

Urban waste for biomethane grid injection and transport in urban areas

Project No: IEE/10/251



## ***Survey on waste management and waste separation in Abrantes***

***WP 3 – Tarefa 3.5, D3.5***

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## The UrbanBiogas Project

The UrbanBiogas project “Urban waste for biomethane injection and transport in urban areas” (Contract No. IEE/10/251) is supported by the European Commission in the “Intelligent Energy for Europe” Programme. The objective of UrbanBiogas is to promote the use of the untapped fraction of organic urban waste for biogas production in order to inject biomethane in the natural gas grid and to use it in transport in five European countries: Austria, Croatia, Latvia, Poland, and Portugal.

UrbanBiogas consists of 6 European partner organisations. The project is coordinated by the WIP Renewable Energies from Germany. The responsible partners for Portugal are the Municipality of Abrantes and IrRADIARE Science for Evolution® in cooperation with MédioTejo21.

In 5 target cities (Zagreb, Graz, Valmiera, Abrantes, and Rzeszów) as well as in partnerships with other European cities a set of well-defined activities will be implemented to contribute towards three main priorities: bringing untapped bio-recourses into the energy market, encouraging biogas injection into gas grids or use as transport fuels, and stimulating investments and business agreements in sustainable bio-energy supply chains.

More information on the UrbanBiogas project is available on the website: [www.urbanbiogas.eu](http://www.urbanbiogas.eu)

## Aim of the Survey

Considering that the efficient management of municipal solid waste separation depends in great part of the citizens, this questionnaire was directed to the citizens of the Municipality of Abrantes. Therefore it was possible to obtain the opinion of the citizens regarding the separated waste collection and the existing obstacles.

The results of this questionnaire will serve as basis for the development of the waste management concept of Abrantes.

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## 1. Introduction

Under the Urbanbiogas project a survey was conducted directed for the citizens of Abrantes. This questionnaire aimed at knowing the citizen's opinions on waste management system in the municipality, the satisfaction, main problems and obstacles as well as attitudes and awareness-raising in this context.

The questionnaire was developed by Ekodoma, Ltd and has been applied to the five pilot cities of Urbanbiogas project (Abrantes, Zagreb, Graz, Rzeszów and Valmiera).

The questionnaires distribution was conducted from February to July 2012, on paper, along with local authorities and by email.

The questionnaire was provided in March 2012 by IrRADIARE in two different platforms ([http://mediotejo21.net/index.php?option=com\\_smartformer&Itemid=169&lang=pt](http://mediotejo21.net/index.php?option=com_smartformer&Itemid=169&lang=pt) and <http://questionarios.irradiare.com/index.php?sid=91644>) in order to streamline the interaction with citizens and stakeholders to participate in this study.

MédioTejo21 Agency had an important contribution in the questionnaires' distribution, reaching in cooperation with Abrantes Municipality, a large number of organizations from schools to local companies. Additionally, MédioTejo21 managed in cooperation with Abrantes Municipal Services, to disseminate the online implemented questionnaires through the bills sent to citizens.



**Figure 1 – Abrantes Municipal Services Bill**

With the dissemination of the questionnaires was possible to obtain 501 completed questionnaires. The average age of the inquired is 37 years, 33% male and 41% female. The average person in a household is 2,4.

The inquired were mostly public employees, administrative assistants, engineers and students.

## 2. Results Analysis

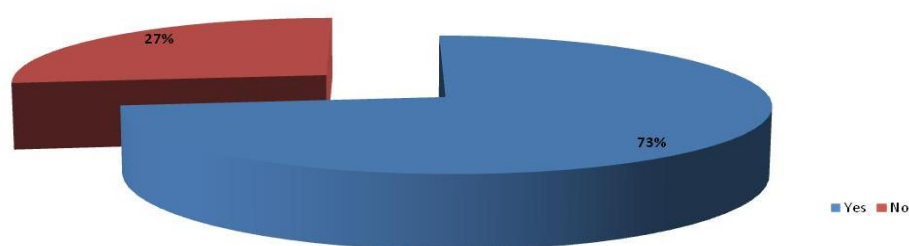
In this chapter the results obtained will be presented, summarized for each subject of the survey questions.

