential users and large generators.

R2: Technical staff to prepare a comparative study to select the most suitable model and/or machinery (rental/purchase, machinery benefits, maintenance cost, complementarity of the collection service, etc.) or consider external contracting.

### Other determining factors

The management of pruning waste generated at homes is essential to achieve more sustainable and healthy urban communities. To achieve this, it is necessary to consider several key factors:

- Public awareness of the importance of properly managing pruning and the benefits it entails.
- Establish rules and regulations.
- Pruning selective collection service.
- Adequate infrastructures.
- Machinery and new technologies (ex. Shredders).
- Collaborations with local communities (eg neighborhood associations and other interested parties).

### Monitoring and control indicators

- Amount of shredded pruning.
- Registration of use of the machinery (citizen participation).
- Compost quality.
- Reduction of pruning waste destined for landfills.

## A2. SYSTEMS TO FACILITATE PRUNING COLLECTION

### Technical resources needed

R1: Study of services to facilitate the transport of pruning (eg door to door, specific containers, community collection points, etc.).

R2: Dimension the needs of the collection of the pruning adapted to the characteristics of the municipality.

### Other determining factors

Facilitating the collection of home pruning generated in municipalities involves the implementation of various strategies that facilitate the process for both residents and service operators. Some examples are the following:

- Collection frequency.
- Identification of the types of pruning waste.
- Rules and regulations.
- Evaluation of costs and efficiencies.

### Links of interest

[Example of a pruning debris collection service in Castelldefels.](#)

## A3. CAMPAIGN TO ENCOURAGE SHREDDING AND COMPOSTING OF PRUNING

### Technical resources needed

R1: Organization of workshops and community events to present the services and resolve doubts.

R2: Expert staff in the field who will carry out the communication campaign (master composter).

R3: Monitoring and monthly recognition of users of community composters to resolve doubts and to become references for potential users who do not use them.

### Other determining factors

Some key factors for the correct development of this type of campaign are:

- Incentives and recognition for the use of the composting system.
- Collection of data and feedback (ex. surveys).
- Establish channels of fluid communication with citizens.

The economic cost of a campaign of this type is approximately €1,500 for a volume of between 100-150 homes.

### Links of interest

[Example of an explanatory video on composting\\_\(Waste Agency of Catalonia\)](#)

### Monitoring and control indicators

- Quarterly analysis of the volume of shredded and composted prunings.
- Registration of the number of users of each service
- Surveys of users' assessment of the information actions carried out to raise awareness and resolve doubts about shredding and composting services.

# L5. Promotion and application of self-composting and community composting

## A1. PROMOTION OF SELF-COMPOSTING AND COMMUNITY COMPOSTING AMONG THE CITIZENS

### Technical resources needed

R1: Technical staff capable of designing a communication campaign about the composting system (functioning, advantages, etc.) or evaluating external contracting.

R2: Carrying out environmental education workshops in educational centers and in neighboring communities to learn how to compost.

R3: Encourage volunteering or hiring staff dedicated to monitoring composters to resolve doubts and provide technical support.

### Other determining factors

In the implementation of a community composting system at municipal level, some factors of great importance must be considered:

- Know the culture and environmental patterns of the citizenry.
- The actions of environmental education and awareness towards the new community composting system must be constant and focused on the needs of the users.

The economic cost of a campaign of this type is approximately €1,500 for a volume of between 100-150 homes.

### Links of interest

[Practical guide Implementation of community composting. Alternative to local Biowaste management.](#)

### Monitoring and control indicators

- Half-yearly surveys to detect the possible increase in composting actions.
- Monitoring the quality of the compost periodically.

## A2. EVALUATION OF THE DIFFERENT COMPOSTING SYSTEMS

### Technical resources needed

R1: Technical personnel capable of developing a comparative study of the different self-composting systems.

R2: Reliable and up-to-date database.

### Links of interest

[Study of the implementation of the composting of the organic fraction of municipal waste on a small scale.](#)

## A3: PROMOTION OF COMMUNITY GARDENS WITH OWN COMPOSTING

### Technical resources needed

R1: Dimension composters and necessary machinery.

R2: Hiring an expert for assembly.

R3: Recruitment master composter. Prioritizing, if possible, volunteering.

### Other determining factors

For the fulfillment of this action, it must be borne in mind that the support in all phases of the process, as well as the transfer of the necessary infrastructure to carry out the self-composting, represent two key factors for its correct development.

