

## **Analysis on economy activities of plastics rubbish recycles package products for informal sector in medan city**

Kimberly Febrina

*Universitas Al Azhar, Medan, Indonesia*

### **ABSTRACT**

*Plastic waste of package product is one of the inorganic waste types which may pollute the land. One of the solutions that could be offered in the management of plastic waste of package product is recycling. The recycling activities in Medan city starts from waste collectors, second waste collectors to the agent. The method of the research was field survey in the form of interview and observation to 58 agents of recycling. The type of plastics waste of package products was categorized into white plastic, bottle plastic, glass plastic, white PE plastic, atom plastic, mixed plastic and bag plastic. The potential of economy on every recycling activity of waste products varied from each type of the plastics. Recently, potential of recycling for waste products was not optimally conducted since it was considered with low value. In implementing recycling business, there are some hindrances to face ranging from the lowest up to the agents such as the low price of plastic products sale, the limited of storage area and the reduced price with the reason of broken products. The results of research showed that Medan city has the potential for informal sector of waste products recycling. Those persons involved in the plastics waste are those waste collectors up to those agents. Those agents get the highest income compared to others since the amount of plastics waste is bigger and with various types.*

**Keywords** - economy analysis, plastic waste of package product, recycle

### **INTRODUCTION**

Rubbish or waste is considered as something invaluable and it even disturbs both the view and health. One of the ways to anticipate the problem of waste is by changing the lifestyle from consumptive to effective and friendly environment lifestyle. Hence, the first step to do is by knowing various types of waste in the environment, then to classify those waste which can be reused and recycled.

Simply, the waste can be categorized into 3, namely a) poisonous waste such as battery, used lamps, and those things with chemical substance, b) solid waste such as plastics, bottle, cans and etc, c) those things which can be destroyed by the land such as vegetables, leaves and etc.

In daily life, human cannot be separated from various activities producing various waste. The increased of population leads into the increased of waste. In waste management pattern, we know the motto of 3 R (Reuse, Reduce and Recycle). The lifestyle with friendly environment applies the motto of 3 R. The definition of reduce is to reduce the needs level of the waste, reuse means to use again those waste and recycle means to recycle again those rubbish in order to use it again.

One of the solid waste which can be recycled is package plastic product. The package product that is consumed always left in the waste. One of common package products is glass plastic. Nowadays, the products for human daily needs have been numerously available with inexpensive price and easy to get. Those products with plastic package are such as syrup, juice, baby food and others.

The activity of recycle is necessary to do since the waste could not be composted by the soil. The objective of the recycle is to save the cost of raw material use and also to reduce the liquid waste volume as well as to reduce the consumption of new raw material (Cook, 1978).

The advantage of using second plastic compared to using new raw material are such as the reduction of energy consumption of plastic production, the reduction of dangerous emission emerged from the new material transformation at the time of plastics forming, and lower consumption for raw material leading into lower energy consumption and lighter impact to the environment from its production process (Vellini et al, 2009).

In our country, waste management system is not relatively oriented to recycle activity. Hence, there are numerous material which may be recycled to get new use. The phenomenon leads into the emerge of informal recycle agent.

In developing countries, informal recycle agents are formed because of low economy development. Low wage and low price of the products and service created feasible profit margin from the collection and sale of secondary raw material (Wilson, et al, 2006).

Recycle activity is also necessary for Final Storage Place. The mixture of formal and informal recycle sector reaches for 25% of the abundance of the total rubbish. Hence, recycle is with important role to prolong the life of Final Storage Place (Suahada, et al, 2003).

Plastic waste material means the organic material which could not be destroyed by bacteria. Hence, plastic waste can be used again by the way of recycle and to be made as new product. The government has attempted various ways for the recycle such as by providing rubbish storage place (wet and dry rubbish). However, such as the efforts have not produced significant output in reducing plastics rubbish. In other words, the available management is not running well. Some people throw

their rubbish as what they like without the category of the rubbish. In this case, the socialization to the people regarding the rubbish should be increased either directly or indirectly. As what said by Vesilind et al (2003) that in the implementation of waste management in one community, the first step to do is to reduce the direct rubbish from the rubbish producer source. Here, one effective way is necessary. The collected waste should be categorized based on the type of plastics, then the recycle process can be running an well.

Well integrated waste recycle will be helpful to reduce the amount of rubbish and later it produces economical value.