In total 501 responses were reached, corresponding to the projects' objective.

### **2.1 General information and waste treatment habits**

The aim of this group of questions is to obtain a better understanding of Abrantes population reality on their attitudes and knowledge regarding waste treatment.

**Do you pay attention to your household waste quantity?**

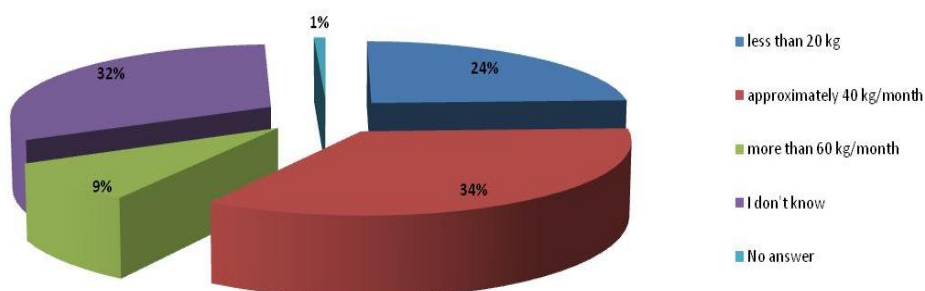


***Figure 2 – Attention to the amount of waste produced in the household  
(Question 1.1)***

In what regards to the attention given to the amount of waste produced in the household it was possible to conclude that 73% of the population is concerned with the waste they produce.

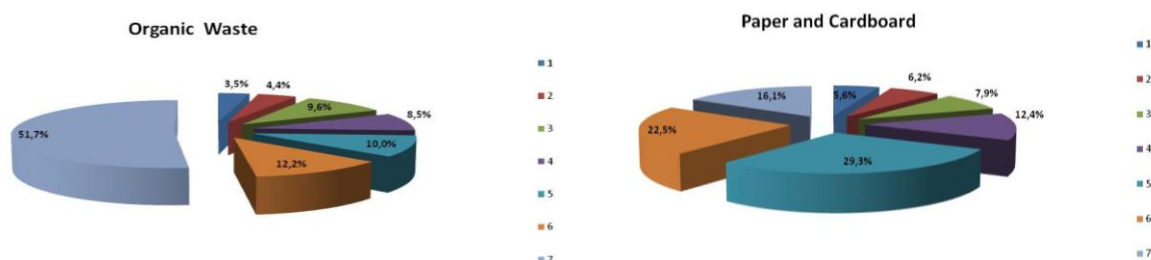
In the following chart you can see the percentage population corresponding to different quantities (in kg) of waste produced per household, monthly. It is possible to conclude that the most common, in Abrantes municipality, is around 40 kg of waste produced monthly per household.

What is the approximate amount of waste generated in your household per month?



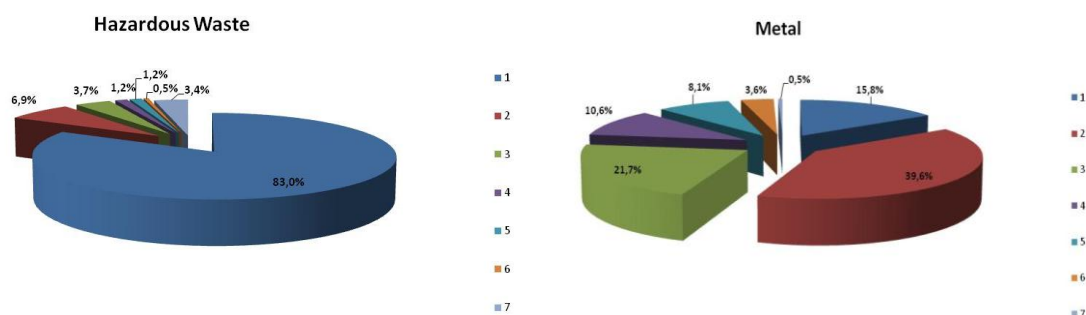
**Figure 3 - Amount of waste produced monthly  
(Question 1.2)**

Concerning the type of waste produced the most common residues are the organic compounds, paper and cardboard, with 51.7% and 16.1%, respectively, classified with 7.



