

## ***Separation of Waste - One of the Ways to Reduce the Cost of Waste Management Municipality***

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**Abstract:** *The decentralization of public administration in Slovakia after the year 2002 meant a significant broadening of competencies and responsibilities of municipalities for the development of their territories. The act no. 416/2001 Z. z. about the transition of some competencies from the organs of state administration to the municipalities and self-governing regions also transferred some competencies in the case of waste management. The waste management in each municipality has to be in accordance with the Act on waste, with the Program of waste management and also the General municipal ordinance. The implementation of these wider competencies can be successfully executed only by the appropriate approaches in municipality management. The financial cost of collection, logistics, processing and expedition of communal waste is very high. One of the possibilities how to decrease this cost is the waste separation which is subsidized by the Recycling fund.*

**Keywords:** *waste, cost, municipality, waste separation, recycling.*

**JEL:** *H72, H76, Q56, K32.*

### **Introduction**

The waste is produced by almost every human activity, by the industrial production and by the households. The accumulation of waste significantly affects the environment. The waste contains substances which endanger all the aspects of the environment. For example the quality of water, air and soil. The appropriate waste management is becoming equally important issue such as the providing of basic living needs for people. The municipality has many competencies in each area of the environmental management. The focus is mainly on the duties and the competencies of the municipalities in the waste economy. Various problems can be identified in this area. *The § 39 Law on waste č.223/2001 Z. z.* is complementing the law of the disposal of communal and small construction waste. The paragraph 1 is defining: „The municipality is responsible for the disposal of communal waste, which originates from within the area of municipality and also for the small construction waste”. The disposal of the waste includes the collection, the transport, the assessment and the liquidation of the waste. It also includes the

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maintenance of the place where the waste is processed and land-filled. The law mentioned above complements in its further paragraphs the duties of municipalities such as the responsibility for the implementation of appropriate waste collection system, the commitment to prepare the General municipal ordinance (GMO) for the municipality concerned or the supervision of the producers of the waste in accordance with GMO ext.

The municipalities collect a local fee for the collection, the transport and the liquidation of communal waste. They also conduct the hearings regarding the offences occurred and provide an information about the land-filling and processing of communal waste in the local area.

### **Material and methods**

This article brings the insight on the issue of the waste management in the municipalities. The main sources for this article are the actual legislative norms and ordinances, The Waste management program of Slovakia, and the data obtained from the Statistical office of the Slovak Republic, Recycling Fund and the municipalities. There are 140 cities registered in the settlement structure of the Slovak Republic. More than 60% of them are included in the size category up to 50,000 people. Almost 40% of the total population of Slovakia is concentrated in this size category. The selected cities Dolny Kubin, Liptovsky Mikulas and Ruzomberok are the representative sample of this group of cities. Another common feature is the fact that they are part of the Euroregion Tatry and they are considered as economic, cultural and tourist centers of the region. In this article were use also secondary sources which are listed in the references.

### **1. Literature review**

The waste management is an activity that is focused on limiting the waste creation and mitigating the negative effect on the environment. In almost every European country the most important decision-making authority of the local government is municipal council. Its organisation governs the life of the settlement by way of local government regulations and decisions (Androniceanu, Drăgulănescu, 2016; Denhardt & Denhardt, 2006). At the same time, however, in some countries it can be witnessed that municipal councils delegate a part of their tasks and powers, together with the financial resources necessary for their implementation, to specialized committees, which also have the function of providing their opinions on proposed local legislation before it is submitted to the municipal council.

Source separation of waste is subjectively done by individuals collecting recyclable or compostable materials from commingle, sorting them into types at the place where the waste is generated, and putting them into different containers for collection. Several authors (Rousta et al., 2015; Hornik et al, 1995; Bernstad, 2014;

Williams & Taylor, 2004) have come to the conclusion that local governments play an important role in efforts to achieve an increase in correctly sorted recyclables and a decrease in missed-sorted waste. This waste management method leads to increase in collected recyclable waste and decrease in the amount of waste to landfill. Not only a large amount of sorted waste will be recycled, but also a substantial amount of land filled household waste can be recovered in various forms such as energy recovery or compost (Herzog, 2015).