Medan city as one of the third biggest city in Indonesia is the gate in western and with big population. In last 5 (five) years, the volume of rubbish increased for the average 30% or 462,430 m<sup>3</sup> per year and the volume of rubbish to recycle reaches for 10% of the total production of the rubbish in city (Medan Cleaning Department, 2008). One of the steps to do in overcoming the limited capacity of Final Storage Rubbish Place is to optimize the recycle for the rubbish such as plastics, paper, glass and cans. Hence, beside the importance of the recycle, it is also necessary to perform the analysis of economy value on certain level from the recycle activities. One of the ways is by conducting the research.

There are adequate potential in the recycle of paper, plastics, metal and others. However, up to this present time, few parties participate in this sector. In this paper, the analysis of economy in the informal sector of rubbish recycle is presented, especially plastics package product in Medan city.

## **METHODOLOGY**

The method used in this research is field survey method in the form of observation and interview with those recycle agents in Medan city. The data include recycle activity of plastics rubbish package product in informal sector of recycle ranging from rubbish collectors up to the agents. The survey was conducted in the period of October- December 2011 in Medan city and totally for 58 recycle doers consisting of 23 rubbish collectors, 19 second goods sellers, 7 place providers and 9 agents. The observation and interview was conducted to every recycle with the objective to observe the existing condition of recycle in Medan city. The survey was done by using list of questions including the type and amount of plastics rubbish package product, the income from the activity, and the selling and buying price. The calculation and primary data processing were taken from the results of survey with recycle doers ranging from rubbish collectors and second good sellers up to the agents in knowing the analysis of economy of plastics rubbish package product which last in the study area and it is expected to reduce the amount of the plastics rubbish.

## RESULTS AND DISCUSSION

### The Condition of Existing Recycle in Medan city

The people in Medan city consume various package products with plastics products such as mineral beverage, juice, syrup, herbal drink, baby food and others. All are as rubbish producers and it is directly with the potential to produce a large amount of rubbish.

Plastic waste package product are as inorganic rubbish with high potential to recycle in Medan city. The recycle process of plastic rubbish product package in Medan city are dominated by informal sectors consisting of 23 rubbish collectors, 19 second goods sellers, 7 place providers and 9 agents. In fact, not all recycle does buy and sell plastics rubbish product package. The results of survey showed that majority of rubbish collectors collect the rubbish, and others choose to collect other damaged product beside plastics rubbish.

### Rubbish collectors

Rubbish collectors are those person who collect the rubbish from any sources or from final storage place, then sell them to place provider or agent. The rubbish collectors collect the rubbish from those people who consider that they are as rubbish. They collect all damaged goods which can be sold again. From the results of survey, it was found that not all rubbish collectors collect the plastics rubbish product package. However, they also collect other material. The percentage of rubbish collecting activity of glass plastics product package by recycle doers can be seen in Table 1.

Table 1: Rubbish collecting activity of glass plastics product package by recycle doers

No	Recycle Doers	Percentage (%)	
		Yes	No
1	Rubbish collectors	67	33
2	Second Goods seller	77	23
3	Rubbish Place Provider	72	28
4	Agents	81	19

Source: Author's own created for the survey to 58 recycle doers (2011)

From Table 1, it can be seen that only 67% of 23 rubbish collectors who were surveyed in Medan city collecting the plastics rubbish, whereas 33% preferred to collect other damaged goods beside plastics rubbish. The rubbish collectors say some hindrance to face in collecting the plastics rubbish are such as low price selling, light goods, and seldom to find in the rubbish source. Other hindrances is the habit the people to combine those organic and inorganic rubbish (without

sorting). Beside, those rubbish collectors do not have the means to collect beside the sack they have.

### **Second goods sellers**

Second good sellers means those who buy the rubbish from the source, then sell them to rubbish place provider or agent. From the results of survey, it was found that not all of them take the plastics rubbish as it is seen in Table 1. There are 77% of 19 Second good sellers surveyed in Medan city collect the plastic rubbish, whereas 23% did not collect the plastics rubbish. The percentage of second good sellers who collect the rubbish is bigger than the percentage of rubbish collectors. It is with the reason that they have the money to buy even though in a small amount and also they carriage to collect the rubbish in bigger amount.

### **Rubbish Place Provider**

Rubbish place provider means those who buy the rubbish from rubbish collectors and second good sellers. Then, they sell again to the agent. The amount of rubbish was not big enough. The process to perform are sorting and initial cleaning. From the results of survey, as it can be seen in Table 1, not all of them buy plastics rubbish. 72% of 7 rubbish place provider receive the plastics rubbish, whereas other for 28% do not accept the rubbish. The hindrances to find are fluctuated price of the rubbish and the limited place to collect the plastics rubbish products. In addition, the destroyed of plastics at the time of transportation may reduce the selling price.