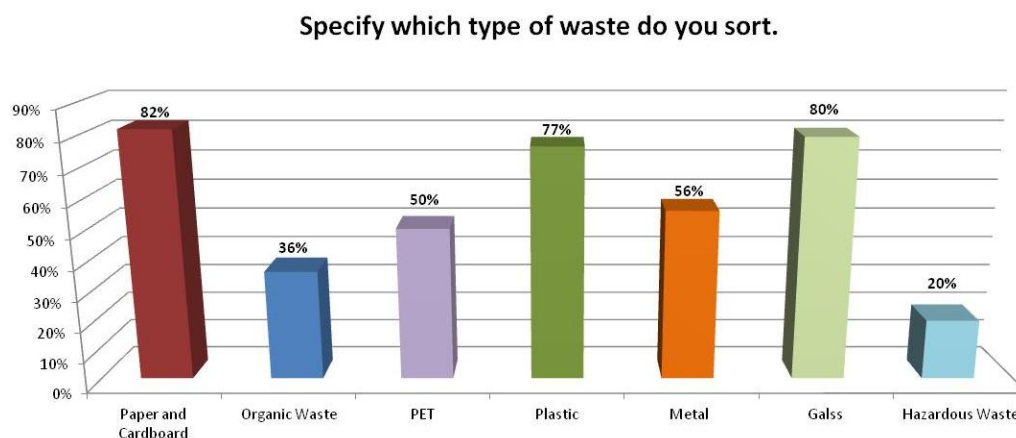
**Figure 4 - Waste generated classification  
(Question 1.3)**

The minor quantities of waste produced are toxic waste and metal with 83% and 15.8%, respectively, classified with 1.



**Figure 5 - Waste generated classification  
(Question 1.3)**

86% of the inquired makes separation either at home or at work. The classification by type of separated waste is shown in the chart below.



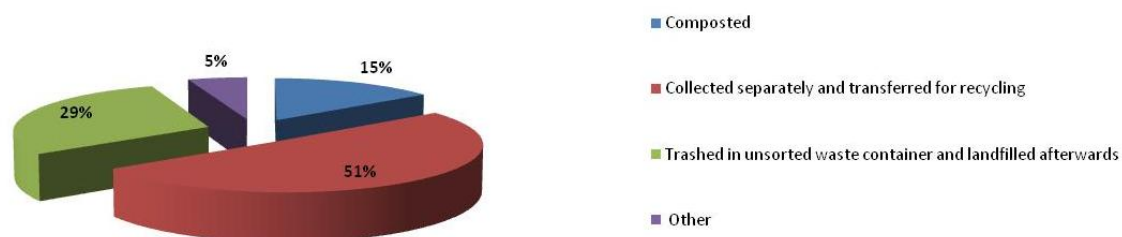
**Figure 6 - Type of waste generated**  
(Question 1.4)

In the universe of people who answered that made waste separation the justification with the highest number of responses (47%) was the perception that the waste can be recycled, thereby reducing energy consumption and resources.

