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A circular economy approach for lifecycles of products and services

Incentive schemes for collaborative reuse/recycling of products

Deliverable 2.5

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Executive Summary

This document describes the definition process of incentive schemes aimed to encourage end users for the reduction of food waste, the reuse of electronic and increase the recycling ratios. In this deliverable, the following actions have been conducted:

- Analysis of different approaches: the development of Incentive schemes and economic instruments has been studied from different points of view considering a wide range of initiatives that are successfully implemented and working in different regions all over the world. In general, incentive schemes can be divided into two different types of systems:
    - System based on rewards for end-users.
    - System based on charges and/or penalties for lack of sustainability.

  As a result of this analysis, it is concluded the system of rewards as the best option for the development of incentive schemes within the CIRC4Life approach.

- Identification of barriers to implement incentive schemes: investigation of potential barriers that could arise during the application and execution of the incentives developed has been realized. Derived from this, solutions to overcome the potential barriers have been proposed. Also, a detailed list of the interactions and contacts maintained with the stakeholders involved in each demonstration has been included.

- Selection and description of the incentive methods: based on the analysis conducted and, as previously stated, a system based on rewards for end-users has been considered the basis for the incentive schemes to be applied in the demo cases to be tested within the project. The system of rewards is related to the eco-credits method developed in task 2.4, so that end-users dispose the waste into the smart bins developed for both demonstrations and they receive eco-credits as a result, depending on the attributes and conditions detailed in the eco-credits method. Then, the eco-credits obtained can be used by end-users to reach the incentives defined for each demo case.

  In this section, some examples of incentives for each demo case are detailed, including the conversion rate between eco-credits and incentives defined in each pilot test.

Finally, considering the characteristics of the demo cases within the CIRC4Life approach and, based on the information available at the moment of this deliverable, a guideline for local authorities and other stakeholders to implement and maximize the impact of the schemes has been produced, including recommendations and suggestions for policies related to reuse and recycling.

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Acronyms and abbreviations

Abbreviation	Description
CEBM	Circular Economy Business models
EC	European Commission
EEE	Electrical and Electronic Equipment
EoL	End of Life
PAYT	Pay As You Throw
WEEE	Waste Electrical and Electronic Equipment

1 Introduction to the System of Incentives.

In regard to the economy, an incentive is a potential benefit that is offered to an individual, group or a sector of the economy with the purpose of elevating production, improving performance or achieving a greater outcome for a determined task.

Human activities can be measured by incentives, many of which exist at an inconsistent level. Each time that a person carries out a certain activity, it is completed with the intent, of one form or another, bringing satisfaction. It is accepted that incentives mobilize action.

The incentive can function as the stimulation that awards an individual for the achievement in whichever area (labor, social, emotional, etc.) with the intention of striving to achieve something. There is an expectation, thus, of compensation.

As mentioned before, incentives may also be instated for the purpose of encouraging citizens to engage in specific actions or activities. The most commonly used incentive is money; however, incentives do not necessarily need to be fiscal or monetary. For example, the high occupancy vehicle (HOV) lane exists on the highway to encourage carpooling, and therefore reduce greenhouse gas emissions. In addition, the incentive must be widely apparent, directly associated with a behavior, and may vary depending on the quantity and quality of the action.

1.1 Incentive Programs

An incentive program may be defined as a formal scheme used to promote or encourage specific actions or behaviors by a specific group of people during a defined period of time.

It is necessary to acknowledge that all incentive schemes should have a specific, well-defined outcome, in order for the intended recipients to have the capability of analyzing the results. As the type of program is being developed, it is fundamental to identify the most suitable motivator, in order to obtain the best results from the participants.

Historically, the system of incentives has been developed in public administrations and private companies oriented around:

- **Workers:** to increase performance and recognize their efforts of successfully completing the objectives. It should also be mentioned that the incentive scheme has remained relevant throughout decades, a difference from other services. Various studies have proven that companies which understood the capacity of motivating workers during a recession were the most efficient at recovering afterwards. The most prevalent example is observed through recovering the portion of the lost profit.
- **Clients:** to create a reliable offer, attract new clients and maintain relationships with existing ones. Accordingly, loyalty cards have been created, which utilize points and other systems. This awards the use of products and/or services, and it is the driver of this incentive system.

Under the CIRC4Life approach, the incentive schemes will be designated for final users with the aim of developing a system that together with the development of the methodologies of “Eco-points” (task 1.3) and “Eco-credits” (task 2.4), will be able to encourage end users to improve the reuse and recycling ratios.

The challenge is to determine if, in addition to the widely accepted 3Rs (reduce, reuse and recycle), another “R” needs to be added: “reward”.

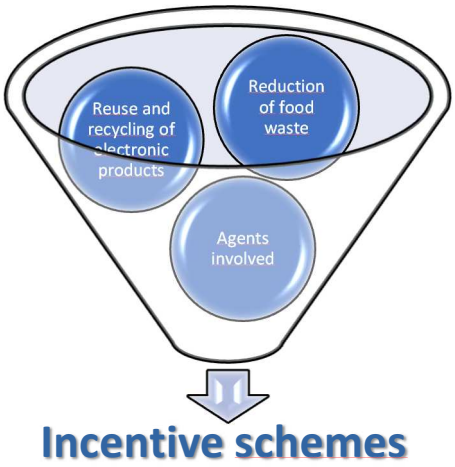

Figure 1. Incentive schemes within CIRC4Life project approach

2 Analysis of different approaches

The development of Incentive schemes has been analyzed from different points of view considering a wide range of initiatives that are successfully implemented and working in different regions and locations both in Europe and other regions around the world.

The analysis of different approaches regarding economic instruments (EI) and incentives is necessary due to the diversity of waste within the CIRC4Life project. The types of waste to be later demonstrated involve, in some cases, completely different processes of commercialization, distribution, recovery and management, so knowing and studying the situation from different approaches is required.

In general, the incentive schemes for achieving an increase in ratios of reuse and recycling are principally divided into two main types; systems of rewards and systems based on penalties or charges:

2.1 System of rewards for the user

2.1.1 Promoted by public administrations

The programs of incentives promoted by local and regional agencies consists of the utilization of financial resources of public aspect for the attainment of established objectives, over a determined period of time.

During the development of this deliverable, some public successful initiatives already in operation have been analyzed, such as the following.

2.1.1.1 Consorcio Valencia Interior: “mi cuenta ambiental” (Spain)

Corsorcio Valencia Interior is a group of 61 municipalities from 5 regions of the Valencia Community (Spain), with a population greater than 250,000 inhabitants and a generation of 120,000 tons of urban waste every year.

The Consorcio started the environmental program “Mi cuenta ambiental” in 2014. This is a pioneering initiative that rewards citizens for their positive behavior in relation to the environment. The effectiveness of the program is compared with others neighboring municipalities to those that are part of the Corsorcio, and the evaluation is based on the overall performance in the management of waste and recycling.

Figure 2. "mi Cuenta Ambiental" card example.

Types of waste that are included in this incentive program are:

- Cooking oil
- Used tires
- Electrical appliances
- Cartridges

- Debris, plant cuttings and other bulky waste
- Fluorescent bulbs
- Paper-carboard
- Wood and furniture
- Leftover paint
- Batteries and accumulators

Depending on the type of waste and its weight, "points" are assigned for its usage. These points conclude at the end of the year and are converted into discounts on the municipal tax for domestic waste. This discount can reach up to 50% in total.

From the Consorcio defends the results that have been produced with the entry into force of this initiative, resulting in an increase of 48% total waste recovered, in comparison to the previous year. In the case of WEEE, this increase reached 13%.

According to the Consorcio, the incentive program focuses on these principle incentives:

- Educate the population on the importance of well-separated collection of waste for the most efficient and sustainable management
- Award those who do well. Recognize the awareness and the collaboration of the citizens within the environmental care
- Improve the environmental performance results by increasing the separated collection of the distinct streams of waste for the most efficient management
- Reduce the bill for the management of waste. The lesser amount of mixed waste there is, the lesser the cost of the management will be

2.1.1.2 Lipor: "Eco Shop" (Portugal)

Intermunicipal Waste Management of Greater Porto (LIPOR) is responsible for the management, recovery and treatment of the Municipal Waste produced in the eight associated municipalities of Portugal: Espinho, Gondomar, Maia, Matosinhos, Porto, Póvoa de Varzim, Valongo and Vila do Conde.

Every year, Lipor treats about 500,000 tons of municipal waste that are produced by about 1 million inhabitants. Production of municipal waste per capita: 1,38 Kg/inhab/day.

Based on modern waste management concepts that stand for the implementation of integrated systems and reduction of waste disposal in landfills, Lipor has developed an integrated strategy for the recovery, treatment and confinement of municipal waste, based on three main areas: Multi-material Recovery, Organic Recovery and Energy Recovery, which are complemented by a Landfill where rejected and previously prepared waste is sent to.

Following the strategy of sustainability, waste management and circular economy approach, Lipor has developed the initiative "Eco Shop". The Eco Shop is a loyalty card that promotes commitment to good environmental practices, represents a method of recognition of their participation in multimaterial recycling process and allows access to LIPOR catalogue of benefits. More than 2,000 users are nowadays using the Eco Shop card by delivering their waste in the selected recycling points available at Lipor webpage.

Figure 3. Categories of Eco Shop cards

Each time you use your Eco Shop card to deliver waste through the municipal services participating in the initiative, you are accumulating points that give you access to purchase coupons on products or services. Once you reach 250 points in the card, you can at any moment request the exchange of points, for benefits included in the catalogue. Each waste gives you points for coupons but there are some differences depending on the type of waste. In this manner, wastes such as plastics, cells-accumulators, paper-carton, WEEE, etc. give 8 points while other wastes such as clothes or contaminated bottles give only 1 point. In between, other types of waste such as wood, ink-cartridges, glass or domestic oil give 4 or 2 points according to the system provided by Lipor in its webpage:

Table 1. System of points given per type of waste_Lipor [1]

SISTEMA DE PONTOS	
EPS/Polystyrene *Lamps* *Paper/Carton* *WEEE* *metal scrap* *Plastics* *Accumulators* *Cells and batteries*	**8 points**
Wood *Glass* *Printer ink cartridges and toner cartridges*	**4 points**
green waste from parks, gardens used cooking oil Contaminated packaging	**2 points**
Debris *Non-metallic waste* *Clothes*	**1 point**

There are 4 categories of shopping vouchers and each category is associated with different benefits, products or services distributed based on an order of value. The more points you accumulate, the higher is the value of the benefits that you will be able to use in products and services provided by Lipor, as well as its partners.

Figure 4. Categories of Eco Shop cards

The benefits offered include a wide range of discounts in several products and services such as sport activities, food, health treatments, leisure and cultural tickets, travels and hotels, phones and tablets, education, etc.

Figure 5. Example of a benefit included in the catalogue_Lipor [2]

2.1.1.3 New South Wales: “Return and Earn” (Australia)

New South Wales (NWS), with the initiative “Return and Earn”, started on 1 December 2017 the largest litter reduction initiative introduced in NSW.