### Links of interest

[Network of community composting projects in Barcelona.](#)

# L6. Development of communication and awareness processes in the field of waste management

## A1. VISITS TO WASTE TREATMENT FACILITIES AND LANDFILLS

### Technical resources needed

R1: Staff with technical and educational expertise.

R2: Organization of open doors at the facilities.

R3. Design or procurement of training and educational materials and dynamics with attractive, pedagogical content and adapted to diverse audiences.

### Other determining factors

For the correct development of these training actions, there are several factors that will determine their success and, therefore, must be considered when planning and executing any educational visit to a waste treatment plant.

- Degree of involvement of the different areas of society with these initiatives, specifically the educational area.
- Presence of skilled spaces and staff prepared to carry out group visits to the treatment plants.

### Links of interest

[Examples of educational projects in the framework of waste and sustainability](#)

[Didactic guide for environmental education](#)

### Monitoring and control indicators

- Satisfaction surveys that evaluate both the trainer's abilities, the facilities visited and the degree of thematic interest of the workshop.
- Volume of visits by new users to waste treatment facilities.

## A2. PROMOTION OF THE USE OF SOCIAL NETWORKS

### Technical resources needed

R1: Analyze and define which platform is best suited to the characteristics and needs of the municipality.

R2. Presentation and initial dissemination of the chosen application to make it known among citizens and promote its use.

R3. Staff with the training and knowledge required to analyze and respond to the different demands of users.

R4. Maintain a proactive attitude on the part of the city council regarding the content that is disseminated.

### Other determining factors

For the development of communicative actions through the use of social networks, it is necessary to take into account several social and legal aspects that must be regulated prior to their use:

- Data protection, photos or personal information cannot be published without the consent of the person.
- Take cybercrimes into account when designing a campaign.

### Links of interest

[Do you know the Compartim un Futur social networks?](#)

### Monitoring and control indicators

- Volume and increase of followers or users of the application.
- Monthly record of inquiries and responses received
- Questionnaires of user satisfaction towards the application with its use.





## A3. CARRY OUT A COMMUNICATION PLAN ADAPTED TO THE MUNICIPALITY (AWARENESS AND COMMUNICATION CAMPAIGNS)

### Technical resources needed

R1: Technical staff capable of designing a communication plan adapted to the specific characteristics of the municipality or evaluating the hiring of these services.

R2: Have an updated database (e.g. demographic information to determine the profiles of the recipients of communication actions).

R3: Media adapted to the type of population (taking into account minorities when broadcasting).

R4: Present quality dissemination material both in terms of content and format.

R5. Evaluate the hiring of services or technological resources that allow you to manage and execute all the tasks of a communication campaign in the most efficient way.

### Other determining factors

Some key factors that must be taken into account for the correct development of campaigns or other communication actions are:

- Define the objectives of the campaign in a specific and measurable way.
- Select indicators to measure the success of the campaign.
- Collect and analyze data to determine if the established objectives have been achieved and identify areas for improvement.
- Evaluate campaign results.

These types of campaigns, also called fund campaigns, have an economic cost that ranges between €2 and €4 per inhabitant.

### Links of interest

[Communication with citizens. Awareness campaigns to strengthen social co-responsibility regarding municipal waste.](#)

[Exclusive technological tool for efficient planning, execution and management for all types of awareness and communication campaigns.](#)

[Communication and awareness campaigns. How to carry them out effectively and with resource efficiency.](#)

# L7. Improvement of economic profitability in the management of urban waste

## A1. SELECTION OF THE LOCATION OF TREATMENT PLANTS

### Technical resources needed

R1: Route and waste transport optimisation study through a prior diagnosis of the territorial and geographical structure, as well as the available transport network.

R2: Adaptation of communication routes to facilitate the passage of trucks in a more agile way.

R3. Assess the need or possibility of introducing intermediate transfer facilities.

R4. Prepare a final report that objectively justifies the exact and most appropriate location of the future waste treatment plants.

### Other determining factors

For the selection of the location of the waste treatment plants, different factors must be assessed and considered:

- Principle of proximity and energy efficiency
- Degree of impact on human health and the environment.
- Coordination with the different competent administrative areas.