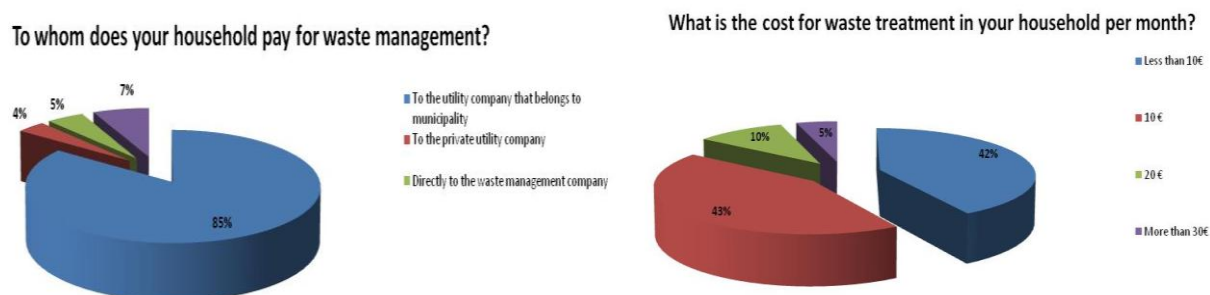
The inquired who replied that don't usually separate waste justified with the lack of infrastructure for waste separation close their houses. (40%).

Waste treatment in Abrantes Municipality is done essentially by separating, collection and transfer for recycling, as shown in the chart below.

**How is the organic waste (e.g. kitchen waste, garden waste) treated in your household?**



**Figure 7 – Waste treatment**  
(Question 1.5)



**Figure 8 - Cost and waste management payment  
(Questions 1.6. and 1.7)**

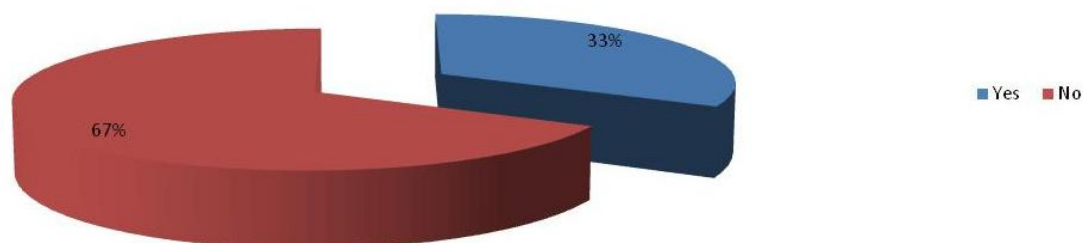
The cost of waste treatment per household each month is mostly less than 10€ (42%) and 10€ (43%). The payment of the waste management is made to the municipal utility company (83% of the inquired).

## **2.2 Existing waste management infrastructure and residents general satisfaction**

The second group of questions in the questionnaire Citizens attitudes towards sustainable management and waste separation in Abrantes aimed at understanding citizens' satisfaction toward waste treatment facilities/system in the municipality.

In the first question it was possible to conclude that citizens are not generally satisfied with the existing waste management system. 67% of the inquired claim to be unhappy with the existing system.

**Are you generally satisfied with existing waste management system in Abrantes municipality?**

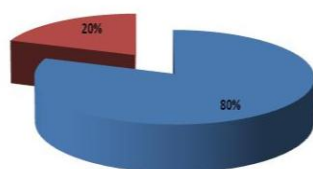


**Figure 9 - Satisfaction with the existing waste management system  
(Question 2.1)**

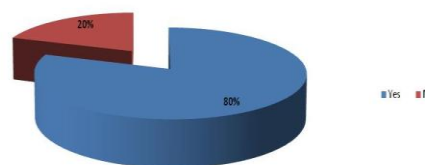


However, in what concerns the number of times that residues are removed, 66% are satisfied and 34% are not satisfied and think that collection should be made more often.

Are you satisfied with waste sorting facilities in Abrantes municipality?



Do you think that the range of separately collected materials is wide enough?

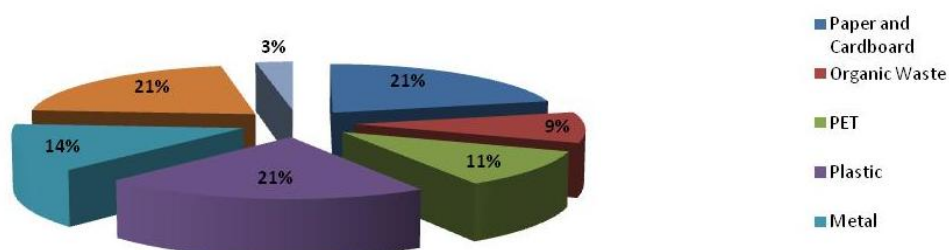


**Figure 10 - Satisfaction with separation plants and waste material collected in separate quantity**  
(Questions 2.3 and 2.4)

In what concerns waste separation facilities in the municipality, 80% of the inquired are satisfied and consider that the amount of separately collected waste is high.