## **2. The basic duties of municipalities in the waste management**

The legal framework for waste management in the Slovak Republic is provided for by the Act of the National Council of the Slovak Republic No. 223/2001 Coll. on waste and on amendments and supplements to certain acts as amended. The Waste Act defines key terms, sets out basic requirements for waste management and obligations for facility operators performing waste management activities. The legal framework for waste management in the European Union is the Directive of the European Parliament and of the Council 2008/98/EC on waste and repealing certain Directives. In the Slovak Republic the competences of waste management are delegated to the municipality. The State retains role of the management and control authority. Its responsibility is to create a legislative framework, coordinate activities, but also participate in the financing of waste management in the form of subsidies and grants.

The municipality is responsible for the disposal of communal waste, which originates from within the area of municipality and also for the small construction waste. Specific local municipality functions include:

- ✓ Compiling and implementing integrated waste management plans,
- ✓ Collecting data for the Waste Information System,
- ✓ Providing waste management services, including waste removal, waste storage and waste disposal services, in line with national norms and standards,
- ✓ Municipality specific standards for separation, compacting and storage of solid waste that is collected as part of the municipal service,
- ✓ Implementing and enforcing waste minimisation and recycling,
- ✓ The waste management is an activity which main focus is to limit the waste creation and to mitigate the negative effect on the environment.

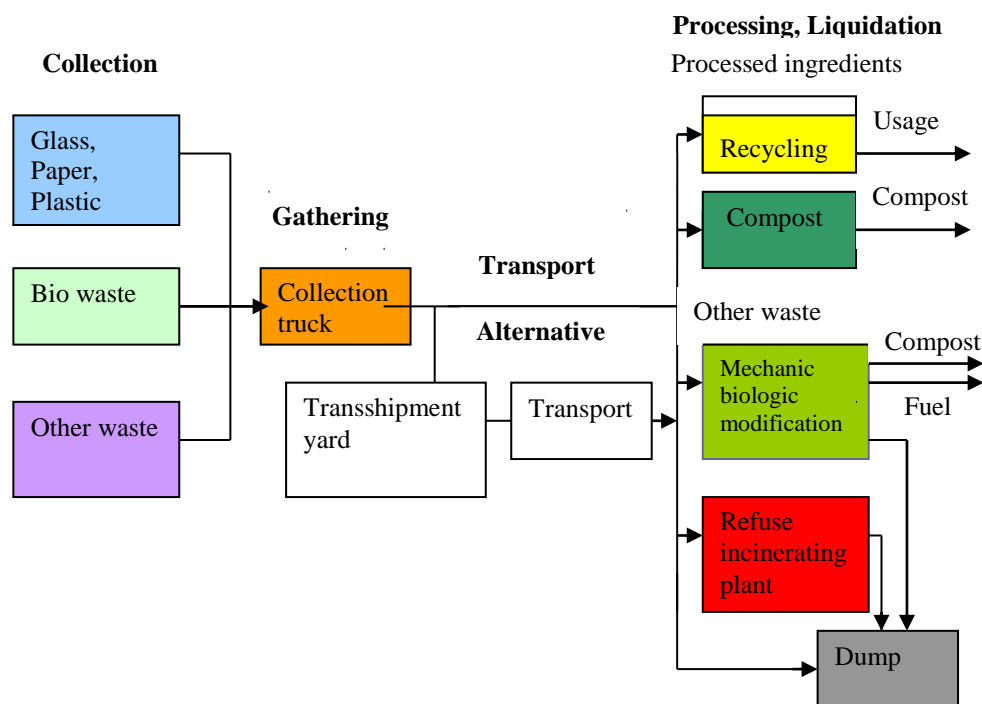
The purpose of the waste management is to prevent the waste creation by developing the new technologies which help to save the primary sources. For example: the waste recycling, or using the waste as the energy source. Other important objective is to control the waste processing which according to the law should be harmless to the humans and to the environment (Rajčiaková, 2008).

