Evaluation of the Work of Separate Collection of Packaging Waste at the Source in Kirklareli City, Turkey

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Abstract

It is very important to prevent packaging waste from being discharged to the receiving environment directly or indirectly and to reduce the amount of unavoidable packaging wastes to be disposed with the help of the reuse, recycling and recovery. In this study, amounts and types of packaging waste collected separately at the source in places like residences, shopping malls, schools, state offices and institutes, hotels etc. taking place within borders of Kirklareli City's Central County between the years of 2009 and 2012 were determined based on the data from the facilities for packaging waste collection and separation and sustainability of this policy was reviewed.

Keywords: packaging waste, recovery, recycling, Kirklareli

Introduction

Solid waste amount is increasing depending on the changed life standard, technological developments and the increased population. Furthermore, composition of waste is also changing depending on the changed consumption habits. The change in waste composition has resulted in the increase in paper-cardboard, glass, plastic, composite and metal packaging wastes inside the waste. Packaging waste has usually large volume and tends to be very noticeable and can be found in wide range of places (Akcay Han et al., 2010). Therefore, recovery of packaging waste, which occupy a significant place in solid wastes, has become very important. Recycling of packaging waste by processing them through physical, chemical and biological methods or gaining energy by burning them is called as recovery. Recovery is not reduction of waste production but the reduction of waste volume.

Practical steps of recovery are:

- Collecting reusable packaging waste (glass, metal, plastic, paper-paperboard and composite) at the source by keeping them clean and separate from other wastes,
- Carrying such wastes that are collected separately, by using different vehicles to prevent pollution caused by organic wastes,
- Classifying these wastes that have been collected separately at the source according to their types (glass, metal, plastic, paper-paperboard and composite) in the relevant sorting facility,
- After sorting, sending wastes remaining on the sorting belt that cannot be recycled to the final disposal,
- The use of the sorted packaging wastes as secondary/tertiary material in manufacturing new products in a recycling facility,
- Introducing new products into the reuse for returning them to the economy.

Benefits from recovery of wastes may be listed as the following:

- Reduction of waste amount to be sent to storage area,
- Reduction of raw material and energy amount required for new products and thus, the use of natural resources more efficiently (for example, using waste papers instead of cutting trees for cellulose production),
- Raising employment opportunities due to the persons to be employed in waste industry,
- Gaining concrete interests with recovery programs,
- Ensuring sustainability

A proper and sustainable waste management system requires collection of recoverable wastes separately at the source without being mixed garbage and implementation of the recovery process in an organized structure. It is required that packaging waste produced by consumption are collected separately from other wastes and made available for delivering them to the storage system specified by the municipality. Thus, separate collection of packaging waste at the source has been assumed as the essential. Because separate collection at the source has high cost and budgets of municipalities are insufficient, municipalities generally prefer to contract with companies with temporary authority/license (Karamangil, 2008).

In Turkey, in 2004, the issue of packing materials was discussed and "Packaging and Packaging Waste Control Legislation" was published. Recycling and recovery of packaging waste became very important with the legislation, which was revised in 2007. According to the legislations, primary responsible for separate collection of packaging waste at the source are the municipalities (Ministry of Environment and Forests, 2007). Therefore, this project was put into practice by Kirklareli Municipality for recycling packaging waste.

In the article study, Management Plan for Packaging Waste, which was in the practice through Kirklareli Municipality in Kirklareli City's Central County, was reviewed as a model.

Materials and Methods

Kirklareli takes place in northwest of Turkey, Thracian Section of Marmara Region. Its area is 6650 km^2 and altitude is 203 meters in the center. Central County's population is 67360 according to the data from 2012' address-based population registration system. In Kirklareli, industry is growing with acceleration. There are two organized industrial zones of which one is private and six small-sized industrial sites in Kirklareli (Kirklareli Governorship, 2013).

Table 1 presents data about waste producers like residences, shopping malls, schools, state offices and institutes, hotels etc. taking place within borders of Kirklareli City's Central County

Table 1.Waste Producers in the City

Waste producers	Number
Total number of residences	25805
Total number of businesses	2860
Total number of schools	28
Total number of state offices and institutes	195
Total number of shops and stores	16
Total number of terminals	1
Total number of medical institutes	9

Separate collection of packaging waste at the source was started in March 2007 in Kirklareli City. Wastes were begun to be collected from state offices and institutes as first and from houses also as of 2008. In 2007, 104060 kg of packaging waste was collected while this figure is 229100 kg in 2008. Then, Kirklareli Municipality maintained collection of packaging waste by contracting with licensed companies in the years of 2009, 2010, 2011 and 2012. There are two licensed/temporarily authorized collection-sorting facilities and one recycling facility within borders of Kirklareli City (Kirklareli Municipality, 2013).