The initiative works with “reverse vending machines” allowing people to deliver eligible waste and get money or coupons in return. This provides a great incentive for people to take interest in the process of recycling.

“Return and Earn” allows citizens to return eligible containers (plastic, cans, aluminium, carton, glass…) and earn 10 cents per container disposed. The machines accept up to 500 containers in one transaction and should be empty, uncrushed, unbroken and with the original label attached.

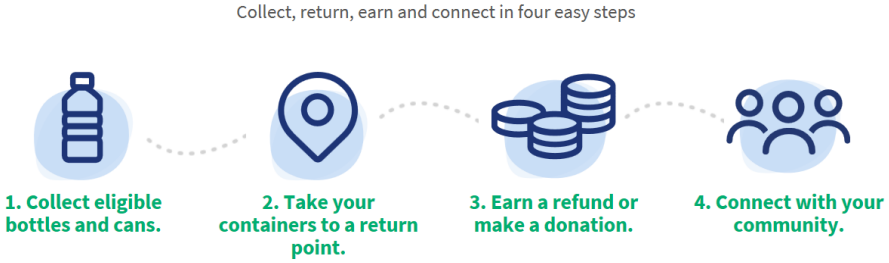

Figure 6. "Return and Earn" system [3]

The refund can be received in many ways, including:

- **Retail voucher:** printed by the machine, the voucher can be spent or exchanged for cash at participating retailers depending on where the machine is located.
- **Electronic refund:** by scanning your barcode and once you return the containers, the refund will be credited to your PayPal account.
- **Cash refunds:** available in some return points, after the containers have been returned the person in charge of the "Return and Earn" point will give you a refund of 10 cents per container.
- **Donations:** you can donate your refund to a Donation Partner. Donation Partners are chosen from a list of not-for-profit and community organisations such as charities, sports clubs and schools. There can be up to four to choose from the touchscreen of every Reverse Vending Machine.

Nowadays, 642 return points are available all across NWS in which citizens have returned more than 1,5 billion containers so far (March 2019), just three months on from reaching the 1 billion mark. The average daily return rate across the state is now around 4,9 million containers a day.

Over a 20-year period the scheme is expected to result in:

- 1.6 billion fewer drink containers being littered.
- 11 billion fewer drink containers ending up in landfill.
- 12.6 million more drink containers being recycled.

"Return and Earn" is part of the NSW Government's commitment to reducing litter volume in NSW by 40% by 2020.

Figure 7. "Return and Earn" point.

2.1.1.4 Other local and regional initiatives

- "The Mercado de Trueque" is a barter market in **Mexico City** that occurs once a month since 2011, promoted by Environmental department of Mexico City [4]. It offers vouchers to citizens in exchange for their waste, which can then be traded in for fresh products. The waste is then sorted by volunteers or employees of the government, before being specially treated at processing facilities. This event draws up to approximately 4,000 people a month and brings awareness to the concept of recycling.

  Citizens are allowed to bring:
  - WEEE
  - Aluminium
  - Iron

- Domestic oil
- Glass bottles
- PET
- HDEP

- **Archdale (USA):** The city of Archdale is encouraging households to recycle by randomly awarding $100 to individuals that are shown to be actively participating in recycling initiatives. Since the program has started there has been an increase in participation from 1,000 households to 3,815 households [5] and there has been a reduction of seven percent of solid waste in landfills.

- **Monroe (USA):** Monroe has set up a recycling incentives program which encourages households to have a competitive recycling-to-trash ratio. Started in late 2004, the program awards households with monetary incentives. First place receives $200 and second place is awarded $100. Each month the route eligible to receive the reward rotates to give all citizens a chance to participate. At the end of the month the winner is featured in the local newspaper. At the end of the year a grand prize of $500 is awarded to the household that had the overall highest amount of recycling during the contest [5].

2.1.2 Promotions through other agents:

2.1.2.1 Recicla y gana (Spain)

"Recicla y gana" is a private platform situated in Spain, which incentivizes users to correctly place their waste in specially designed smart bins.

Recicla y gana provides the user with recycling points through usage of intelligent containers, when acceptable waste is deposited using the platform. In this way, the users are identified by the container with their user-card or a QR code on their cellphone. Then, the container prints an adhesive sticker that one part is kept for the user as a receipt of the operation made and the other part is attached to the waste for traceability and control of it. Once the sticker is attached, the user delivers the waste into the corresponding intelligent bin.

Through the web platform Recicla y gana (https://www.reciclaygana.org/), it is possible to keep track of all users and assess the recycling being completed. In concrete, all waste deliveries that have been carried out can be consulted and checked the state in which they are found and the economic incentives that the user can reach as a result of the management.

The types of accepted waste for the platform Recicla y gana are:

- Cans of aluminum
- Waste Electronic and Electric Equipment
- Cooking oil
- Clothes
- Ink cartridges
- Batteries and accumulators
- Fluorescent bulbs
- Coffee capsules

Since the implementation in November 2016, the platform has achieved the following goals at their Albacete (Spain) location:

- Nº registered users: 1,812

- Total recovered Kg (all types of waste): 30,044 Kg
- Kg WEEE: 5,367 Kg
- Nº Total containers: 7
- Nº Containers for WEEE: 2

Recicla y gana considers its initiative as essential to promote the recycling and awareness in people by giving incentives in return to the separated and disposed waste by the user in their machines, in contrast to the traditional system. According to their sources, people consider them as a new way to motivate citizen to contribute to sustainability at local level.

Figure 8. “Recicla y Gana” containers at the recycling point located at Albacete (Spain).

2.1.2.2 Ikea: reverse vending (Scotland)

Ikea rewards people in some countries for recycling domestic bulbs, glass, aluminium and plastic (PET) drinks containers through a range of incentives such as money back, discount vouchers or vouchers for donations to charities.

As an example, Ikea launched in 2013 a “reverse vending scheme” in the largest cities of Scotland composed by vending machines where customers can recycle any glass, plastic or aluminium drinks containers purchased from the restaurant, shop, or vending machines in their Edinburgh and Glasgow stores.

Once returned and deposited through the machine, for each item shoppers are offered the choice of a 10p voucher to redeem in-store or a 10p donation to one of the stores’ selected charities.

Figure 9. Ikea voucher in a reverse vending machine at Glasgow (Scotland).

Using reverse vending machines, Ikea is pioneer in offering incentives such as vouchers, donations to charities or money back to end-users with the aim of increasing the recycling rates and reduce the amount of used drinks containers going to landfill, as well as to encourage people to take part of the recycling system.

2.1.2.3 Ganamos reciclando (Spain)

"Ganamos reciclando" is an initiative that has been functioning in various regions of Spain since 2016 and is expanding through a franchise system that extends the model of incentives to users in other regions.

The initiative works with reverse vending machines. This means that containers in good condition are recognized when inserted and then classified. Following this, the machine delivers a coupon that can be used in collaborating establishments.

This incentive is in place to improve the rate of recycling of bottles, contribute to the cleanliness of the municipalities, and benefit the local commercial businesses by directing the public to markets where the machines can be found. According to them, this program favors monetary savings for the citizens, and promotes a method of alternative recycling with social, environmental and economic benefits.

Even though the basis of the incentive is solely symbolic, it highlights the potential of this positive reinforcement for creating and maintaining a beneficial attitude with the planet. In this sense, it has been confirmed that the reception for the systems is positive within the population. Also, it extends to all ages, from children to the elderly.

Figure 10. "Ganamos reciclando" collection points

2.1.2.4 Segundos para el planeta: “Ecosegundos” (Spain)

“Segundos para el planeta” is a novel business that is dedicated to the promotion of recycling through incentives for end users. The incentives are offered through their APP “ECOSEGUNDOS” in collaboration with various establishments and sale platforms.

This company, through the use of several special containers, allows for the delivery of packaging waste. The container prints a receipt with the information about the waste that has been delivered, and the seconds (ecosegundos) that have been added to the planet because of sustainable behavior. These “ecosegundos” later are converted into incentives for the user to enjoy in various collaborating establishments.

The initiative has been functioning since 2019 in Granada (Spain) and permits the recycling of plastic and metal containers and also foresee the introduction of glass containers recycling in the future.

Figure 11. "Ecosegundos" container

2.2 Penalty systems for lack of sustainability

2.2.1 Pay as You Throw (PAYT):

PAYT is a usage-pricing model for disposing different types of waste (traditionally used for municipal solid waste). In this system, citizens are charged a rate based on how much waste they present for collection to the municipality or local authority.

Under traditional systems, people typically pay for trash collection and disposal through a flat fee. Within PAYT programs, cities typically reduce or eliminate flat fees and replace them with variable pricing. People who throw away more pay more, while people who throw away less pay less.

When it’s paired with free recycling services, PAYT simply and effectively aligns the incentives for everybody to reduce, reuse, and recycle.

Figure 12. "PAYT" system [6].

The way that PAYT is implemented depends on the community: some communities have specific bags, others have tags, while still others have certain sized bins. Citizens are then charged based on the weight or size of each container. This encourages the recycle and reuse of products.

PAYT programs are an effective tool in increasing waste separation and recycling, and also encourage waste minimization. According to the "Environmental Protection Agency" of USA (EPA) [7], the main benefits of implanting PAYT programs can be distinguished between:

- Environmental Sustainability - Communities with programs in place have reported significant increases in recycling and reductions in waste, due primarily to the waste reduction incentive created by PAYT. Less waste and more recycling mean that fewer natural resources need to be extracted. In addition, greenhouse gas emissions associated with the manufacture, distribution, use, and subsequent disposal of products are reduced as a result of the increased recycling and waste reduction PAYT encourages. In this way, PAYT helps slow the buildup of greenhouse gases in the Earth's atmosphere which leads to global climate change.

- Economic Sustainability - PAYT is an effective tool for communities struggling to cope with soaring municipal solid waste management expenses. Well-designed programs generate the revenues communities need to cover their solid waste costs, including the costs of such complementary programs as recycling and composting. Residents benefit, too, because they have the opportunity to take control of their trash bills.

- Equity - One of the most important advantages of a variable-rate program may be its inherent fairness. When the cost of managing trash is hidden in taxes or charged at a flat rate, residents who recycle and prevent waste subsidize their neighbors' wastefulness. Under PAYT, residents pay only for what they throw away.

The result is especially significant in energy savings from transportation, increases in material recovered from recycling, and reduction in pollution from landfills and incinerators. And thus, the reduction of the load of landfills [8]. PAYT programs also indirectly encourage producers to develop more efficient designs and environmentally friendly product life cycles.

PAYT system is widely implemented in USA where nowadays are more than 7,000 PAYT programs already working all over the country, including some of the largest cities, according to the latest EPA data available. [9].

2.2.1.1 The city of San Francisco [10]

As a method of decreasing the amount of waste that is thrown away, the city of San Francisco imposes fees for the collection of trash bins. The charges are based on the size of the trash bin and the frequency of which the collection occurs. Additionally, a fee of up to 10 times higher is applied for regular garbage, in contrast to recyclables. A contamination charge is also in existence for citizens that have been found to be unvigilant, several times, with the proper separation of waste.

The success of this program, in part, comes from partnership with the waste management company "Recology".