**Communal waste** is the waste created in the municipalities by the activities of households and small businesses but also the waste which is created by the cleaning of the towns and villages. For example: the cleaning of main roads, parks or cemeteries.

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The structure of the waste has been changed recently. Nowadays the waste consists mainly from food and the plastics. The ash which had a significant proportion in the communal waste decreased, because many households switched to gas and electricity central heating. There is an increasing amount of the wrap materials in the waste. The household waste comprise between 20% and 30% of them and industrial waste around 8%. In more detailed insight into the content of communal waste the most prevalent is biological waste (45%), paper (20%), glass (12%), plastic (7%), textile and metals (4%). Only 1% is the dangerous waste. **The dangerous waste** is a waste which possesses one or more dangerous features. For example is toxic, infected, flammable, cancerogenic, mutagenous, or explosive or any other way dangerous to the humans or the environment. The dangerous waste is processed and liquidated as first and in some cases is not allowed to be land-filled without previous processing. This processing provides a significant reduction of toxicity and also reduces its volume and weight (Hreusik, 2007)

The waste management consists of various processes include collection, transport, liquidation (Figure 1), which start from the producers and finish at the point where the waste is land-filled or incinerated.



**Figure 1. Waste management of municipality**  
(Source: Tolgyessy- Melicherčik, 2010)

As much as 70% of all costs related to waste processing are transport costs.

- the volume and the composition of the waste,
- the transportation and the storage conditions,
- the size of the local market for the raw materials and the energy obtained from the waste processing,
- the economical difficulty of the system. (Hreusik, 2007).

### **3. The waste economy tools and waste separation**

The municipalities use mainly these tools:

- The Program of waste economy including the strategy of the waste processing
- The Program the economy and the social development
- The General municipal ordinance about the waste processing
- Budget

*The programs of waste economy* – all the municipalities have to oblige to this program and is approved by the district environmental office. There is included an information about the current level of waste production and the perspectives into the future. These documents stipulate the objectives, the possibilities of how to achieve these objectives and the most viable environmental solutions.

*The program of the economy and the social development* – is a document which contains the priorities, the development objectives and the concrete development intentions in the municipalities based on detailed analysis. In the field of the waste economy this document gives an overview about the volume of land-filled waste and the recycled waste. It amends the terms of communal waste processing for all the subjects in the local area. It also stipulates the collection price calculation and the methods of payment.

*The budgets of municipalities*-are generated also from the fees paid by the citizens and the businesses. Nowadays in Slovakia there are obligatory local fees paid in each municipality for communal and small construction waste. The amounts of these fees are subject to the local authorities (Mitaľová – Molitoris, 2006).

Amongst the other sources of revenue for self-governing regions related to the waste is an income from the Recycling Fund for the *waste separation*. Recycling Fund is a non-state, purpose-bound organization, aimed to gather funds for the collection, recovery and recycling of certain wastes in Slovak republic. The recycling fund subsidises the waste separation in the municipalities. There are two types of grants: (1) Eligible grant, is used on the projects which are related to the waste separation. For example the promotions of waste separation or the intensification of already existing processes. (2) Non-eligible grant is used mainly for the purchase of the collection vehicles, containers and the waste processing equipment (Šmelková -Teslík, 2016).

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The practical experience with the Recycling Fund shows that it is a good tool for the implementation of the waste economy law. Otherwise because of the financial cost, the municipalities would not be able to implement this law thoroughly. The expenditures from the budget of self-governing regions include the expenditure on the collection and the transport of waste, and the payments made to the waste processing companies. The comparison of the cost and the revenue in the waste economy shows that the cost incurred is much higher than the revenue gained. Therefore the municipalities have to cover the differences from other sources of income. The main causes are the fees paid for the waste processing which according to the law cannot be included into the fees for the waste collection paid by households.

