WASTE SEPARATION IN VELKÝ ÚJEZD IN THE CONTEXT OF ECONOMICS

SEPARACE ODPADŮ V MĚSTYSI VELKÝ ÚJEZD V EKONOMICKÝCH SOUVISLOSTECH

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Abstract

The paper deals with waste management as a part of the reverse logistics. The aim is to analyse relations between costs and income regarding waste management in the small town of Velký Újezd. The information from annual reposts and bookkeeping of the town from 2004 and 2014 are used as important sources. The methods used are comparison and the best judgement.

Abstrakt

Práce pojednává o odpadovém hospodářství jako součásti reverzní logistiky. Cílem je analyzovat souvislosti mezi náklady na odpadové hospodářství v městysi Velký Újezd a příjmy z tříděného odpadu, které plynou městysi zpět. Pro práci budou použity informace z ročních hlášení a účetnictví městyse Velký Újezd z let 2004 a 2014. Mezi použité metody patří srovnání a kvalifikovaný odhad.

Key words

Low on Waste, separation, waste, waste management, reverse logistics, Velký Újezd

Klíčová slova

Zákon o odpadech, separace, odpad, odpadové hospodářství, reverzní logistika, Velký Újezd

INTRODUCTION

Waste - costs for someone, income for others. The essential question is, if it is possible to find the balance in between. The amount of waste has grown rapidly in the last 50 years. Luckily also approaches how to deal with waste develop and are successful in most developed countries.

The basic unit where waste has its origin is a household. One of the important task for municipalities is to choose carefully the approach to the waste management. Ten years is an ideal time to compare the attitudes, costs or incomes regarding waste management.

REVERSE LOGISTICS

When talking about waste, let's first introduce a wider topics of logistics, esp. reverse logistics. Every single item, product, ware or object (we can use many words to describe) has

it place of origin, its way of production, transport, utilization or consumption. People have benefit from products or services. Here we talk about logistics in a very simple way. The time of benefit differs with each product. When the time is over, when we do not use it any-more, then the product should go from the point of consumption back to the point of origin. Here we talk about reverse logistics.

According to Rogers and Tibben-Lembke reverse logistics is "*The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal."(Rogers a spol., 1998).*

People in general are aware about some kinds of products that go backwards – electrical equipment such as televisions, refrigerators, mobile phones of batteries which we carry back to the place we bought or similar. Waste from our households cannot be brought back to where we bought it. But we all use elements of reverse logistics if we separate waste.

WASTE MANAGEMENT AS A PART OF REVERSE LOGISTICS

Waste management is essential in our society of 21st century. There are countries that separate high percentage of waste, there are countries that do not separate at all. Unfortunately pictures showing waste at beaches e.g. in Hawaii can also be found. Hawaii is considered as a paradise but the Pacific ocean brings the waste to this place.

The U.S. Army – Hawaii states at its website[1]: *„Reduce waste... If not you, WHO? Before making a purchase, ask yourself if you need to buy the goods or materials, or if you are buying more than you need. The best way to reduce waste is not to produce it in the first place!"*[2]

PRODUCTION VS. CONSUMPTION

Let´s think about the status quo. Do we consume what is produced or do we produce what consumers need or just want? More and more waste is produced, thus more energy is needed to produce waste, and then, even more energy is needed to destroy or reuse the waste again. Here the economics starts to play its role. The fight of ecology and economics is a never-ending story and there cannot be only one winner. The key players in the field of package production should take care about the environments much more.

LAW ON WASTE

According to the § 4 of the Law No 185/2001 Sb. on Waste, the **waste management** is *„activity focused on waste prevention, management of waste and after-care of the place where waste is stored permanently, and on control of these activities"*[3], and **waste recycling**

1 USAG-HI's technical environmental liaison between the state and federal regulatory agencies, the Hawaiian communities and special interest groups. (http://www.garrison.hawaii.army.mil/sustainability/SolidWaste.aspx)

2 *Reduce Waste, Recycle More!* Retrieved from: http://www.garrison.hawaii.army.mil/sustainability/SolidWaste.aspx, [cit. 5. 4. 2015]

3 Law No 185/2001 Sb. on Waste, § 4

is stated as *„any way to use the waste, which the waste is reprocessed into products, materials or substances for the original or other purposes of their use, including reprocessing of organic materials; waste recycling is not an energy recovery and processing into products, materials or substances used as fuel or backfield waste“*[4].