Separate collection of packaging waste at the source was put into practice in certain sites initially and it was aimed to make the practice common in the entire county. The practice is composed of two steps. The first step consists of the districts of Cumhuriyet, Karakas, Karacaibrahim, Bademlik, İstasyon and Akalar. These districts were selected for the first step because they were close to the center, houses and businesses were intensified in these districts and especially the top three districts account for almost half of the total population of Kirklareli. Second step covers districts of Karahidir, Kocahidir, Demirtas, Yayla, Dogu and Pinar. Collection works were made initially on Monday and Thursdays. Then there is an increased number of neighborhoods, has begun to collect every weekday. Amount of packaging waste collected in Kirklareli in the years 2007-2012 is shown in the Table 2 and Figure 1. As seen from the figure the amount of packaging waste is collected at Kirklareli is increasing year by year.

Table 2: Year According to the Amount of Packaging Waste

Year	Amount (Kg)
2007	104060
2008	229100
2009	256900
2010	467130
2011	589160
2012	621565

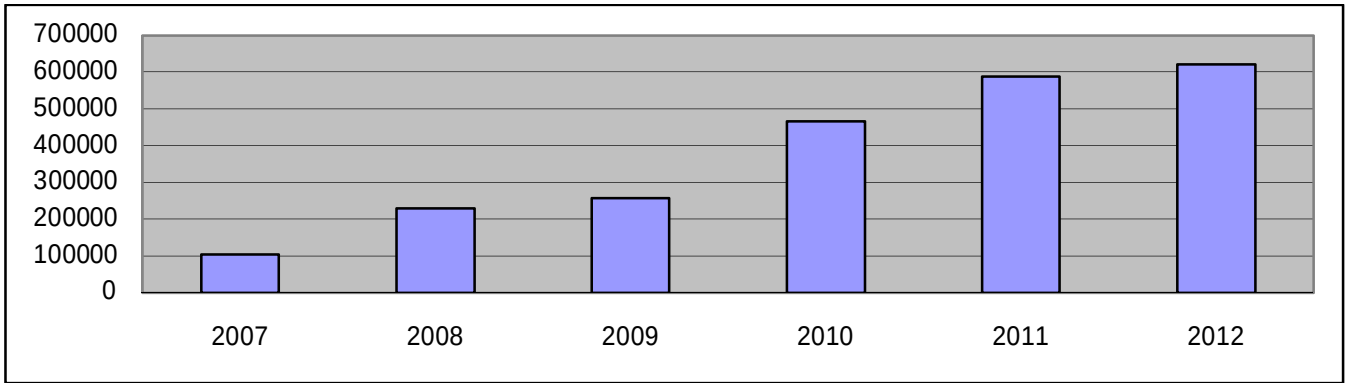

Figure 1: Amount of Packaging Waste is Collected Separately

Initially, thirteen waste glass collection boxes were provided to collect waste glasses in Kirklareli Central County and they were placed at various points of the county. Related to paper packaging waste, boxes made up of hard paper (indoor boxes) were provided to collect all waste papers from all state offices and institutes, apartments and houses according to the protocol with the licensed companies.

Collecting-sorting facilities submit their developments reports to the ministry once every 6-month. Thus, how much waste has been recovered can be recorded. In 2009, averagely 256900 kg of packaging waste was collected across the city. 92% of it accounts for paper, 5% of it accounts for polypropylene (PP) and 3% of it accounts for polystyrene (PS). The rates according to the type of packaging waste in 2009 is shown in the Figure 2.