### Links of interest

[General advice for the design of facilities. Optimizing the location and scale of the facilities.](#)

## A2. DESIGN OF STRATEGIES FOR THE IMPROVEMENT OF SELECTIVE COLLECTION

### Technical resources needed

R1: Technician specialized in data analysis who develops a study to optimize the selective collection of waste or consider outsourcing this service.

R2: Reliable and up-to-date database. Some examples of required information:

- Selective collection figures.
- Type and distribution of containerization elements.

R3: Elaboration of a comprehensive diagnosis of the collection system.

R4: Carry out a study of alternatives for collection models and establish methods to select the most appropriate one according to the characteristics of the municipality (decision matrix).

R5: Organization of meetings between specialized technicians and politicians to make joint decisions.

R6. Dimensioning of the different elements that make up the chosen model.

### Other determining factors

Some of the main factors that will determine success in terms of developing efficient strategies for improving selective collection are:

- Degree of experience you have in carrying out studies to optimize selective collection (structure, elements of analysis, etc.).
- Align the political sphere with the technical to decide the most suitable model.
- Have the ability and willingness to apply work methods, either in-house or through subcontracting, that facilitate the selection of the model that best suits our municipality (eg: decision matrix)

The decision matrix is a work methodology to evaluate key points that will allow to evaluate and select the optimal municipal waste collection model.

It represents a process that facilitates the alignment between politicians and technicians for decision-making through previously defined parameters (e.g. economic cost, reduction of inappropriate, etc.). For more information contact [hola@anthesisgroup.com](mailto:hola@anthesisgroup.com)

The price range for the following studies varies between:

- €6,000-10,000 for an initial diagnosis.
- €7,000-10,000 for a dimensioning of the service.
- €4,000-8,000 for a waste prevention plan.

### Links of interest

[Explanatory document of the study of alternatives and the decision matrix](#)



## A3. IMPLEMENTATION OF NEW TECHNOLOGIES ADAPTED TO THE NEEDS OF THE MUNICIPALITY

### Technical resources needed

R1: Have technicians with knowledge about data analysis.

R2: Have knowledge about subsidies for the acquisition and implementation of new technologies.

A3: Know the main functions and modules of these technological tools offered in the market in order to select the most suitable services.

### Other determining factors

The main factor that influences the execution of this action is both the knowledge of the benefits that these new technologies bring us, as well as the political conviction and determination to implement them.

In addition, it is necessary to be aware of the relevance of these tools on the control of contractors, a factor that will allow the economic and operational improvement of subcontracted services.

### Links of interest

[The example of LinkAudit, the application intended for the collection of on-site data on waste collection and urban cleaning services through the inspection team.](#)

### Monitoring and control indicators

- Selective collection indexes.
- Content of inappropriate words of each fraction.
- Citizen participation (use of platforms, incidents, etc.)



# A4. AWARENESS CAMPAIGNS OF GOOD PRACTICES AMONG THE CITIZENS

## Technical resources needed

R1: Hiring environmental educators or people specialized in waste to help raise awareness among citizens about the advantages and importance of managing waste well.

R2. Design or contracting of training and educational materials and dynamics with attractive, pedagogical content and adapted to diverse audiences.

R3. Evaluate the hiring of services or technological resources that allow you to manage and execute all the tasks of a communication campaign in the most efficient way.

## Other determining factors

When developing this type of campaign, several determining factors must be considered:

- Achieving a balance between the expenditure invested in infrastructure (smart containers, treatment plants, etc.) and the expenditure on communication actions to the various waste producers.
- Define the objectives of the campaign in a specific and measurable way.
- Select indicators to measure the success of the campaign.

These types of campaigns, also called fund campaigns, have an economic cost that ranges between €2 and €4 per inhabitant.

## Links of interest

[Exclusive technological tool for efficient planning, execution and management for all types of awareness and communication campaigns.](#)

[Communication and awareness campaigns. How to carry them out effectively and with resource efficiency.](#)

## A5. APPLICATION OF THE FAIR RATE AND UPDATE OF FEES TO ENSURE REGULATORY COMPLIANCE

### Technical resources needed

R1: Define the objectives of the generation payment system.

R2: Identify the waste that will be included in the payment per generation system.

R3: Define the rates that will be applied according to the amount and type of waste.

R4: Establish a measurement system to determine the amount of waste generated.

R5: Communicate and explain to citizens the operation of the new payment system by generation.