Let's look at the waste hierarchy into the law again, § 9a. In terms of waste management, the following waste hierarchy must be followed:

a) waste prevention

b) preparing for re-use

c) recycling

d) other recovery of waste, e.g. for energetic purposes

e) disposal of waste

The goal No 1 is waste prevention. What every single person can do is to buy products packed in paper, glass or in no harmful materials. Here the producers play an important role. And economics fights with ecology again. Imagine just some kinds of chocolates, teas or detergents packed in two or three separated packages. Some products have much bigger package than needed. Here is one of the possible ways for waste prevention.

THE TOWN OF VELKÝ ÚJEZD

The town of Velký Újezd is located between Olomouc and Lipník nad Bčvou, on the foothill of Oderské vrchy. The altitude is 371 m. The river Odra has its source 6 km from the centre of Velký Újezd.

It may be interesting to mention famous natives. Jaroslav Švarc, one of the seven parachutes, who died in Gorazd church in the Ressel street in Prague after the assassination on Heydrich in 1942. František Nechvátal, a poet of the Nezval generation or academic sculptor Vladimír Navrátil.

Nowadays there live 1311 inhabitants in Velký Újezd (1. 4. 2015) and people keep finding their new homes here.

WASTE MANAGEMENT AND WASTE SEPARATION IN VELKÝ ÚJEZD

The town of Velký Újezd follows the Regulation about establishing a system of collection, transport, separation, use and disposal of urban waste and construction waste management in the area of Velký Újezd. The Regulation is based on the Law on Waste No. 185/2001. The waste separation works in cooperation with the company EKO-KOM.

According to the mentioned Regulation (up-to-date version valid since April 1st

4 Law No 185/2001 Sb. on Waste, § 4

2015), the waste is separated into 10 components. The following table compares the components that were separated in 2004, 2014 and are separated now.

Tab. 1.: Waste separation – components in time

TYPE OF WASTE / YEAR	2004	2014	01.04.2015
paper	✔	✔	✔
plastics	✔	✔	✔
glass (all types)	✔		
glass – white		✔	✔
glass – colour		✔	✔
bulky waste	✔	✔	✔
hazardous waste	✔	✔	✔
cemetry waste	✔	✔	✔
residual waste	✔	✔	✔
bio waste			✔
metals			✔

source: onw, according to the Regulations of waste, Velký Újezd

The Regulation also describes:

- what type of waste belongs to which container or sack
- where the containers are located
- what to put to the particular containers or sacks, what does not belong there
- when the transport happens
- bulky waste management
- construction waste management
- waste of the cemetery and its disposal

The waste management in Velký Újezd uses containers and sacks, as described above. All residents of Velký Újezd get the sacks for free – yellow one for plastics and blue one for paper. Every fortnight the collection and transport is realised by the Remit company. People just prepare the sacks to the front of their houses. Collection and transport of the residual waste work the same, people place their own waste bins in front of their houses every other fortnight.

Fig. 1.: Sacks for plastics and paper ready for collection

source: own

White glass, colour glass, metals and bio waste belong to the containers (white, green, grey and brown ones). The bio waste is processed by local farmer. There are 5 containers for both types of glasses, one for metal and 20 for bio waste.

Bulky and hazardous waste is being collected and transported twice a year in announced day and time in 5 places all over the town.

One container for used clothes, shoes and toys in placed in the centre of Velký Újezd. Also the charity works here to collect the needless stuff.