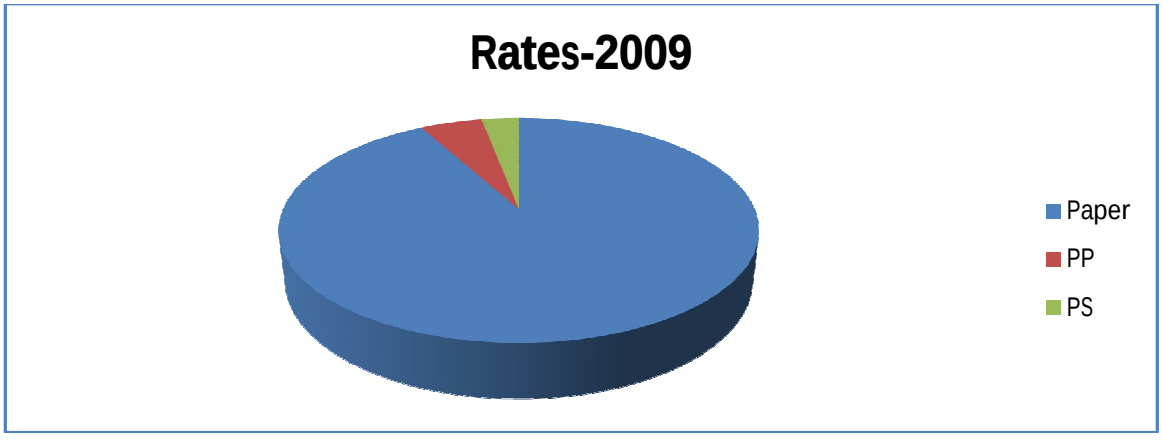

Figure 2: The Rates According to the Type of Packaging Waste in 2009

In 2010, averagely 467130 kg of packaging waste was collected across the city. 92% of it accounts for paper, 8% of it accounts for polyethylene (PE) and trace amount of PET (Polyethylene terephthalate). The rates according to the type of packaging waste in 2010 are shown in the Figure 3. In 2011, averagely 589160 kg of packaging waste was collected across the city. 98% of it accounts for paper, 2% of it accounts for polyethylene and trace amount of PET. The rates according to the type of packaging waste in 2011 are shown in the Figure 4.

In 2012, averagely 621565 kg of packaging waste was collected across the city. 94% of it accounts for paper, 4% of it accounts for polyethylene and 2% of it accounts for PET (Yavas, 2013). The rates according to the type of packaging waste in 2012 is shown in the Figure 5. Metal and glass waste is found in very low percentages did not take place in the figures.