Regarding the existence of separate waste collection containers in Abrantes Municipality, in the chart below is specified the separation by waste type.

Which type of waste can be collected separately near the place you live?



**Figure 11 – Existence of separate waste collection containers**  
(Question 2.5)

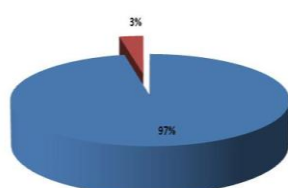
With this group of questions, it was possible to gather some comments from the inquired. The citizens that were unsatisfied with the amount of materials collected separately suggested that the municipality should invest in a larger number of collection points for batteries and oil and also raise awareness on waste separation among citizens.

## **2.3 Education and awareness**

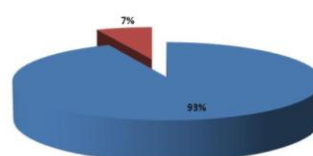
In this set of questions it was intended to understand people's knowledge about waste. Additionally this group of questions allowed measuring the number of initiatives undertaken by the municipality to raise sustainable waste management awareness and citizen's interest in these actions.

Regarding the amount of waste landfilled, 97% agree with the need to decrease this reality and also agreed with the importance of initiatives to promote waste collection in order to reduce the amount of waste generated and landfilled.

Do you think that the quantity of waste sent for disposal to landfill should be minimised?



Do you think that Abrantes municipality should introduce waste collection initiatives that are designed to reduce amount of waste generated and landfilled?



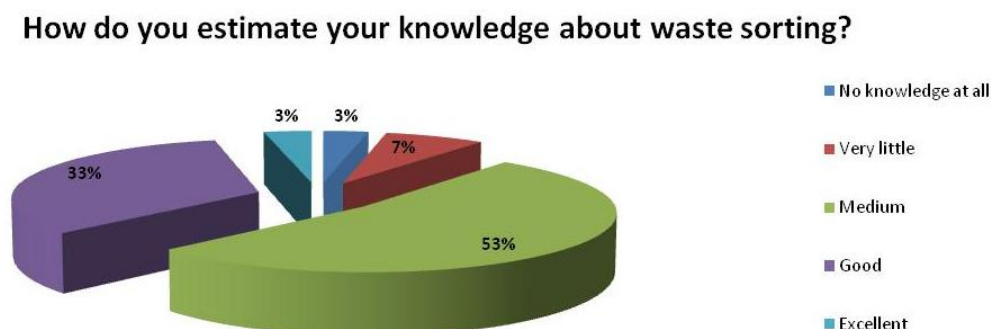
**Figure 12 - Decrease reduction of waste going to landfill and promote initiatives in this area (Questions 3.1 and 3.2)**

Some of the suggestions to reduce waste produced were less individual packaging use, reducing the plastic bags use, free distribution of domestic waste collection containers to encourage waste separation at home, use of thermal bottles to reduce the consumption of pet bottles, biogas use and awareness in schools.

Regarding the organic waste recycling, it was suggested composting and distribution by vacant lots, incineration, energy recovery due to waste treatment, biogas production and anaerobic digestion.

These suggestions were given by 80% of respondents.

The populations' knowledge regarding waste separation is moderate, as it can be verified in the chart below.



**Figure 13 – Knowledge about waste sorting  
(Question 3.5)**

Although 71% of the inquired stated that there is enough public information about waste separation, 58% are not aware of which entity provides information on waste sustainable management and 73% had never participated in a workshop of waste separation and/or biogas production from waste.