**The waste separation** is according to the law of waste the separation of waste according to the classes and material. The waste separation has a positive environmental impact because it significantly reduces the volume of land-filled communal waste, saves the primary sources and the energy (Rajčiaková, 2008).

The waste management hierarchy is defined by the law of waste and contains these five points:

- ✓ To prevent the production of dangerous waste.
- ✓ Re-usage.
- ✓ Recycling.
- ✓ To use the waste as the source of energy.
- ✓ Incineration and land-filling.

Because the waste liquidation is done in Slovakia mainly by land-filling, the waste management hierarchy is not implemented properly. **The liquidation of waste is preferred instead of recycling and energy extraction from the waste.** In the year 2015 in Slovakia were 143 waste yards in operation, 13 for dangerous waste, 114 for communal waste and 16 for inert waste. Although that recently significant financial resources have been invested into this field the waste separation is still in loss (Augustín, 2016).

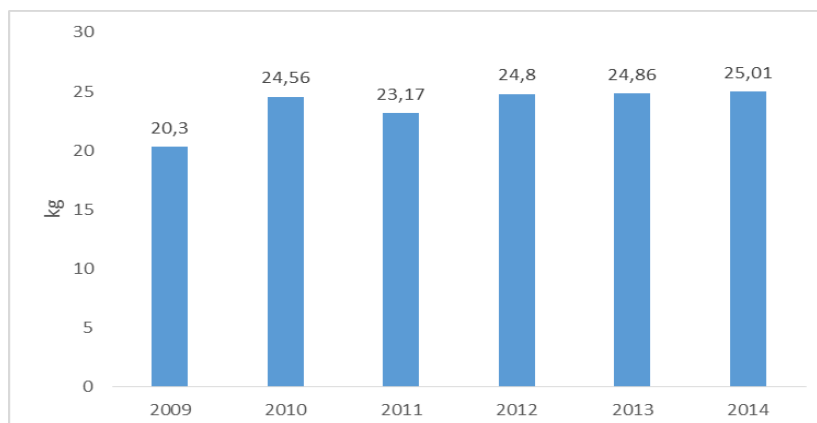
**Table 1 The volume of separated waste per capita in kg/year**

	2009	2010	2011	2012	2013	2014
<b>Dolný Kubín</b>	<b>20,30</b>	<b>20,90</b>	<b>25,60</b>	<b>18,35</b>	<b>28,68</b>	<b>28,13</b>
<b>Ružomberok</b>	<b>34,67</b>	<b>53,68</b>	<b>51,15</b>	<b>54,86</b>	<b>44,33</b>	<b>45,16</b>
<b>Liptovský Mikuláš</b>	<b>29,30</b>	<b>40,62</b>	<b>34,08</b>	<b>48,84</b>	<b>42,31</b>	<b>44,21</b>

*(Source: Our elaboration on data taken from Internal materials of Dolný Kubín, Ružomberok, Liptovský Mikuláš)*

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The analysis of waste separation has been made in three chosen towns Dolný Kubín, Ružomberok, Liptovský Mikuláš (Table 1). The main focus was laid on the volume of the waste separated per capita. The results were compared with the Slovak average (2009-2014) data from the Statistical office of the Slovak Republic (Figure 2).



**Figure 2. Average volume of separated waste in Slovakia, kg**

(Source: Our elaboration on data taken from The Statistical office of the Slovakia)

More than 90% of all separated waste consists from four main components (paper, plastic, glass, metals). The research show that very low percentage of households separates, metal packaging covers and tetrapack covers. Municipalities become eligible to a contribution if reliably establishing separation, recycling of a respective commodity based on an agreement which the Recycling Fund must conclude. The Recycling fund was established by the Act on waste in 2001 and it became a new element in the system of waste disposal in the Slovak Republic This demand doesn't include electronic waste coming from the household.

There is no legal title to provision of financial means of the Recycling Fund, with the exception of settlement of financial contributions paid under paragraphs 13 and 14 and refund of a contribution under § 56 paragraph 4 act No. 211/2001 of codex.