Figure 13. San Francisco's three bin system.

The city of San Francisco has also introduced the Mandatory Recycling and Composting Ordinance. This is a law requiring that all businesses, citizens, visitors and the government recycle properly. Those found to be un-abiding are possibly subject to a fine. For the first two times, warnings are attached through a tag on the bin. If contamination continues to occur, the perpetrator must pay a fine.

San Francisco's success in recycling program is due to the combination of five factors:

- Convenience
- Incentives
- Legislation
- Education
- Partnerships

2.2.1.2 Gainesville, Florida, USA

The city of Gainesville [11], Florida, began reshaping the city´s disposal of solid waste in 1994. Before this, the community was devoid of attempts to limit the amount that citizens discarded. A PAYT system was implemented, in which citizens were charged based on the size of the trash bag that was purchased.

Three different sizes existed: 32, 64, and 96 gallons, each costing $2-4 more than the size below it. In addition to this, Gainesville added items that could be recycled, such as brown paper bags, phone books, and cardboard. Several public outreach programs were also introduced in order to familiarize the public with the new program. Within the first year, the amount of collected recyclables increased by 25% and the collection of solid waste decreased by 18%. The total amount of tons disposed decreased by 4,000, and the total savings for the city resulted in $186,200.

2.2.1.3 San José, USA

Before 1993, San Jose imposed minimal regulations regarding the amount of waste that citizens disposed [12] [13]. The city charged a monthly flat rate of $12.50 for the garbage collection service, and the majority of households set out three 32-gallon garbage weekly. However, in July of 1993, San Jose began their attempt to

reduce waste; public education programs were set up beforehand, and eventually San Jose began imposing an additional cost for 32, 64, and 96 gallon trash bags. Residents reacted quickly, and 87% of households requested the 32-gallon bag immediately after the program was implemented.

Since then, San Jose has continued to make progress. Through the combination of technology and innovation, the city of San Jose introduced a plan for a more sustainable design within the next 15 years.

Ten main objectives were established, which mainly focused on job creation, responsible energy use, construction of green buildings, and elimination of waste. Additionally, the ultimate goal of a 75% diversion rate by 2013 and a zero waste goal by 2022 were also officially acknowledged. San Jose also identified the specific ways to reach zero waste, which included the improvement of the "downstream" and "upstream" of materials, the reuse of products, the preservation of land for sustainable development, and creating a more convenient approach for recycling.

2.2.1.4 South Korea

South Korea is another country that has taken initiative and greatly reduced their food waste total [14]. In 2005, South Korea banned food waste from landfills. Later, in 2013, another ban was introduced that restricted the dumping of liquid residuals. Accordingly, the percent of recycled food waste rose from 2% to 95% between 1995 and 2013.

The city of Seoul, especially, has undergone significant changes to improve the percentage of recycled food. This is because another law exists, which requires that food waste be disposed of in biodegradable bags and placed into specified containers. Citizens pay for the bags at the convenience store, therefore also paying for the waste tax.

In other parts of the city, another type of "pay as you throw" program exists, where large metal waste containers are available for the public to weigh and toss their excess food. Before disposing the food, the citizen scans into the machine with a card associated with their specific household. At the end of the month, the citizen receives a bill correlating to the amount of food that was disposed. The food continues on to become animal feed, fertilizer, biogas or bio-oil. Each machine is also equipped with a radio frequency identification (RFID) chip reader, allowing for management of the container, service verification, productivity of appliances and tracking of food.

2.2.2 Other penalty systems: plastic bag charges

In regard to plastic waste, it has been noted that plastic bag charges are often more successful than bans. In terms of bans, citizens continue to find the free option rather than changing their behaviour by bringing a reusable bag. In contrast, when a charge is enforced, individuals tend to seek the cost-saving alternative of bringing a bag from home.

Washington DC in the USA has been one of the cities to report the greatest amount of success with plastic bag fees. After completing a study on the nature of waste in the Anacostia River, it was composed mainly by plastic bags. As a result, a $0.05 tax was imposed on plastic bags in 2009.

This law stated that businesses selling food or beverages must charge customers for any plastic bags that are used, which discouraged the purchase of single use bags. The resulting revenue went to the Anacostia River Clean Up and Protection Fund. This financed the protection of the watershed mainly through stream restoration initiatives, educational programs, and the distribution of reusable bags to the public. The overall result, based on a study that was conducted 6 months after the implementation of the tax, was successful. It was reported

that businesses achieved a 50% reduction of plastic bag distribution, and a 72% reduction of plastic bags found in stream clean-up events was noted [15].

Another method of encouraging citizens to use reusable bags is with the combined implementation of plastic bag charges, as well as a ban. This has been implemented in several cities in California, and it has demonstrated success. In the city of San Francisco, which banned single use bags in 2007, and added a $0.10 bag tax in 2012, a reported 72% reduction resulted from these initiatives [16] [17].

In 2002, Ireland introduced a plastic bag charge of EUR 0.15, which produced highly significant results in the reduction of plastic bags. The tax was implemented to clean up the landscape and combat the adverse effects of producing plastic bags. Within the first several years, plastic bag usage had been reduced by 90% [18]. However, the purchase of plastic bags began to rise again in 2007, to which the Irish government responded; the cost of plastic bags rose to EUR 0.22. In addition to this, though it was never implemented, there was also the possibility of increasing the cost by an additional EUR 0.03. This amount would also have been continuous; it was proposed that a 10% increase should be added every year, owing to inflation. Even without the continual increase, over the course of 12 years, the plastic bag tax generated a total of 200 million euros. A year before the tax, it was noted that plastic bags contributed to 5% of litter pollution. In 2013 when the study was re-conducted, the amount of plastic bags in litter pollution only amounted to 0.13% [19].

2.3 Differences between the two types of incentive systems.

When creating methods for encouraging citizens to recycle, as stated before, the approaches mainly fall into two main categories: positive incentives and negative incentives. During this process, it is important to determine the desired goals as well as the conditions under the scheme that is going to be implemented. This may assist in the election process between the two different systems.

Negative incentives are based around a system of penalization to encourage citizens to recycle; it functions by introducing charges to the public for the trash that is disposed and thus, are usually promoted by public administrations. Additionally, these economic instruments may further be enforced by establishing laws and introducing the possibility of fines for citizens that do not follow the rules.

As we have analysed before, one popular design for negative incentives is known as ¨Pay as You Throw" programs. The PAYT concept is simple-rather than paying for trash collection and disposal indirectly (often through property taxes), residents under this program are asked to pay for each container of waste they generate. It gives them an incentive to reduce waste, and it can be very effective: after implementing PAYT, communities typically report significant reductions in generation of waste as well as increases in recycling. Various US and European cities have reported success with this type of system, possibly the most distinguished being San Francisco (USA). After the city began to charge the citizens for waste and also instated disposal bans, the amount of waste diverted from landfills rose greatly. In addition, it is also worthwhile to recognize the fact that public dissent for this type of program has been limited to non-existent [20].

One of the major benefits of PAYT is the reduction of greenhouse gases that are produced. When citizens are encouraged to recycle, reduce and reuse existing products, there is a decrease in the amount of greenhouse gases emitted. Statistics showed that if an additional 200 communities adopted PAYT and the population was able to reduce waste by 20%, it would cut emissions by 3.8 million MTCE (mega ton carbon equivalents) [21].

In contrast to negative incentives, positive incentive systems encourage citizens to recycle by providing a benefit. Monetary rewards, as well as non-monetary rewards can be utilized and these instruments can be promoted both by public administrations and private organizations.

Some examples of non-monetary rewards are free entrances to local events, promotional items, reduced transportation time in the HOV lane, and convenience. For one instance, North Carolina Division of Pollution Prevention and Environmental Assistance (DPPEA) provided the local communities with tickets to a local baseball game as recognition for recycling. A certain amount of tickets was distributed per community, which was based on citizen interest in recycling information, and requests for recycling bins. Approximately 4,000 tickets were distributed and an increase in recycling was observed; the main message of recycling was effectively conveyed.

Positive incentives also typically operate by providing the community with ways to accumulate points, which can then be used at designated locations. Positive incentives are mainly in use throughout the US, EU and certain parts of Asia.

Both systems of rewards have previously been implemented and proven successful; positive and negative incentives have each produced significant results. Based on the data collected, it can also be inferred that the combination of economic instruments can also be more effective. There have been reports of greater success when a tax, in addition to a ban, was imposed on certain items or cases. For instance, where the proper sorting into fractions will be of major importance for recycling efficiency by giving rewards when actors are sorting and managing their waste correctly but also punishing bad practices in handling the waste or breaking rules. Providing information to citizens is also popular method of incentivizing, although it cannot function well on its own and must be accompanied by an incentive. The success of the system also depends on several factors. This includes the size of the population, the population demographics, social and socio-economic aspects, the convenience of the implemented programs, as well as other influences. Results are likely to vary based on the specific circumstances due to not all programs have the same goals to achieve. These, factors such as the size of the city or cultural and socio-economic aspects need to be considered and all of these have an influence on the development and implementation of the program. For instance, PAYT programs proved than the schemes must be adapted to the place, it is not the same a program developed for a big city like San Francisco than a little town like Gainesville. Depending on the size of the city, you may decide to use different types of containers or bins. The collection of the waste may be door-to-door in small towns, but it is much more difficult in big cities. Also, citizens may prefer a system based on the weight of the waste instead of a Volume-based system which is more popular. Finally, they may prefer an incentive scheme based on rewards instead of one based on penalties. All these factors necessarily affect to the program to be implemented.

3 Identification of barriers to implement incentive schemes

3.1 Interaction with stakeholders.

During the process of creation of a novel incentive scheme, one of the key aspects is to engage the potential stakeholders in the area where incentives are planned to be implemented.

Also, during the implementation of the scheme, it´s important to keep a continuous contact with them in order to implement incentive schemes in an effective way, because if their opinions, requirements and possibilities of collaboration are not considered, the incentive schemes wouldn´t be correctly applied and the possibilities of failure increase as a result.

In this manner, for the demonstrations in which the incentive schemes are going to be applied, a description of the interactions conducted in each case is detailed below:

3.1.1 Demo 2 (tablets) interactions:

- **Local and regional authorities:**

As previously stated in task 2.1, for the Demonstration of tablets, a survey among the potential municipalities where the incentive scheme may be implemented was distributed, with the support of the environmental public administration of the Basque Country "Ihobe", in order to select the most appropriate city to host the pilot test.

As a consequence of this process, detailed in task 2.1 too, Getxo was selected as the city of the Basque Country to hold the pilot. From that moment on, several meetings have taken place with the city council in order to address the activities to carry out during the demonstration. Also, regular communication with them through e-mail and phone calls is maintained getting direct feedback on the ideas, requirements and suggestions which can improve the implementation of the scheme in the city, as well as to get the contacts of potential agents to get involved in the activities.

In addition to this, other public authorities have been contacted. In this regard, a meeting with "Aula Ambiental", the environmental education and awareness institution in the Basque Country was held to get information about the schools in the town and how the activities in these centres could be realized. During the meeting, some suggestions of which schools can participate, which activities could be suitable to do with the students and the right point to place the smart bin, were received. The communication with "Aula Ambiental" continues and further meetings and contacts with them are expected in future.