R6: Implement the system.

R7: Access system to the data needed to implement a payment per generation.

R8: Technical team to configure and develop the generation payment system or consider outsourcing.

### Other determining factors

Below are the main factors that influence the correct implementation and development of a generation payment system:

- Will and political consensus.
- Inform citizens in detail about the change in model.
- Use of technological tools that allow thorough monitoring and control of the data necessary to apply the payment criteria by generation.

### Links of interest

[Communication technology between citizens and councils. Improvement of the separate collection at the source of waste through citizen co-responsibility.](#)

[Guide for the implementation of payment systems for the generation of municipal waste](#)

# L8. Promotion and profitability of biogas

## A1. INSTALLATION OF BIOGAS PLANTS

### Technical resources needed

R1: Personal capacity to carry out a study of the economic and environmental feasibility of installing a biogas plant before starting construction (raw materials, energy demand, economic aspects, regulations, etc.).

R2: Hiring/training of a specialized technician to develop and monitor the process.

R3: Plant design: Several factors must be taken into account such as the type of substrate, digestion technology, digestate treatment systems, etc.

A4: Obtaining permits: the construction of a biogas plant requires different permits and licenses.

R5: Plant construction: includes the installation of digesters, biogas storage systems, biogas and digestate treatment and utilization systems.

R6: Start-up and monitoring of biogas production.

### Other determining factors

The construction of a biogas plant is a complex process on which certain factors must be considered for its correct operation:

- Operation and maintenance: regular maintenance is required to ensure efficient and safe operation (eg biogas production monitoring, equipment maintenance, etc.).
- Strategic location: these facilities must be located close to the main sources of raw materials (agricultural areas, sewage treatment plants, etc.).

For a biogas plant that treats more than 100 tons/year of organic matter, the investment can be higher than €140,000.

### Links of interest

[Envolta publishes informative guide to promote Biogas in Catalonia.](#)

[Digital news about the aid line for installing Biogas plants in Catalonia.](#)

[The operation of a biogas plant.](#)



## A2. CITIZEN AWARENESS CAMPAIGN ABOUT BIOGAS

### Technical resources needed

R1: Hiring environmental educators or waste specialists to raise awareness among citizens about the advantages and importance of biogas plants in the territory.

R2. Design or contracting of training and educational materials and dynamics with an attractive, pedagogical content adapted to diverse audiences that is able to spread the need and benefits of promoting biogas in its territorial areas.

R3. Evaluate the hiring of services or technological resources that allow you to manage and execute all the tasks of a communication campaign in the most efficient way.

### Other determining factors

Several determining factors must be considered:

- Achieving a balance between the expenditure invested in infrastructure (smart containers, treatment plants, etc.) and the expenditure on communication actions to the various waste producers.
- Define the objectives of the campaign in a specific and measurable way.
- Select indicators to measure the success of the campaign.

The economic cost of these types of campaigns ranges between €2 and €4/inhabitant,

### Links of interest

[Communication with citizens. Awareness campaigns to strengthen social co-responsibility regarding municipal waste.](#)

[Exclusive technological tool for efficient planning, execution and management for all types of awareness and communication campaigns.](#)

## A3. REGULATING TREATMENT PLANTS AT ADMINISTRATIVE LEVEL FOR THE INSTALLATION OF BIOGAS DIGESTORS

### Technical resources needed

R1: Organize work sessions with interested actors to find solutions and generate proposals to promote the installation of digesters in sewage treatment plants.

R2: Draw up a feasibility plan for Biogas in treatment plants that justifies the benefits it brings both economically, operationally and environmentally.

### Other determining factors

Coordination between administrations is key to achieving this action.

It is essential to schedule meetings with stakeholders to technically present the opportunity and turn proposals into effective policies.

### Links of interest

[The function of the digester in the production of biogas](#)





# L9. Implementation of methods for assessing the environmental impact of selective collection and reduction of CO2

## A1. INCORPORATING SUSTAINABILITY CRITERIA IN CONTRACTS

### Technical resources needed

R1: Staff with knowledge about more sustainable options (materials, production systems, provenance, useful life, environmental impact, etc.).

R2: Hiring of advice to select and draft the key criteria to be incorporated into public contracts for municipal collection and cleaning.