### **Agents**

In general, those agents have bigger capital and wider place to collect the rubbish. Hence, they are able to collect much rubbish and variative from other recycle doers.

The hindrances to face are related to fluctuated price and low selling price and less profit compared to others.

The average of rubbish can be taken weekly. The weight unit for plastics rubbish is kilogram. The average acceptance of the rubbish of plastic package was for 200 kg, and it depends on the season. In the season of celebrating the parties, then they may get bigger amount of plastics rubbish.

From the results of survey, it showed that 81% of 9 agents accepted the plastics rubbish in Medan city and 29% others accepted other material. On Table 1, it can be seen that the number of rubbish collectors and second goods sellers were increased in the agents.

## **Plastics Rubbish Management**

### **Plastics Rubbish Collection**

Plastics Rubbish Collection is carried out by involving some informal sectors namely rubbish collectors, second goods sellers, rubbish place provider and agents. Those recycle doers of plastics rubbish collect the plastic rubbish and then sell them. Lastly, it will be in the recycle industry of plastics rubbish. Usually, the rubbish collectors take the rubbish from the source, final storage place, depot or others. They collect those rubbish which can be sold again such as paper box, paper, cans, bottle, and others. In addition, to collect the rubbish, the local government provided the carriage or truck to take the rubbish.

### **Plastic Rubbish Sorting**

At the present time, the first who perform plastic rubbish sorting is those rubbish collectors. They collect and sort out the type of the rubbish in place of rubbish. One of the hindrances to find in sorting the type of the rubbish is the mixed of some rubbish leading into the contamination of the plastic rubbish. This activity leads into extra activities in the second goods provider and agent. The extra activity is such as plastics rubbish cleaning from the dirt attached in the plastics. The dirt without cleaning may cause the contamination in plastics recycle and at last it may cause low quality of plastics. It is also commonly found that those plastics could not be recycled. In attempting to separate those dry and wet rubbish, the local government put separate place for wet and dry rubbish. However, it is not optimum done since after the arrival in final storage place, those rubbish mix again. Low awareness of the people regarding the separation of the rubbish are caused by some factors. Based on the results of interview to 58 respondents, 35% say that they know the difference wet and dry rubbish and 65% said that they do not such as the difference. For the type of plastics rubbish, second goods seller and agent divide it into 8 (eight) types such as pure plastics, bottle plastics, glass plastics, pure PE plastics, wide plastics and atom plastics.

### **Compaction**

The next activity after sorting is the activity of compaction. Here, the process to do is to cut into pieces. The usual and common way to do is trapping down. However, this ways is only for those plastic bottle of mineral drink and glass plastics. For the wide plastics and atom plastics, the process of compaction is rather difficult to do since they are strong and thicker compared to bottle plastics and other plastics.

### **Prefabrication**

The next step to do is fabrication. The plastics rubbish have been cut into pieces, and cut again into smaller pieces. Then, those pieces are cleaned to avoid the

contamination with others. Those material which may contaminate others are such as the label of brand made of paper or metal. After cleaning, those plastics are destroyed. In the agent or supplier level, the recycle activity is only up to prefabrication. It is caused by the limited of capital to buy the sophisticated technology. However, some agents have bought the tools.

**Fabrication.**

The final activity of recycle is fabrication. It is the process of changing the plastics rubbish into plastics material recycle using melting and peletation method. The activity of fabrication is usually done in recycle industry, since it requires sophisticated technology and big capital. In the fabrication activity, it consists of second sorting phase, that is to differ those plastics based on the type of the plastics. The second sorting is conducted since ever plastics has different nature and all could not be treated similarly. Here, the method to use is by putting the pieces of rubbish into the solution, such as water, oil and fried oil. The difference of the mass from each plastics will lead into float and sink plastics. Those float plastic should be put into different place with sink plastics. Being separated, the plastics will be melted using the adjusted temperature with the type of the plastics. In this process, strand will be produced (long plastics looks like the noodle). Then, the next step is filtering to separate between the strand with unfiltered contamination material in the inspection phase (Sorting phase I). The next strand is by putting into peletation machine to produce the recycle plastics material.

**Analysis on Economy of Plastic Rubbish Recycle**

Based on the survey to 58 recycle doers in Medan city (Table 2), it can be seen that the amount of plastics rubbish to get from the agents keep increasing. In general, the type of plastics which are mostly sought are glass plastics, bottle and pure) and mostly are bottle plastics. In this research, the writer concentrate only on the three types of plastics rubbish. The amount of recycle plastics can be seen in Table 2.