"Getxoempresa", the association of small and medium companies of Getxo, has also been contacted with the aim of organise a workshop with their partners and be informed about the demonstration goals in which they can contribute and participate. This workshop is expected to take place before the start of the pilot so that they can make suggestions and even be involved in the incentive schemes for end-users. At the moment of this deliverable, a date for the workshop is being discussed.

Interactions will continue during the whole process of preparation of the activities included in the demonstration as well as during the implementation so, additional contacts with all the agents identified and new potential public administrations, will happen in future.

- **Other stakeholders**

From the beginning of the project, phone calls, e-mails and meetings were held with some manufacturers of tablets. In particular, companies such as "Mundo Reader" and "Apple" showed their interest in being part of

the demonstration activities. However, at this moment, no agreement has been achieved regarding the collaboration and engagement of a manufacturer within the demonstration, but conversations are still in progress.

On the contrary, discussions with distributors and local stores and are much more advanced, including preliminary agreements to participate both in the incentive schemes and other activities to be carried out within the demonstration. Some of the distributors that would take part of the demonstration and, thus of the incentive scheme are Expert-Cordevi, Tien21, Milar and Eroski. Up to this moment, several interactions happened with them, including meetings in their stores where smart bins would be placed, phone calls and e-mails. The communication is open and the collaboration in progress in order to define their role in the demonstration starting on November.

Finally, some activities are planned for end-users to let them know how the incentives work as well as to get their feedback, suggestions and opinions. These activities will include surveys focused on citizens, a workshop arranged together with the City council on Getxo and a communication campaign also to be conducted in the city. Based on the results and suggestions obtained from end-users, the system may be modified to be more efficient.

3.1.2 Demo 4 (biowaste) interactions

- **Local and regional authorities**

As initially planned, the first interactions and contacts were made with the local authorities of Lorca, where it was intended to carry out the pilot test. These contacts consisted in emails and phone calls with city council. However, not fruitful meetings were held. As no agreement reached with this local authority, then the focus was put on other city near Murcia, Abarán. In this case, the interactions have been much more fruitful and finally the demonstration will happen in this town. The contacts with this local authority have included physical meetings as well as other regular contacts with them for the organization of two workshops for citizens of the town and the dissemination of a survey. This stakeholder has been engaged together with the partner A.D.R.I. from H2020 LIVERUR project, with which ALIA will collaborate in the recycling pilot project. Contacts will continue in next months to define all the activities planned.

Furthermore, other public administration has been contacted during these months but, in this case, not a local authority but a regional one. In this manner, interactions with the Autonomous government of the Region of Murcia are in progress, including regular phone calls and emails with the aim of knowing the advances in the biowaste recycling plans in the whole region (in relation with Spanish Law 22/2011, which establish that all the municipalities of more than 5.000 inhabitants must have selective collection of biowaste before December, 31st of 2020), which kind of incentives they plan to provide and to study possible collaborations within the project. As before, the contact will continue in the next months and activities are in progress.

- **Other stakeholders**

In addition to the public administrations, several contacts with other stakeholders of the area have been conducted. Considering the type of waste of this demonstration, supermarkets were selected as one of the most suitable agents to participate in the pilot test, due to they are considered as potentially generators of biowaste but also as a place highly frequented by citizens, being a potential place for the smart bins, allowing people to dispose their biowaste into them, and later use the eco-credits obtained with the recycling process to purchase new products of the supermarket.

Many of these interactions have involved Carrefour, one of the most important distributors in the area. During these months, two physical meetings took place (Lorca and Madrid) with this potential agent and a regular

communication with them is maintained, including phone calls and emails, in order to define the activities in which Carrefour could participate within the demonstration. Contacts will continue in the next months.

In addition to Carrefour, at the beginning of the project Aldi supermarkets was contacted including emails and phone calls. However, at this moment, not positive response has been received.

Finally, as mentioned below, a workshop with citizens organized together with the city council of Abarán was conducted during the month of April, in which the possible incentives were presented and people had the opportunity to give their opinions about what they would rather and how. Also, a survey has been produced to engage more citizens of the area. At this moment, the results of this workshop are being processed.

3.2 Barriers identified

During the process of research, creation and implementation of a novel incentive scheme, as well as derived from the contacts made with the different stakeholders, several barriers have arisen as potential problems in the practical application of the system, including legal, cultural, social and economic barriers.

The understanding, analysis and consideration of these barriers, as well as the collaboration with the public administration, stakeholders and other agents is essential to prevent problems in the implementation of the incentives proposed, increasing the possibilities of success of the program.

The identification of barriers has been determined for each test pilot but, in some cases, barriers may apply to both sectors, especially those related to the smart containers developed and to be used in both demo cases.

3.2.1 Barriers for implementing incentives for electronic products

When implementing an incentive scheme for electronic products, different barriers may arise depending on a vast amount of factors. In our case, regarding the demonstration of tablets to be conducted in Basque Country, the barriers arisen may be differentiated between:

- **Barriers related to the agents involved**

As mentioned before, one of the most important factors for the success in the implementation of an incentive scheme is the engagement of key agents in the area.

On the one hand, the lack of support and commitment of the public administration in the creation, promotion and communication of the economic instruments developed can result in barriers during the process of the implementation of the scheme and finally in a failure of the all system. For instance, in the process of communication and awareness to end-users, public administrations have a key role and, a lack of support by them, may result on barriers in citizen engagement and the information about the program may not reach the user properly.

Other potential barrier is the lack of incentives to be offered to end-users in case of no stakeholder wants to participate in the program by offering money, discounts, vouchers or any other economic instrument. Also, if the incentives are not attractive enough for end-user may result in a demotivation of people to use the system developed.

- **Barriers related to Eco-credits**

A problem may present itself concerning the correct amount of eco-credits that citizens should receive for each product. If the amount is too low, citizens may not be motivated to recycle. On the other hand, if the amount

of eco-credits received is too high, the system can promote end-users to change old devices before finishing its lifespan, resulting in unsustainable behaviours.

Other potential barrier is the time elapsed between the delivery of the waste into the smart bin by the user and the receipt of the eco-credits resulting of the process (according to the tasks 2.1 and 2.4). If the time elapsed is too long, end-users can loss the motivation and incentives may be useless.

In addition to this, it is well recognized that simple incentives tend to stimulate better results than those that are more complicated. Likely, citizens will not want to put in the effort to understand the system if there are too many parts involved, or if it is not entirely user friendly. Therefore, the information associated to the system of eco-credits and incentives for recycling electronic products should be straightforward.

Finally, the conversion of eco-credits into rewards is also a barrier because it depends on the agents involved and the goals established.

- **Barriers related to smart bins used for incentives**

The smart bins developed for both demo cases are a novel initiative to conduct the incentive schemes proposed for tablets and biowaste pilots within the CIRC4Life approach. However, these containers are also associated with potential barriers in the process of implementation. One of the potential barriers is the high cost of the bins compared to the traditional ones. The features included in these smart containers cause an extra-cost that need to be considered for exploitation stage.

As the smart bin is an electronic product itself, problems related to the use of the bins may occur. Users need to have all the information about how to use correctly the intelligent bins and what is the process followed from the moment they dispose the waste to the moment they receive the eco-credits. The lack of information can result in a bad use of the system or in a demotivation of the people to use it.

Besides, some problems may arise regarding the use and maintenance of the containers, such as a malfunction or the absence of electric current to power them. This requires bins to be placed inside of the establishments, stores or indoor places where a current source is available and the electronic components are protected from climate conditions, as well as to protect the value both of the containers and the waste disposed.

Other barrier may be introduced as a result of the creation of a novel collection process that may interfere in the traditional ones and thus, creating confusion in people as a result.

- **Barriers related to cultural, economic and social aspects**

Each region has its own social, socioeconomic and cultural characteristics so the application of the same incentive scheme for all the regions may result in barriers during the implementation.

Also, some barriers may happen related to the second hand tablets. People may have reserves and doubts about the reliability and properties of tablets reused and sold as second hand products. In Europe, people still preferring to purchase new electronic devices instead of having reused ones, this can be a barrier to be considered for those tablets remanufactured within the project.

Another barrier to consider is the possibility of not enough collection of tablets during the pilot test in order to demonstrate the goals established.

- **Barriers related to information and dissemination of the incentives**

The lack of information to the end-user may result in barriers during the implementation. If the information, communication and dissemination is not enough, the system can fail, even though the rest of the aspects of the

scheme are well developed. This is because the scheme is designed for end-users so, having a good campaign of information for them, can prevent problems during the application of the incentives.

Other barriers can emerge related to the transparency in the conditions of access to the economic instruments. When incentives are offered to people, clearness about how to achieve them, the reasons to be offered and how the system of rewards works are essential to prevent distrust or bad reputation of the scheme proposed.

In addition to this, incentive schemes must be complemented with educational and awareness campaigns for end-users due to the fact that the lack of information about why the end-users have to use the system developed for reuse and recycle may result on barriers in the implementation of the incentives.

Finally, differences in culture or preferences within various regions concerning rewards, may generate additional barriers.

3.2.2 Barriers for implementing incentives for food and biowaste

Regarding food and biowaste, many of the barriers described for tablets can be also applicable for this waste. For instance, since the smart container is very similar to the ones used for tablets, the barriers mentioned before related to this topic apply in a similar way for this demonstration. Potential problems with smart bin such as the high cost compared to traditional ones, the malfunction of it or the difficulties in the understanding of the process of recycling through the smart bin developed, can generate problems in the process of implementation of the incentive scheme.

As the demonstration for tablets, the engagement of public administrations is also essential but, in this case, is maybe more important due to the type of waste, so the lack of commitment and involvement of local and regional authorities may generate barriers and difficulties in the implementation. The engagement of other stakeholders such as supermarkets is important too for the development of the scheme since they are a source of future biowaste but also can be a key agent in the successful implementation of the system, as mentioned before.

Also, when we talk about food and biowaste, offering incentives for the food that you are throwing away may cause problems in the message sent to the end-user.

Another potential barrier may occur if the biowaste is not well separated. The presence of improper components in the waste, different to the organics, can affect to the process of recycling and, therefore, the success of the system. If that happens and the biowaste is not well separated but general waste is disposed in the recycling point, the incentives will not be given to the user. Awareness will be needed in order to avoid this problem.

Illegal dumping and burning of waste are one of the mostly frequently barriers when a system of incentives like this is trying to be applied, both through positive and negative incentives.

In regard to the obtainment process of eco-credits for the disposal of this waste and the incentives offered as a result, the process must be understandable and the incentives affordable in order to prevent the apathy and demotivation of people in taking part of the pilot test.

In terms of resistance to recycling food waste, it may be beneficial to practice the greatest amount of transparency as possible, explaining the program and the goals and always trying to collaborate with the public administration. Then, the citizens can observe the objectives of the system, allowing for a positive opinion and

less of likelihood for opposition. Educational and awareness campaigns for end-users can also reduce the possibilities of a failure in the implementation, as mentioned before.