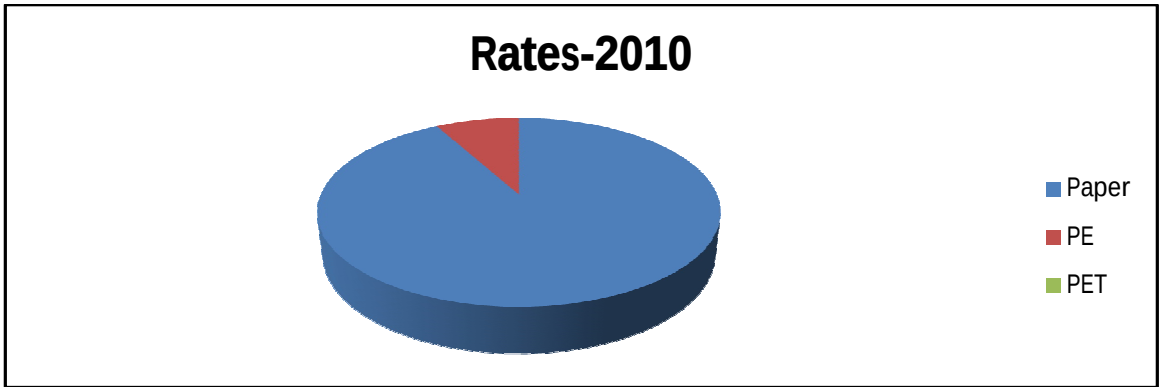

Figure 3: The Rates According to the Type of Packaging Waste in 2010

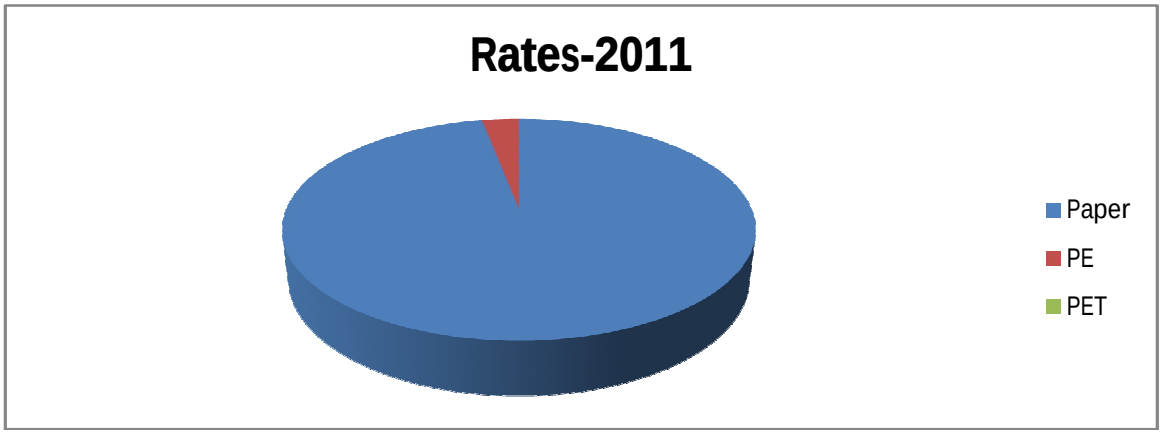

Figure 4: The Rates According to the Type of Packaging Waste in 2011

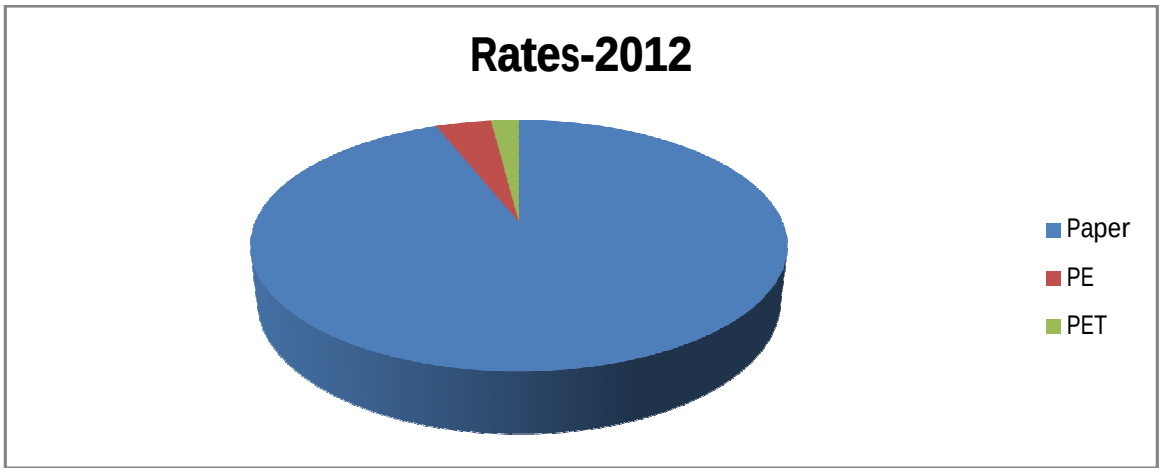

Figure 5: The Rates According to the Type of Packaging Waste in 2012

Conclusions

There are two licensed collection-sorting facilities and one recycling facility in Kirklareli City's Central County with a population of 67360 for management of packaging waste. According to the data provided by the licensed companies, collected packaging waste amount is 256900 kg in 2009, 467130 kg in 2010, 589160 kg in 2011, 621565 kg in 2012. The collected wastes were sent to the recovery facilities. However, disputes arise between the collecting companies and the municipality because the companies employ untrained personnel and such personnel does not care their job sufficiently. The increased personnel training efforts will eliminate such disputes.

In general, bags are used in at-the-source separate collection operations in the city. It is unavoidable to use containers instead of bags causing inefficient use of the funds in collection for the future of the system. The system of packaging waste collection through containers prevents inefficient use of the funds and reduces costs while it facilitates municipalities for inspections.

It is seen in the conducted studies that, in case of at-the-source separate collection projects in practice in European Union, householders can be inspected strictly and sanctions can be imposed on householders, who fail to collect their wastes separately, by the municipalities in a great determined way. However, in our country, waste producers, who were made obliged to collect their wastes separately at the source by "Packaging and Packaging Waste Control Legislation", cannot be controlled according to the current system. This reduces efficiency of collection and obstructs the system's progress seriously. Thus, separate collection at the source depends on householders' preference and good intent. To raise the collection efficiencies to the desired levels, first of all, householders should be informed about the fact that separate collection at the source is a legal obligation and then, they should be inspected by municipalities.

As a conclusion, first of all, it is quite important that proper collection systems are built not only in testing grounds but everywhere and problems are prevented in collection points after the awareness is raised. After the collection system is established, criminal sanctions should be put into practice to force individuals follow the system.

References

Akcay Han G.S., Bektas N., Oncel M.S., Separate Collection Practice of Packaging Waste as an example of Kücükcekmece, İstanbul, Turkey, Resour Conserv Recy 2010,54:1317-21.

Karamangil N.P., Characterization, Recycling and Disposition of Packaging Wastes in Turkey. MSc Thesis, Kocaeli, Turkey (in Turkish) 2008.

Republic of Turkey, Kırklareli Governorship, http://www.kirklareli.gov.tr, (accessed 2013).

Republic of Turkey, Kırklareli Municipality, http://www.Kirklareli.bel.tr, (accessed 2013).

Republic of Turkey, Ministry of Environment and Forestry, Packaging and Packaging Waste Control Legislation, No. Official Gazette No. 26562, Ankara, Turkey, 2007.

Yavas B., Central District of Kırklareli Province Packaging Waste at Recovery and Reuse Evaluation of Work. MSc Thesis, Tekirdağ, Turkey (in Turkish) 2013.