Table 2: Average of Amount of Plastics Rubbish Per Week Collected by Recycle Doers in Medan city

Recycle doers	Plastic rubbish product package per week (from survey)		
	Glass plastics (kg)	Bottle plastics (kg)	Pure plastics (kg)
Rubbish collectors	18	24	10
Second Goods seller	20	26	13
Rubbish Place Provider	29	38	8
Agents	68	89	38

Survey representing 58 recycle doers (2011)

The price for buying and selling of plastic rubbish of product package can be seen in Table 3. The difference can be found from one recycle doers with others in the categorization of goods leading into the difference price on buying the plastic rubbish. The estimation of buying and selling price for small glass plastic generally increase from rubbish collectors, second goods seller, rubbish place provider and agents.

Table 3: The estimation of buying and selling price for small glass plastic in Medan city (from Survey)

Recycle doers	Glass Plastic (Rp/kg)		Bottle Plastic (Rp/kg)		Pure plastic (Rp/kg)	
	Buying price	Selling price	Buying price	Selling price	Buying price	Selling price
Rubbish collectors	-	750-1.000	-	1.000-1.500	-	750
Second Goods seller	1.000-1.500	2.000-2.500	1.500-2.000	2.000-2.500	1.500-2000	2.000-2.500
Rubbish Place Provider	2.000	2.500-3.000	2.000	2.500-3.000	2.000	2.500-3.000
Agents	2.250	3.000-3,500	2,500	3,000-3,500	2,500	3,000-3,500

Source: Author's own created from survey 2011

Buying and selling price of the bottle depends on the type of the bottle. However, there is certain clause regarding the division of the type of the bottle. The difference can be found from recycle doers to others in making the categorization of the bottle leading into the difference of the price of the bottle. The estimation of buying and selling price for small glass plastic generally increase from rubbish collectors, second goods seller, rubbish place provider and agents.

The profit means the difference between selling price and buying price. From each recycle doer, the profit can be calculated from buying and selling of the plastic rubbish. In Table 4, the profit of each plastics can be seen. Generally, the profit to get from rubbish collector, second good provider and agent is reduced. Rubbish collectors get the highest profit since they do not need capital to get the rubbish.



Table 4: Average Profit of Recycle Doers of Plastic Rubbish

Recycle doers	The benefits		
	Bottle plastic	Glass Plastic	Pure Plastic
Rubbish collectors	17,000	12,800	5,700
Second Goods seller	15,000	12,000	4,000
Rubbish Place Provider	14,000	11,500	3,500
Agents	13,500	10,000	3,500

Source: Author's Own Created (2011)

The profit to get in the next step is on second goods seller, rubbish place provider and agent is only with little difference. The factors influencing the difference price is related to the request from the consumers. The higher is the request, the higher will be the price. Conversely, the lower is the request, the lower is the price.

## CONCLUSION

1. In Medan city, there is a great potential of economy for glass and bottle plastic package product for informal sector.
2. Glass plastic package product recycle flow in informal sector is rubbish collectors- second good seller- rubbish place provider - agent.
3. It is found 67% rubbish collectors, 77% second good seller, 72% rubbish place provider and 77% agent who performing buying and selling activity for glass plastic package product.
4. The hindrances faced in glass plastic package product recycle are low selling price, limited storage place, few amount of plastic and light weight of plastic. Glass plastic package product can be categorized as glass and bottle as well as pure.
5. Generally, the profit to get from rubbish collectors- second good seller- rubbish place provider – agent is reduced since the difference on the price is only little. The agents have the biggest income compared to others because buying-selling activities are numerous and in a big amount.

## REFERENCES

- [1] Cook, R.F. (1978). *The Collection and Recycling of Waste Glass (Cullet) in Glass Container Manufacture Conservative & Recycling*, 2, Issue 1, 59-69.
- [2] Min'ko, N.I. Bolotin, V.N., and Zhernovaya, N.F. (1999). *Technological, Energy and Environmental Aspects of Collecting and Recycling of Cullet, Glass and Ceramics*, 56, 131-133.

- [3] Vellini. M., and Savioli,M. (2009). *Energy and Environmental Analysis of Glass Container Production and Recycling Energy*, 34, Issue 12, 2137 - 2143.
- [4] Wilson, D.C Velis. C and Cheeseman, C. (2006). *Role of Informal Sector Recycling in Waste Management in Developing Countries*. Habitat International, 30, 797-808.