It is important to mention that the incentives to be provided to the users of the biowaste recycling system are considered in the frame of pilot actions. The main objective of it is to encourage people to modify their attitudes towards daily recycling habits. This means, to make people separate biowaste at home and dispose it in the appropriated place, something that in the pilot area does not happen nowadays.

The success of the implementation of an incentive scheme as this, must be to achieve these daily changes in the citizenship so, in the future, maybe there is no need to provide incentives to make people separate biowaste and dispose it properly.

3.3 Proposals to overcome barriers

As a result of the barriers identified before, a list of possible solutions to overcome each barrier is proposed below, distinguishing between electronic equipment (EEE), food and biowaste and those which apply for both sectors:

Table 2. Proposals to overcome barriers

Type of waste	Barrier identified	Solution proposed
EEE	Consumers receive too many or too few eco-credits and are unmotivated to recycle as a result.	Find the best way to offer eco-credits without discourage to the consumer.
EEE	Eco-credits earned can incentive end-user to change old devices before finishing its lifespan and thus may promote unsustainable behaviors.	Adapt the system to provide enough incentives to encourage end-users to reuse/recycle but avoiding the promotion of unsustainable behaviors giving more money that the necessary.
EEE	Designing a universal system for assigning eco-credits to various electronic products.	Base eco-credits off of product´s carbon footprint and relative life span.
EEE	Difference in culture or preferences within various regions concerning rewards.	Conduct surveys and adjust certain factors in each region.
EEE	A novel collection process may interfere in the traditional ones and creating confusion in people.	Communication and awareness campaigns in which all the information be available for people. Information about this topic, such as instructional materials or movies may be available in the mobile app to clarify the process to the user and the importance of recycling.
EEE	Second hand tablets may not be attractive or trusty for end-users.	Giving information of second hand markets and extend the guarantee of these products, can encourage end-users to purchase it. Adding

		the history of the equipment as well as traceability information may enhance the confidence of end-users.
Biowaste	Food and biowaste may content improper waste when delivered in smart bins.	Information and awareness for users are required. Also, in case of a bad use of the system made by the user repeatedly, a penalization in the program of rewards can be applied.
Biowaste	Logistics of transporting food to collection points (cost of gas, designated employees).	Regulations and fines imposed if found to be disposing food in regular waste.
Biowaste	Bad message sent to end-users promoting the recycling of food instead of reduction in the generation of this waste.	Prevent the promotion of unsustainable behaviors through the education of people.
Biowaste	Costs related to processing food waste.	Development of new business models using the high-quality separated bio-waste, saving money from disposal and maintenance of landfills as well as getting profits as a result of the high-quality waste obtained.
Biowaste	Illegal dumping and burning.	Public education and enforcement policies.
Biowaste	Possible critique for incentivizing the disposal instead of donation of food.	Offer several options; higher amount of eco-credits if food is donated rather than disposed.
Biowaste	General opposition for paying to recycle food waste.	Practice transparency, display entire intention of project and company to the public as another means of incentivizing good environmental behavior.
Biowaste	Excess greenhouse gas emissions that are transmitted during transportation of leftover food to food banks.	Emissions saved from avoiding production of new food offset these emissions.
Both	Cultural, social and economic differences between regions.	Adapt the incentive schemes to each region, using a common incentive approach across the European countries.
Both	Doubts about transparency in the conditions of access to the incentives.	Communication campaigns in which all the requirements and specifications are available for users.
Both	Lack of incentives to be offered to end-users.	Present the benefits of implementing an incentive scheme, both for public administration and

		other stakeholder which can offer incentives.
Both	Lack of commitment of the stakeholders in the correct implementation of the incentives.	To involve them in the process of creation and development of the incentive scheme, adding their comments and suggestions.
Both	Smart bins are complicated to understand and not geared toward the user, thus causing disinterest.	Smart bins should be constructed to function in a user-friendly manner and information for users on how the bins work is required. A quick guide with instructions should be included in the mobile application for the users.
Both	Smart bins may malfunction and need repairs.	Smart bins are connected to a server to identify problems and report it to system. Also, periodical maintenance of bins is required.
Both	Cost of smart bins is higher than cost of regular bins	Amount of money saved by recycling offsets this amount.
Both	Smart bins must be attached to an electric current.	Find other sources of energy for powering smart bins such as PV panels attached to the bins.
Both	Potential problems with containers being stolen.	Keep containers inside stores or ensure that they are tightly secure outside.
Both	Lack of support from public administration.	Clearly present benefits of recycling.
Both	Lack of information, education and awareness to end-users related to the motivations to reuse and recycling.	Educational and awareness campaigns connected to incentive schemes to encourage end-users to reuse and recycling.
Both	EcoAccount developed for end-users may not be understandable or user-friendly and can cause demotivation as a result.	Consider the opinions received by end-users during the workshops, adding information about what items and sections include the EcoAccount and how the user can manage it.

4 Selection and description of the incentive methods developed

Based on the analysis of different approaches and different incentive schemes functioning all around the world and for multiple types of waste, it has been concluded that there is not a single methodology to be applied in all the cases and for all the regions. One of the main conclusions is that incentives must be adapted to each demo case and need to be performed according to the objectives which want to be reached.

In general, it is accepted that the application of an incentive scheme depends on different variables which affect the development of the process, such as:

- Municipality/region/country where the scheme is expected to be established: socio-economic aspects of each region necessarily affect the introduction and implementation of economic instruments. Indicators such as level of income, demographic structure, labour market, employment, cultural and geographical aspects, etc. affect in which incentives and how they are implemented in each area. In this manner, it concludes that, as an example, an incentive scheme would be different in Spain and Finland, due to the differences between these two regions. Under CIRC4Life approach, the two demo cases where incentives are going to be implemented for reuse/recycling are part of the same country (Spain) but differences between these two regions, for instance in economic and social parameters, also applies, even being the same country.
- Type of agent giving the incentive (public administration, manufacturer/producer, distributor, other public companies, other agents): other key variable to be considered is the agent who is going to offer the incentive in each area and the motivations to do it. Local authorities usually offer incentives linked with the promotion of good practices and benefits for their regions while other agents like producers, manufacturers or distributors usually encourage end-users giving bonus, discounts and other benefits linked with their own businesses, products and services. All the agents can use economic instruments to promote end-user to reuse/recycling but the motivation and thus, the incentives offered, could be different among them.
- Type of incentive to be offered: incentives can vary between a wide range of options, including tax benefits and reductions, discounts on new products and services, coupons and vouchers, extension of guaranties, etc. not only depending on the agent but other constraints like motivation, business strategies, goals to achieve, etc. Most of the options will be later appointed for the demo cases.
- Similar initiatives already implemented: Other programs that could be already working in other areas for similar purposes can promote the implementation of incentives in a particular area, due to the benefits reported by these initiatives compared with the non-implementation regions or business.
- Other instruments which support the application and implementation of incentive schemes such as educational and awareness campaigns that may enhance the effectiveness of the program by giving information to the end-users about why they are encouraged to reuse/recycle.

As we mentioned before, within the CIRC4Life project, there are 2 demonstration cases in which incentives will be implemented and tested, always associated to the smart bins placed in each pilot:

4.1 Selection of a method for the Demonstration of CEBM with tablets

According to the analysis carried out in section 2, there are many ways to encourage people to take part in the recycling process by delivering their old electronic devices with the aim of being correctly managed. These schemes are not only promoted by public administrations but also for other type of agents such as private companies, NGOs, recyclers, etc.

Also, as we have studied, some of the initiatives for electronic products use “rewards” to promote good practices in end-users and citizens while other initiatives apply a system of penalization to motivate citizens to

recycle by introducing penalties and extra-charges to the people who don't act properly. However, this last type of negative incentives is usually used by public administrations since they act on public taxes and fees.

Both systems could be useful to reduce the waste generation and increase reusing and recycling ratios of WEEE. The success of the system will depend on several factors in each case.

Putting the focus on tablets, this particular stream of electronic waste is new comparing to other traditional WEEE streams, and, nowadays the collection rates for this type of waste are still very low, as stated in task 2.1.

On the one hand, tablets are one of the most popular electronic devices in the world and one of the fastest growing streams. On the other hand, according to the recycling ratios of tablets, people usually keep their old devices at home because they consider that could be used in future or they should receive money for them. In this manner, giving people incentives may facilitate them to dispose this type of waste for reuse and recycling avoiding the storage at home.

The demonstration for tablets under the CIRC4Life project will be conducted in Getxo, a town of Basque Country (Spain) with an estimated population of 80,000 inhabitants. For this pilot, due to the incentives may come from different types of agents, a reward-based scheme has been determined as the most appropriate to incentivize end-users, using two smart bins placed in selected points of the municipality.

During the process of creation of the incentive scheme for this pilot, potential agents to offer the incentives have been determined and contacted, as shown in section 3. As a result of the different processes, meetings, contacts and studies made at Basque Country, a matrix of potential agents and incentives to be implemented during the pilot have been performed (see Annex 1), including:

- Type of agent which could offer incentives for end-users in Basque Country:
    - Local/Regional Authorities.
    - Other public companies.
    - EEE Manufacturer with a presence in Basque Country.
    - Large manufacturer with sale of EEE in Basque Country.
    - Large distributors without sale of EEE in Basque Country.
    - Small distributors with sale of EEE in Basque Country.
    - Small distributors without sale of AEE in Basque Country.
    - Other agents: waste managers and recyclers in Basque Country.
    - Other agents: financial and insurance services with a presence in Basque Country.

- Potential incentives to be implemented during the pilot:
    - Reduction of municipal fees.
    - Discounts on public services (transport, library, sports centers...).
    - Environmental recognition by authorities.
    - Discounts on new products and services.
    - Discounts on after-sale services.
    - Extension of guarantees of products and services.
    - Coupons and vouchers.
    - Reduction on charges, second hand products and after-sale.
    - Free attendance to courses.
    - Monetary incentives in bank accounts.
    - Extension of insurance coverage.
    - Donation to social projects.

- Similar initiatives already implemented: potential incentives have been also identified based on other current initiatives promoted both by public administrations and private organizations, such as:
    - Environmental programs promoted by some local and regional authorities.
    - Loyalty cards promoted by private companies.
    - Reward programs promoted by private business.
    - Reverse vending programs.
    - Local and regional initiatives

- Motivations for these agents to incentivize end-users:
    - Citizen awareness and consciousness.
    - Reward citizens that do well.
    - Improve the collection ratios, recovery and management of waste.
    - Reduce the cost for processing of municipal waste.
    - Promotion and support of local businesses.
    - Promote citizen participation.
    - Recruit of new clients.
    - Loyalty of existing clients.
    - Improve the offers on products/services.
    - Identifies as a sustainable company.
    - Service and added value for the clients (not necessarily related with their business).
    - Reparation and sale of second hand tablets.
    - New models of business.
    - Publicity for their businesses.
    - Advertising, promotion and reinforcement of brand.
    - Relations with sustainable companies.
    - Access to new sources of waste.

4.1.1 Implementation of the incentives for tablets

Once all the potential options to incentivize end-users have been identified and, derived from the first meetings and contacts with the agents involved, some incentives are in the process to be implemented during the demo case starting from Month 18.