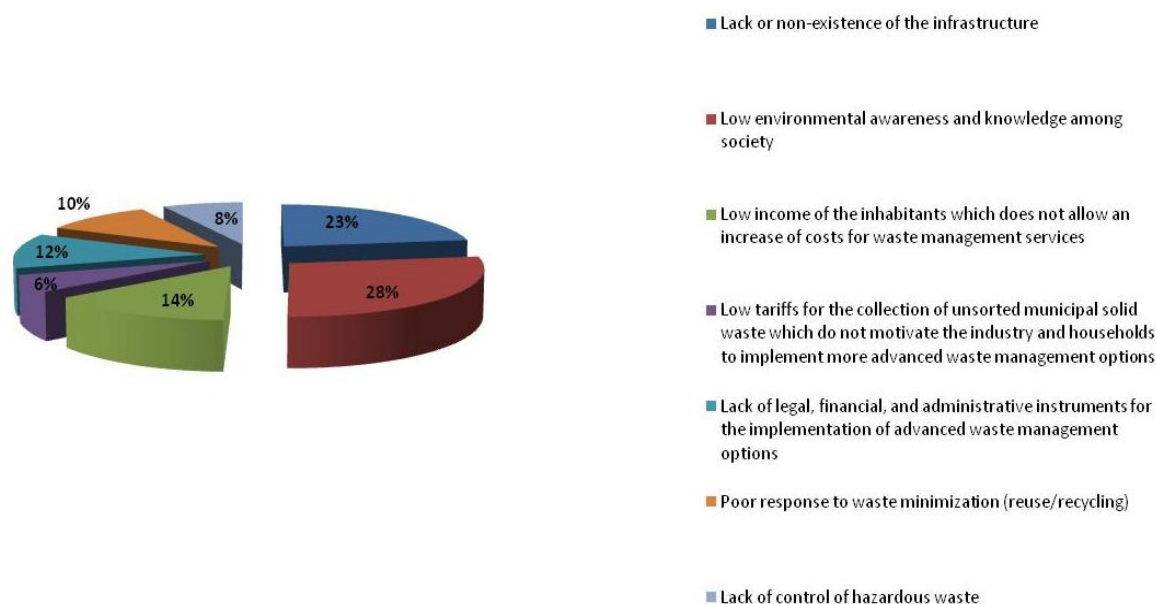
## **2.4 Problems and actions**

This last group of questions is directed primarily to the main problems identified in the waste management system in Abrantes.

In this context it was also intended to analyze the willingness from the citizens to solve and support the municipality in improving waste management system.

Only 56% of respondents did not consider the existing waste management system and the separate waste collection from Abrantes municipality problematic. The opinion on the problems that justify this dissatisfaction is quite divergent, as shown in the chart below.

### Which are in your opinion the main problems?

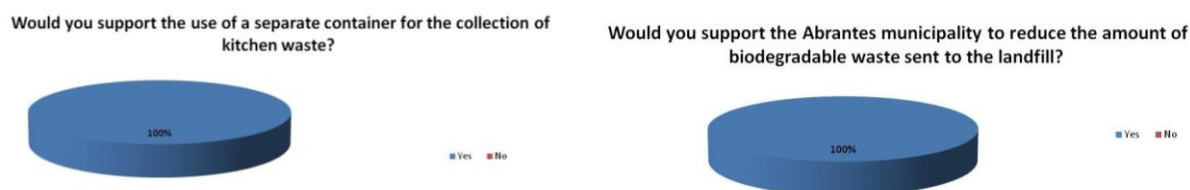


**Figure 14 - Main issues of waste management system**

**(Question 4.1)**

The main issues identified were lack or absence of infrastructure, low environmental awareness and knowledge among society and low wage of the citizens.