**Table 2 The funds from the Recycling Fund, (Eur)**

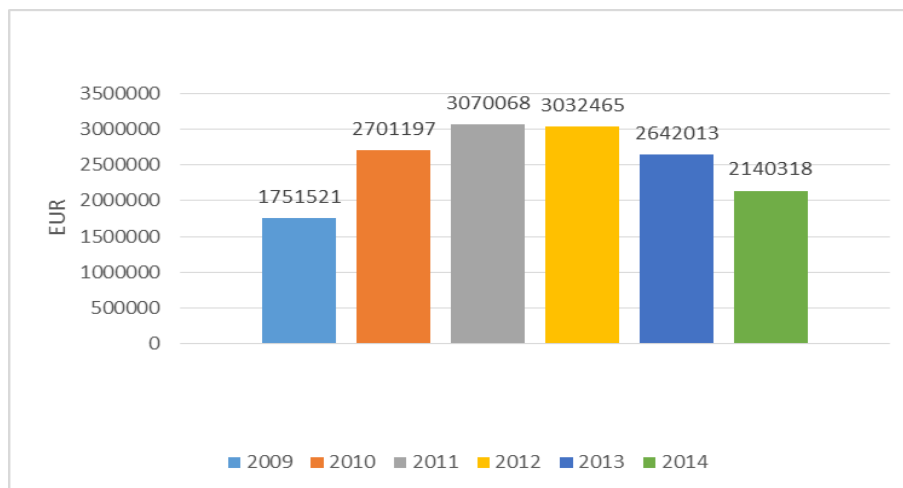
	2009	2010	2011	2012	2013	2014
<b>Dolný Kubín</b>	<b>14 062</b>	<b>15 850</b>	<b>18135</b>	<b>13240</b>	<b>4143</b>	<b>16668</b>
<b>Ružomberok</b>	<b>22 065</b>	<b>36 044</b>	<b>27 812</b>	<b>27237</b>	<b>9051</b>	<b>39772</b>
<b>Liptovský Mikuláš</b>	<b>31 869</b>	<b>34 969</b>	<b>27812</b>	<b>32704</b>	<b>9840</b>	<b>34922</b>

(Source: Our elaboration on data taken from Internal materials - Dolný Kubín, Ružomberok, Liptovský Mikuláš)

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The towns mentioned above do not use the full potential of the Recycling Fund. The income generated from the waste separation only partially covers the operation costs (Table 2).

In all three towns the allocation of the financial resources from budget does not cover the costs incurred on the waste management.



**Figure 3. Grant to municipalities for commodities the separated and transferred for recovery**

(Source: Our elaboration on data taken from Recycling Fund, 2016)

The financial means of the Recycling Fund may be used only for the purpose for which they were provided by the decision of the Board of Directors and under terms and conditions laid down in the agreement on provision of financial means of the Recycling Fund. The applicant for provision of financial means of the Recycling Fund shall be obliged to return unspent financial means to the Recycling Fund without any delay. Figure 3 presents the total value of grant to municipalities for commodities the separated and transferred for recovery in the period 2009-2014.

### Conclusion

The improvement of the waste economy is one of the major tasks in the environmental protection. The modern waste economy of municipalities in which the waste separation and the recycling have an important role requires significant financial resources and also the change in the habits of the households.

The improvement of the waste separation in Slovakia was hindered by the economic crisis. The result was the sharp drop in the production demand which



was reflected by the drop in the prices of secondary raw materials which are generated by the waste separation. Because of the low prices of secondary raw materials the cost of waste separation and recycling became higher than the potential revenue from it.

By the law all the municipalities from the January 2010 have to separate at least 4 components of communal waste (paper, glass, plastic and metal). According to the new legislation the biologically degradable waste separated from the year 2015. During finalization period of this paper a new legal framework has been in process of preparation.

According to the facts discussed above it is recommendable to study the concrete alternatives of the waste reduction in each municipality. Probably the most suitable method is the waste management audit. It would show where the waste is created and which are the options of the waste reduction.

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