In this manner, according to the method developed to calculate eco-credits in task 2.4, an example on how the eco-credits relate to the incentives in this pilot has been developed, using some feasible incentives to be demonstrated during the pilot.

4.1.1.1 Discounts on purchasing new electronic devices offered by local distributors

One feasible incentive for end-users who dispose their old tablets into the smart bins for reusing/recycling during the pilot, is a voucher or discount between 5% and 15% to purchase a new tablet in local stores of Getxo where the bins will be placed.

The eco-credits given as a result of the disposal of tablets in the smart bins are calculated depending on the properties of the waste disposed, following the method described in task 2.4, including:

- State of the tablet:
    - It works and can be reused.
    - It´s not suitable to be reused but can be repairable.
    - It´s broken.
- Lifetime of the Tablet comparing to the expected lifespan (in months).

In this case, the value of the voucher is calculated based on an average price of 172,8€ for a new tablet in these local stores. Once the eco-credits are calculated considering all the different aspects mentioned before, the conversion factor between eco-credits and incentives is applied as follows:

- **For a tablet which works and is suitable for reuse**

Table 3. Distribution of eco-credits and incentives for a tablet suitable for reuse

	Reuse		
	Eco-credits	Incentive (€)	Discount on local stores
0-12 months	18,8	19,5 €	11%
12-24 months	24,8	24 €	14%
24-36 months	26,2	25 €	15%
36-48 months	25,2	24,3 €	14%
48-60 months	23,4	23 €	13%
+60 months	17,6	18,50 €	11%

- **For a tablet not suitable to be reused but repairable**

Table 4. Distribution of eco-credits and incentives for a repairable tablet

	Repairable		
	Eco-credits	Incentive (€)	Discount on local stores
0-12 months	16,7	17,5 €	10,0%
12-24 months	22,3	22 €	13%
24-36 months	23,8	23 €	14,50%
36-48 months	22,7	22,50 €	13%
48-60 months	20,9	21 €	12,50%
+60 months	15,1	16,50 €	10%

- **For a broken tablet**

Table 5. Distribution of eco-credits and incentives for a broken tablet

	Broken		
	Eco-credits	Incentive (€)	Discount on local stores
0-12 months	12,3	14,50 €	8,50%
12-24 months	18	19 €	11%
24-36 months	19,4	20 €	13,50%
36-48 months	18,4	19 €	11%
48-60 months	16,6	18 €	10,50%
+60 months	10,7	13,50 €	8%

As shown before, in this case, a conversion rate of 1 eco-credits ≈ 1€ is applied. The relation between eco-credits and incentives and how this evolves in this case is shown below:

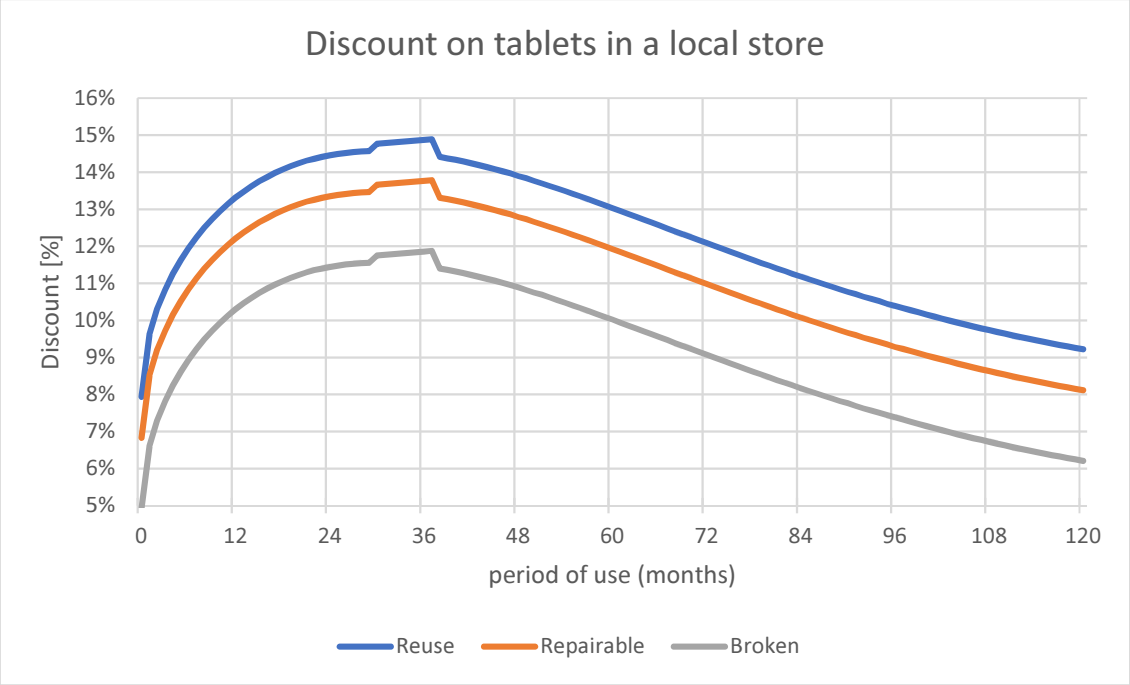

Figure 14. Example of incentives for tablets

The more eco-credits you get through the disposal of your old tablet into the smart bins, the easier is to reach the incentive offered by the local store to purchase a new electronic device. By accumulating eco-credits as a result of your good practices, you will be able to reach new incentives.

4.2 Selection of a method for the Demonstration of CEBM with Biowaste

Food and organic products are one of the most important sources of generation of waste in the world and is considered as a big problem in several countries and regions, including Europe. According to studies, Total EU consumer food waste averages 123 kg per capita annually (16% of all food reaching consumers). Almost 80% of this is considered as avoidable food waste, which is edible food not consumed [22].

Food and biowaste represent a big deal not only for environment but also for the economy and society, representing high waste management costs and money wasted, given the considerable amount of edible food thrown away every year in the EU. All these matters require actions and proposals of solutions to deal with the problem.

The demonstration for biowaste within the CIRC4Life project will be conducted in Abarán, a town of the Region of Murcia (Spain) with a population of approximately 13.000 inhabitants. For this pilot, due to the incentives may come from different types of agents, a reward-based scheme has been also determined as the most appropriate to incentivize end-users.

As for the demonstration of tablets, a smart bin for the collection of biowaste will be used. When using it and, according to the development of the project, users will receive eco-credits. These eco-credits will be converted into the selected incentives for the users as a result of the agreements with the agents involved by Month 18.

During the process of creation of the incentive scheme for this pilot, potential agents offering the incentives have been determined and contacted. As a result of the different processes, meetings, contacts and studies

made at the Region of Murcia (Spain), a matrix of potential agents and incentives to be implemented during the pilot have been performed (see Annex 2), including:

- Type of agent which could offer incentives for end-users in Murcia:
  - Different local authorities near Murcia.
  - Regional Government of Murcia.
  - Butcheries.
  - Grocery stores.
  - Local supermarkets.
  - Big supermarkets.
  - Organic industry.
  - Waste recovery companies in Murcia.
  - Waste managers and recyclers in Murcia.
  - Food products manufacturers.
  - Other services providers in Murcia.

- Potential incentives to be implemented during the pilot:
  - Reduction of municipal fees.
  - Discounts on public services (cultural events, transport, sports facilities, fairs...).
  - Donations for disadvantaged groups.
  - Donations for NGOs and associations helping people at risk
  - Environmental recognition by authorities.
  - Regional promotion of sustainable initiatives
  - Discounts on food products.
  - Discounts on other products.
  - Monetary incentives.
  - Discounts on services.
  - Biodegradable, reusable bags or similar for free.

- Similar initiatives already implemented: potential incentives have been also identified based on other current initiatives promoted both by public administrations and private organizations, such as:
  - Environmental programs promoted by some local and regional authorities.
  - Other initiatives of recycling promoted by NGOs and other social organizations.
  - Loyalty cards promoted by private companies.
  - Reward programs promoted by private business.
  - Waste managers programs.

- Motivations for these agents to incentivize end-users:
  - Citizen awareness and consciousness.
  - Reward citizens that do well.
  - Improve the collection ratios, recovery and management of waste.
  - Reduce the cost for processing of municipal waste.
  - Promote citizen participation.
  - Integration of vulnerable groups.
  - Promotion of cultural events in the area.
  - Recruit of new clients.
  - Loyalty of existing clients.
  - Improve the variety of products/services.
  - Identification as a sustainable company.
  - Service and added value for the clients (not necessarily related with their business).

- Corporate social responsibility.
- Competitive improvement in business.
- Commitment with the society and the development of the region.
- New models of business by expanding its scope of action.
- Green marketing.
- Contribution to sustainability.

4.2.1 Implementation of the incentives for biowaste.

During the analysis of potential incentives to be implemented in the demonstration for biowaste, two workshops were held in the municipality of Abarán, the place where the intelligent bin will be located. One of the main objectives of the workshops was to decide which incentives are the most suitable ones for the citizens. These participation actions were carried out in relation to Task 7.2. "Implementation living labs".

The first workshop was focused on citizenship in order to receive a feedback of different incentives and understand their preferences. After this, a list of possible incentives with the preferences voted by the citizens was generated:

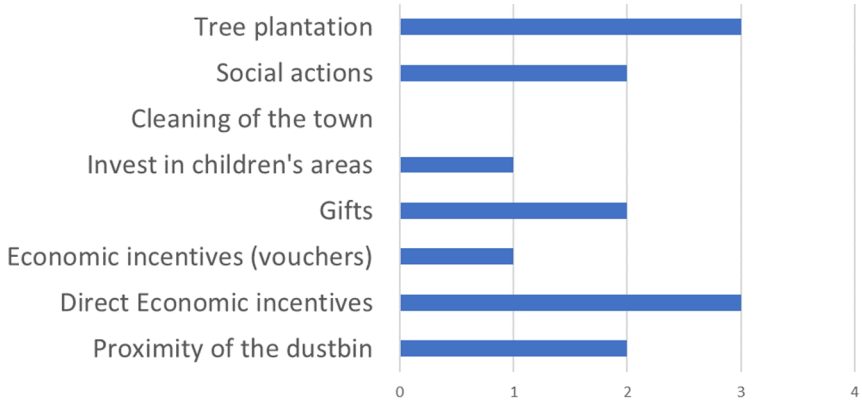

Figure 15. Workshop outcomes for biowaste

Regarding the second workshop, focused on the public administration, the results obtained from the first were explained and their opinion about how the public administration could participate in the incentive schemes was discussed. New possible incentives came out and the definition of the previous ones where complemented according to the public administration point of view.

After that, a survey has been prepared in order to widespread it among the entire municipality of Abarán, so it is possible to obtain the feedback from as much people as possible. The list of possible incentives which contained the survey follows as next:

1. To receive discount vouchers and/or gifts in Abarán cultural activities (theatre, concerts, dinners in restaurants, etc.).
2. To receive direct financial compensation.
3. To donate the corresponding economic incentives for social actions in the municipality.
4. To donate the corresponding economic incentives for rehabilitation actions on the river bank: tasks for the elimination of reeds and planting of native species.
5. To donate the corresponding economic incentives for cleaning actions in the municipality.
6. To donate the corresponding financial incentives for investments in playgrounds.
7. Discounts on municipal taxes.