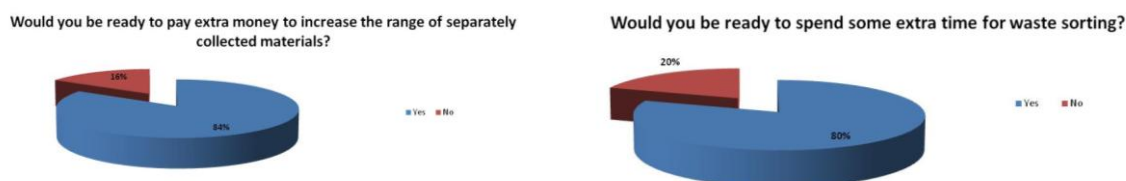
The inquired showed 100% support, both as regards the need to reduce the amount of biodegradable waste to landfill as to the use of a separate container for collecting organic waste.



**Figure 15 - Availability to support the municipality**

**(Questions 4.2 and 4.3)**

The distance as important to waste separation occurs in 84% of the obtained answers. The most common maximum distance that the inquired would be willing to make was between 100 and 200 meters.



**Figure 16 - Time and money availability for waste separation  
(Questions 4.5 and 4.6)**

As regards giving some extra time for waste separation, 80% is available to do so. In this universe, 84% are willing to pay some extra money to increase the amount of waste collected separately, as long as the value does not exceed € 10.

Regarding facilities construction for urban waste management the support is 85% as an important self-sufficiency factor and to reduce waste management cost in municipality.



**Figure 17 – Respondents opinion about a construction of an organic waste management facility  
(Questions 4.7 and 4.8)**

### **3. Conclusion**

This questionnaire allowed realizing the perspective of Abrantes' citizens for waste management system.

This public consultation was important for the waste management concept development adapted to municipality since it has been identified some of the problems as well as public availability for enhancement systems.

On the first group of questions regarding the general information and waste treatment habits it was possible to realize that most of the population is concerned with the waste that produces being the average production, per month, of waste around 40 Kg. The most common waste in households are the organic compounds, paper and card as the less common are the hazardous waste and metal.

The waste separation either at home or at work is very usual in the Municipality of Abrantes, as there is the perception that the waste can be recycled, existing a decrease in the consumption of energy and resources. The inexistence of infrastructures for waste separation near home works as a disincentive for the waste separation.

The waste treatment is made by separated collection and its forward to recycling. The treatment cost is between less than 10€ and 10€, being the payment mostly made to the company managed by the municipality.

The second group of questions, existing waste management infrastructure and residents general satisfaction, it was possible to verify that there is a general dissatisfaction with the existing waste management system.

The frequency by which the waste are removed, however, the general opinion is that it is enough. The ones that didn't agree would prefer a more frequent waste collection.

In what concerns the installations for waste separation, there is a general satisfaction being the amount of separated waste collected elevated.

The main suggestions obtained for a larger number of collected materials were the investment in collection points for batteries and oils, considering that the Municipality doesn't have enough as well as the preparation of awareness actions for the citizens regarding the importance of waste separation.

On the group of questions related to education and awareness, the results obtained were very interesting, since 97% of the inquired agree with the need to decrease the amount of waste deposited in landfills.

The knowledge of the population regarding the waste separation is not high. Although a large number of the inquired affirmed the existence of enough public information on this topic, also a large number of people refers that has no knowledge of the entity that supplies information on sustainable waste management. Also, the inquired have never participated in a workshop on the context of waste separation and/or biogas production from waste.

The last group of questions was related to problems and actions concerning the waste management system, being possible to acknowledge that some of the citizens, not a very significant number, considers the existing waste management system and separated waste collection as problematic.

The main problems identified were the lack or inexistence of infrastructures, the low environmental awareness and knowledge among the society as well as the low wage of the citizens.

With these questions it was confirmed that the distance is an important factor of decision to make the waste separation, being the distance that the people were willing to make between 100 to 200 meters. In what concerns extra time and money, a high number of the inquired showed to be available for spending more money and time as long as value to pay for the separate collected waste wouldn't exceed 10€.

The construction of installations of urban waste manage would have the support of 85% of the inquired both related to the self-sufficiency factor and to reduce waste management cost in the Municipality.