### Other determining factors

Some of the main factors that will determine success in terms of the selection and incorporation of sustainable public procurement criteria are:

- Knowledge of new needs and environmental regulations.
- Knowledge of the hiring criteria that can improve the environmental scenario of our municipality.
- Comprehensive knowledge of all the elements (human and material resources) incorporated in the collection and road cleaning services to be able to evaluate them and in this way, define the environmental criteria for each of them.

The price range for sustainability reports ranges from €8,500 to €14,000, and mobility plans from €6,000 to €10,000.

### Links of interest

[Company mobility plans](#)

[Sustainability reports](#)



## A2. CO2 EMISSION CALCULATION STUDY AND CARBON FOOTPRINT COMPENSATION

### Technical resources needed

R1: Studies to calculate CO2 emissions on the collection system. These documents must analyze and evaluate aspects such as:

- Type of fuel for waste collection and cleaning vehicles.
- Size of the population served.
- Waste collection and treatment model.
- Technology used: These resources can significantly reduce the amount of CO2 emitted per unit of collected waste.

R2: Economic study to propose and define the actions to be implemented on the collection model to optimize it in terms of energy efficiency and reduce it in terms of CO2 emissions.

R3: Hiring of advice to draw up a compensation study of the carbon footprint of a sector or socio-economic area of our municipality.

### Other determining factors

Some of the main factors that will determine success in terms of developing CO2 emission calculation studies on collection systems are:

- Policy and regulatory framework. These elements can have a direct impact on waste collection and treatment actions and consequently on CO2 emissions.
- Willingness to implement technological resources that allow to optimize and reduce the most polluting elements of the collection systems (type of vehicles, behavior guidelines, final treatment of waste, etc.).

The price of carbon footprint compensation studies are determined based on the compensation project and the value of the credits at the time of compensation.

### Links of interest

[CO2 compensation of services](#)

[Guide for calculating the carbon footprint for the development of an organization's improvement plan.](#)

# A3. optimisation OF WASTE COLLECTION AND CLEANING ROUTES THROUGH NEW TECHNOLOGIES

## Technical resources needed

R1: Have technicians with knowledge about data analysis.

R2: Have knowledge about subsidies for the acquisition and implementation of new technologies that allow services to be optimized at an economic, energetic and operational level.

A3: Know the main functions and modules of these technological tools offered in the market in order to select the most suitable services.

## Other determining factors

The main factor that influences the execution of this line is both the knowledge of the benefits that these new technologies bring us, as well as the political conviction and determination to implement them.

The approximate €/year range for a medium-term contract (6 years) is:

- 25,000€ (<30,000 inhabitants)
- 65,000€ (<200,00 inhabitants)

Where monitoring and control of the service is included.

## Links of interest

[Example of a technological platform for the management and execution control of collection and cleaning services.](#)

## Monitoring and control indicators

- Selective collection indexes.
- Content of inappropriate words of each fraction.
- Citizen participation (use of platforms, incidents, etc.)

# THE IMPACT OF THE PROGRAM

The SIMIL Programme, as a bridge between policy makers and scientists, has proven to be a fruitful initiative during its first edition.

The diversity of perspectives has created a space for dialogue and collaboration that has made it possible to address the current challenges regarding municipal organic waste management through innovation. The vital intersection between science and politics is established as a space for collaboration, essential for developing informed and effective solutions to address environmental challenges.



The impact of the SIMIL Programme as a catalyst to empower municipalities with knowledge and tools is reflected in the numerous initiatives and ideas that emerged during this first edition.

These approaches are a testament to the aspiration of representatives of the public administration to promote positive changes that contribute to the improvement of measures and strategies at the municipal level.

Additionally, the willingness of scientists to actively contribute with innovative solutions based on scientific evidence to support local needs has been noted.

# AND THE FUTURE SIMIL



The SIMIL, far from being ephemeral, emerges as the first part of a continuous series of pairing schemes between scientists and representatives of the administration to face the main environmental challenges.

The BETA Technological Center's commitment to bidirectional collaboration within the science-policy interface will materialize with the creation of two new editions of the SIMIL Programme.

Through these new Programmes, continuous dialogue will continue to be encouraged to encourage the co-creation of solutions to challenges based on environmental technologies and the principles of circular bioeconomy to continue contributing to the sustainable development of the territory.



@Simil\_cat



Programa Simil

This project has been coordinated by the BETA Technological Center