8. To appear in a municipal list on a monthly basis in which their good practices are recognized.
9. To receive the incentives immediately (although the amount is lower).
10. To receive the incentives cumulatively using a points card.

As a result of the participation of people in the survey, the most voted ones will become the priority for the public administration in order to be implemented during the pilot test.

At the moment of this deliverable, the final outcomes on this survey were not available. However, an example of one of the most feasible incentive to be applied and how this incentive is related to the eco-credits generated by the end-user, is shown below:

4.2.1.1 Incentives offered by local authorities of Abarán.

As we mentioned before and, in contrast to the incentives proposed for the demo case of tablets, in this pilot one of the potential incentives may be offered by local authorities of Abarán. In this manner, when people dispose the organic waste into the smart bin, they earn eco-credits to turn into free tickets for the town theater. In contrast to the tablets, the generation of biowaste is continuous, so the incentives are designed to reward also the loyalty of people who dispose the waste into the smart bin on a regular basis.

According to the formula developed for organic urban waste in task 2.4, the eco-credits for biowaste are calculated considering:

- Chemical exergy calculation for food.
- Weight of waste.

The ticket for the local theater is valued in 4€ so, considering an average of 8 bags of 500g of biowaste generated per house each month, the incentive is designed to be rewarded and used from 4 kg of biowaste disposed into the smart bins.

Considering the formula developed and the incentive offered by the municipality, a conversion rate of 1 eco-credits = 1€ is applied by adapting the factor "D" considered in task 2.4. This factor is used to associate the eco-credits resulting of the disposal of biowaste by the end-user, with the incentives developed for this demonstration. In this case, an extra reward for people using the system on a regular basis is also considered, giving 1 extra ticket when people dispose 8 kg (3 tickets instead of 2) and 2 more tickets when people reach 12 kg disposed into the smart bin.

In this manner, the connection between kg of biowaste disposed eco-credits and tickets for the local theater would be:

Table 6. Ratio kg biowaste/eco-credits/incentives

kg biowaste	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Eco-credits	0	1,00	2,01	3,02	4,03	7,55	9,06	10,57	12,08	17,99	19,99	21,99	23,99	25,99	27,99	29,99	31,99
Theatre tickets	0,0	0,0	0,0	0,0	1,0	1,0	2,0	2,0	3,0	4,0	4,0	5,0	6,0	6,0	7,0	7,0	8,0

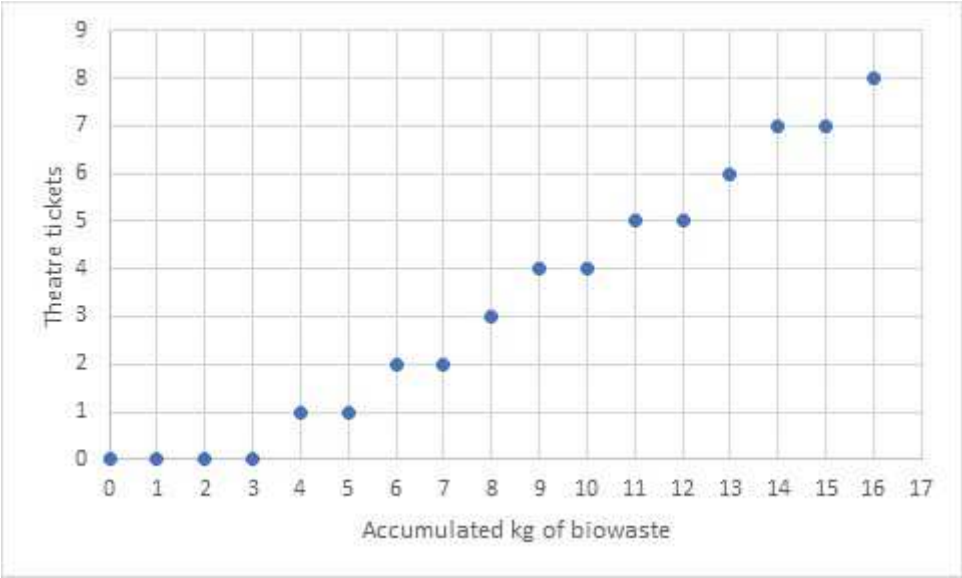

Figure 16. Example of incentives for biowaste

As mentioned before, within the demonstration, the main goal is to reward people who deliver the biowaste into the smart bin placed in the municipality of Abarán. The incentive will apply from 4kg onwards through free tickets to be used in the local theater. Also, it´s expected to reward the loyalty of people who use the service, not as a special event but a regular practice. In this manner, people who dispose the biowaste into de bin during two consecutive months (it is estimated an average of 4 kg of biowaste generated per user each month) would earn an extra ticket for the theater and, using the service three months in a row, people would receive a voucher of 6 tickets. This system encourages people to use the service regularly as well as gives an extra incentive to people who adopt sustainable practices on waste management.

5 Guidelines for local authorities and other stakeholders to implement and maximize the impact of the proposed schemes.

Based on the lessons learnt so far, the guidelines for local authorities and other stakeholders provide a framework and a list of recommendations to implement and maximize the impact of the incentives proposed.

This document also includes suggestions to policy makers regarding the incentive schemes for recycling and reuse, both WEEE and biowaste. Policy support is considered vital, for instance, to overcome barriers such as the ones identified in section 3 but also to promote good practices on waste management in the community in which the program is going to be implemented.

Waste is one of the most important challenges that the world is facing in 21st century. We all produce waste, on average, each of the 500 million people living in the EU throws away around half a ton of household rubbish every year. Only 40 % of it is reused or recycled and, in some countries, more than 80% still goes to landfill [23].

The European Union's approach to waste management is based on the "waste hierarchy" which sets the following priority order when shaping waste policy and managing waste at the operational level: prevention, (preparing for) reuse, recycling, recovery and, as the least preferred option, disposal (which includes landfilling and incineration without energy recovery). In this point is when economic instruments such as an incentive scheme may be useful as a tool to enhance the outcomes of the waste management at all levels (local and regional).

Implementing an incentive scheme is an ongoing process, requiring persistent attention to a wide range of details, including the scope of the program, the achievement of the goals established, the motivation of people to take part of the program, the engagement of stakeholders as well as other necessary elements for the system like the containers to dispose the waste or whether the incentives proposed (positives or negatives) work or not.

These guidelines try to give an approach for the potential stakeholders about which activities are needed to fully implement an incentive scheme, with the information available at the moment of the submission of this deliverable. The suggestions included in this document can be divided into:

5.1 Suggestions to implement and maximize the impact of the scheme proposed.

- Analysis of the background: as we mentioned during the previous sections, it´s important to adapt the schemes to the place where will be implemented. The study of the social and socio-economic aspects in each region must be considered. Parameters such as GDP per capita, demographic distribution, poverty rates, etc. need to be analyzed. Cultural aspects like what is the system that user prefers or whether the people tend to reject some kind of incentive are important too. Finally, the current results on waste management must be analyzed to determine in which areas or waste streams the incentive scheme need to focus on.
- Design the program and define the intended objectives: one of the first steps when planning an incentive scheme is to determine the goals of the program based on the review of your community and the background mentioned before as well as the needs and concerns of the population.
- Define the system of incentives: as stated in section 2, there are different ways to incentivize people, including systems based on rewards for end-users, such as reverse vending programs or initiatives working with smart containers and, on the other hand, systems based on charges or penalties for waste generation, such as PAYT programs. The definition and selection of the best system in each case is necessary to maximize the impact and the success in the implementation of the program.

- The infrastructure for reuse and recycling must be both comprehensive and convenient for the end-user: collection points must be accessible for people, placing enough containers to facilitate end-user the delivery of waste. Information about the schedule for collections, especially for biowaste and especially using PAYT programs is also important. Besides, in case of using smart containers, the information about how to use them is required to be available for citizens. A not user-friendly system could cause rejection and demotivation in end-users.
- The incentives offered need to be simple and attractive: the scheme of incentives must be simple and understandable by end-users. Citizens would not want to put in the effort to understand the system if there are too many parts involved, or if the incentives are difficult to obtain or penalties for noncompliance are too high. Therefore, the information to the community should be adapted, clear and simple.
- Communication and awareness campaigns: other key aspect is the communication to end-users and citizens as well as the awareness campaigns to be conducted before the start of the operations. The information related to the type of waste included in the programs as well as the infrastructure for the delivery of waste and the incentives or charges estimated as a result of the scheme selected are essential to be provided to end-users before the entry into force of the program. The lack of information might produce misunderstanding and directly translated into non-citizenship participation.
- The benefits of the system must be clearly presented, including the understanding of the investments of resources, energy and impacts that the waste may represent. Also, since end-users are in charge of the correct disposal of the waste, they need to be informed about the benefits of a correct disposal of the waste to be properly managed.
- Participation of citizen in the definition of the program: the opinion, suggestions and considerations of end-users about the system developed are important to maximize the impact as a result. The conduction of workshops where people can contribute with ideas and suggestions about their preferences, are one of the activities which can increase the acceptance of the programs and facilitate the implementation of the schemes developed.
- To provide forums for the sharing of experiences with other public administrations and stakeholders from other regions: sharing information between different type of programs in different regions, comparing the outcomes and difficulties in each case and working together with the retailers and stakeholders may enhance the development of the program and the improvement of those areas in which the outcomes are not good enough.
- To provide enough resources to the system. The use of economic instruments creates a direct incentive to recycle more and to generate less waste.

5.2 Suggestions for policy related to recycling and reuse.

- Establish a common framework for European countries regarding some key aspects such as landfill taxes: It is estimated that imposing a fixed, minimum tax level through EU legislation is not desirable due to differences in the economic conditions across Europe, and it would be difficult to bring about due to the unanimity required by the countries on taxation legislation. Instead, a common method for calculating a common framework in which some rules could be developed, taking into account the varying conditions of countries, is suggested.
- Common normative in the use of economic instruments by public administrations in order to adopt incentivize schemes to encourage people in reduce, reuse and recycle by establishing common rules and giving legal certainty to all the agents involved across Europe.
- Provide common regulation and assessment in the use of public funds and budget depending on local authorities to promote the development and application of incentive schemes in their municipalities and regions.
- Allowing some flexibility for local authorities and other stakeholders to implement economic instruments in the most appropriate way for their own particular conditions.

- Introducing rules that promotes the creation of incentive schemes provided by private organizations and other stakeholders. Also remove all obstacles to the implementation of measures which promotes these initiatives.
- Providing a clear policy framework for the foreseeable future within which stakeholders such as the waste management industry can operate. This is a pre-requisite for rational investment by private companies. Public administrations should consider the need to announce rates or taxes for several years ahead. If the rates change from one year to the next, industry is likely to hold back from investing.
- The introduction of regulation to encourage the use of economic instruments such as charges or taxes that ensures waste generators face incentives in line with the waste hierarchy: First, introducing some incentive to reduce waste generation and to make use of recycling services which are cost-effective under prevailing market conditions. For instance, landfill and incineration taxes will help discourage disposal of waste that could be dealt with higher up the waste hierarchy.
- Enforce bans and penalties on illegal diversion, including dumping and burning of waste and adding non-recyclable materials to recycling bins.
- Ensuring an appropriate balance between regulatory instruments (e.g. targets, technical standards, bans) and potential economic instruments. Whilst economic instruments are intended to incentivize an improvement in waste management behaviors, they can equally generate additional stimulus for illegal activity, so regulatory approaches need to be developed in parallel.

6 Conclusion

In the course of this deliverable, a research and the analysis of a broad amount of incentive schemes already in operation all over the world has been conducted, including different ways to incentivize people, by giving rewards as a result of good practices or applying penalties for bad practices on waste management.

Furthermore, an identification of the potential barriers which could arise during the implementation of the incentive schemes has been realized, together with a list of possible solutions to overcome the barriers, which is also included in this document. In addition to this, the stakeholders with a potential key role during the pilot tests have been identified and the interactions made with them in each demo case during these last months to assure the success in the implementation of the schemes, have been pointed. These steps are considered as essential to anticipate problems during the implementation of the programs.

As it has been studied in this deliverable, there are different ways to implement incentive schemes, using different economic instruments but, considering the characteristics and the type of waste of the both demonstrations in which incentives will be developed, the system of “rewards” to the end-user has been selected to be demonstrated within the CIRC4Life project. This system is directly related to the smart bins developed to be used in the pilot tests since they have a key role in the process of identification of the user who deliver the waste, the traceability and the eco-credits given as a result, which could be later turned into the incentives defined in each demonstration case. Another conclusion is the relevance of incentives to encourage people to reuse and recycle, adding to the widely accepted system of 3R (reduce, reuse and recycle) a new R - “reward”.

The interactions and agents identified of each demo case as well as the potential incentives for end-users have been added as “Annex 1” (for tablets) and “Annex 2” (for biowaste) as a result of this deliverable.

Regarding biowaste incentive scheme, replacing meat waste recycling to householder biowaste recycling will be approved by the project consortium.

Finally, the recommendations and suggestions for local authorities and other stakeholders to implement and maximize the impact of the proposed schemes have been included in the section 5, based on the results and lesson learnt during the process of this deliverable. These guidelines include also suggestions for policy which can facilitate a correct implementation of the incentive schemes, especially for public administrations but also for other potential agents of the area where incentives could be implemented.

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Annex 1. matrix of incentives for tablets

Agent	Potential agents in Basque Country	Posible incentives	Similar initiatives already implemented	Motivation to incentivize the user
Local/Regional Authorities	Getxo	Reduction of municipal fees. - fees for municipal waste management. - municipal fees that are unassociated with waste: * Discounts on local transport/GetxoBizi * Discounts on other services (library, sports centers...). Environmental Recognition: - "sustainable store/shop" - "recycler card"	- "Mi cuenta ambiental": Consorcio Valencia Interior (Spain). - "Eco Shop": Lipor (Portugal). - "Punto Verde" (Ecuador). - "Centro ambiental sostenible" (Spain).	- Citizen awareness and consciousness. - Reward citizens that do well. - Improve the collection ratios, recovery and management of waste. - Reduce the cost for processing of municipal waste. - Promote citizen participation.
Other public companies	Metro Bilbao	- Coupons, vouchers and travel tickets. - Extra trips on monthly pass. - Participation on guided visits.	-----	- Citizen awareness and consciousness. - Recruit of new clients. - Link public transportation with sustainability.
EEE Manufacturer	Apple, Samsung, others	- Discounts on the products and/or services. - Discounts on after-sale services. - Extension of guarantees.	- Loyalty cards. - Reward programs.	- Knowledge and control of company waste. - Loyalty of existing clientes. - Recruit of new clients. - Improve the offers on products/services. - Identifies as a sustainable company.
Large manufacturer with sale of EEE	Eroski (large stores)	- Discounts on new electric and electronic appliances. - Discounts on other services: * Eroski gas station. * Eroski travel/trips. * Eroski supermarkets.	- Promotions from Media Markt: exchange of old devices for a discount to buy a new one. - Loyalty cards and discounts on products/services. - Ikea: Reverse vending	- Service and added value for the clients (not necessarily related with their business) - Loyalty of existing clients. - Recruit of new clients. - Improving on their offer of products and services. - Identifies as a sustainable company. - Compliance with WEEE legislation for stores with an area of EEE greater than 400 m^2
	Fnac	- Discounts on new electric and electronic appliances. - Discounts on after-sale services. - Extension of guarantees on new products. - Discounts on other non-electric products. * Discounts on charges for Internet-phone-Tv. * Others.		
	Leroy Merlin			
	Euskaltel			
Large distributors without sale of EEE	Petronor	Discounts on Repsol-Petronor gas stations: * Discounts or coupons for fuel. * Discounts on products in the store.	Loyalty card or combustible points (Repsol, Travel...)	- Service and added value for the clients (not necessarily related with their business) - Identification with sustainable companies. - Responsible consumption. - Improve on the offer of products/services.
	Iberdrola	Discounts on bills for Lights/Gas.	-----	
Small distributors with sale of EEE	Expert Cordevi	- Discounts on new electric and electronic appliances. - Discounts on other non-electric products. - Discounts on after-sale services. - Extention of new product guarantees.	- Card "Club Expert" (Spain). - "Removil": The Phone House: Discounts for exchanging a used phone.	- Service and added value for the clients (not necessarily related with their business) - Advertising, promotion and reinforcement of brand. - Loyalty of existing clients. - Recruiting of new clients. - Improvement of offer on products/services. - New models of business (sale of second hand products).
	Tien 21			
	The Phone House			
	Mobile phone reparation stores and others RA	- Reduction on charges and after-sale. - Discounts on products and accesories.	----------	- Reparation and sale of second hand tablets. - New models of business. - Recruit of new clients. - Larger influx of people to their establishments. - Publicity for their businesses.
Small distributors without sale of AEE	Supermercados BM	- Discounts on supermarket products. - Free eco-friendly bags.	- "Tropa Verde" (Spain).	- Increase in clients. - Service and added value for the clients (not necessarily related with their business). - Advertising, promotion and reinforcement of brand. - Relations with sustainable companies. - Participation in an European project. - Larger influx of people to their establishments. - Publicity for their businesses.
	Businesses associated with "Getxoempresa"	- Discounts on associated stores and businesses. - Organization of workshops, sessions and meetings with incentives.		
	GetxoKirolak	- Discounts on sports centers. - Discounts or coupons on sport and healthy services. - Free entrances for a day at the facility. - Free attendance to GetxoKirolak courses.		
Other agents: Waste management	Koopera, Emaus	- Discounts on the sale of second hand electrical and electronic appliances. - Extention of guarantee on second hand products. - Discounts on other second hand products (clothes...).	- "Recicla y Gana" (Spain). - "Ecosegundos" (Spain). - "Ganamos reciclando" (Spain).	- New model of business. - Reparation and sale of second hand tablets. - Access to sources of waste. - Recruitment of new clients. -Larger influx of people to their establishments. - Publicity for their business model. - Participation in an European project. - Identifies as a sustainable company.
Other agents: financial and insurance services	Laboral Kutxa	- Monetary incentives in bank accounts. - Elimination of fees and charges on financial products. - Discounts on financial products and services. - Extension of insurance coverages. - Debit cards with incentives included.	- "Pensumo" (Spain).	- Link banking-sustainability-future. - Identification and commitment of the banking industry with the protection of the environment. - Service and added value for the clients (not necessarily related with their business). - Advertising, promotion and reinforcement of brand. - Promotion of long term financial products. - Participation in an European project.
	Kutxabank			

Annex 2. matrix of incentives for biowaste

Agent	Potential agents in the Region of Murcia	Posible incentives	Similar initiatives already implemented	Motivation to incentivize the user
Local / Regional Authorities.	- Abarán Municipality. - Other municipalities in Vega del Segura. - Lorca Municipality. - Regional Government of Murcia	Reduction of municipal fees: - municipal waste management fees. - municipal fees non related to municipal wastes: * Water. * IBI (taxes of house value).	- "Mi cuenta ambiental": Consorcio Valencia Interior (Spain). - "Eco Shop": Lipor (Portugal).	- To develop awareness campaigns. - To reward the citizen because of the good recycling practices. - To improve the collection ratio in the municipality. - To reduce cost of hte municipal waste management - To foster the participation in the community. - As a clear example of the environmental commitment of the city council. - For the integration of vulnerable groups and as awareness campaigns of social problems. - To promote cultural events or services in the municicipality.
		- Discounts on sports facilities, cultural events, fairs, etc. - Free bus vouchers.		
		- Donation of economic incentives to associations in order to help disadvantaged groups. - NGOs and associations helping people at risk, difficult situations. To focus on local disadvantaged grupos should be a key aspect.	- Afapade: Tapones Solidarios Murcia (Solidarity bottle caps Murcia).	
		- Development of a municipal list on a monthly basis in which their good practices are recognized.		
		- Regional Government as source of funding for public local initiatives (through Circular Economy Regional Strategy)		
Small distributors.	- Butchers, grocery stores, organic supermarkets, others.	- Discount in their products.	- Loyalty cards. - Reward programs.	- Loyalty of existing costumers. - Attracting new clients. - To improve their variety of product. - Identification as sustainable company: sustainable/green marketing.
Large distributors.	- Carrefour. - Big supermarkets.	- Discounts on sustainable food products. - Biodegradable, reusable bags or similar free. - Discounts on other food products. - Discounts on other products.	- Loyalty cards and discounts for major brands.	- Added value to its customers (not necessarily related to its main activity). - Loyalty of existing costumers. - Attracting new clients. - To improve their variety of product. - Corporate Social Responsibility: identification as sustainable company, sustainable/green marketing. - Competitive improvement in the area. - Commitment with the society and the development of the territory.
		- Donation of economic incentives to associations of help to disadvantaged groups. NGOs and associations to help people at risk and difficult situations in the territory.		
Waste recovery companies.	- Orgánicos Pedrín, Fyneco, and other industries in the area which could be interested on the organic waste. - Ulea waste treatment plant.	- To give money for the supply of an added value waste that gives you a new business models for your company and economic benefit. This economic benefit the user receives will be related to the amount and quality of the organic waste disposed.	- Companies which pay to use the waste produced by others as a resource in their own processes. Different companies from different activity sectors.	- Economic benefit for the waste separated in a efficient way. - Sustainable/Green marketing.
Waste managers.	- Ganamos reciclando. - Recicla y Gana.	- Economic incentives.	- Recicla y Gana. - Ecosegundos. - Ganamos reciclando.	- To improve their business model by expanding its scope of action.
Food products manufacturers	- Los Quijales.	- Discount in their products.		- Green marketing. - Attracting new clients. -Identification as a sustainbale brand: sustainable/green marketing.
Services providers in the territory	- Museums in the area. - Theatres. - Spas.	- Discount in their services.		- Green marketing. - Attracting new clients. - Identification as a sustainbale business: sustainable/green marketing.