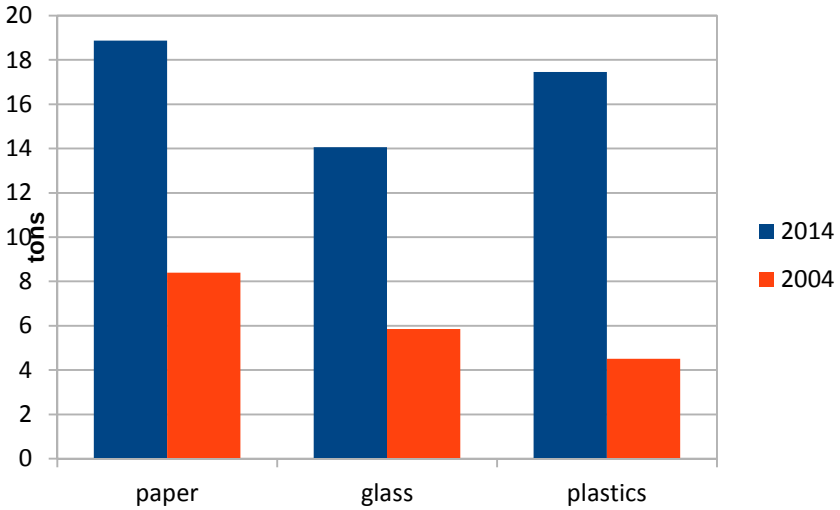
Fig. 2.: Containers for glasses, clothes and metal
source: own

Fig. 3.: Container for bio waste
source: own

The following tables and graph show what type of waste was separated and in what amount (numbers in tons) in the years 2014 and 2004. As we can see in the table, the last 10 years has witnessed a speedy progress in waste separation.

YEAR	paper	glass	plastics	tyres	liquid chemicals	batteries	non-biodegradable waste	separation in total
2014	18,87	14,06	17,46	0,42	0,27	0,07	4,94	**56,09**
2004	8,4	5,86	4,51	N/A				**18,77**

Tab. 2.: Separated waste – amounts in tons (comparison 2014 and 2004)
source: own, on the basis of the Reports



Tab. 3.: Waste separation in numbers

YEAR	number of residents	separation per resident / t	separation per resident / kg	percentage of separation
2014	1281	0,0438	**43,79**	18,2
2004	1068	0,0176	17,57	10,3

source: own, on the basis of the Reports

According to the EKO-KOM company, the separation per resident in the Czech Republic in 2013 was 39,7 kg in average[5]. (Numbers for 2014 are not available yet.) Residents from Velký Újezd have separated more (in 2014), 43,79 kg per resident.

Regarding the residual waste the best numbers in ecological view reach the Plzeňský region with 231 kg of residual waste per resident (Středočeský 372 kg). To highlight the best region regarding the separated waste is a bit troublesome. You never know, if the lower number means the lower consumption of waste in general (which is a positive aspect) or lower percentage of separation. This must be evaluated in wider context.

In the competition „For a ceramic waste bin 2014“ Veký Újezd took the fifth place. It wast the eight place in 2013. Here is the list of the winners in 3rd category - towns. (1st category – villages up to 500 inhabitants. 2nd category – villages from 500 inhabitants.)[6]

1. Jeseník
2. Olomouc
3. Litovel
4. Hanušovice
5. Velký Újezd
6. Kojetín
7. Zábřeh
8. Konice
9. Prostějov
10. Velká Bystřice

The table No 4 shows how much kilograms of paper, glass (white and colour in total) plastics and residual waste was produced in Velký Újezd per one resident in 2014.

Tab. 4.: Separation per resident – basic elements and residual waste

separated waste in 2014	paper	glass	plastics	residual waste
kg per resident	14,73	10,98	13,63	195,9

source: own, on the basis of the Reports

The volume of waste produced by one resident will be presented at the particular household. The method of the best judgement was used. There are of course differences between households or single persons regarding waste production and possibilities of

5 *Přehled dosahovaných výsledků*. Retrived from: http://www.ekokom.cz/cz/ostatni/vysledky-systemu/vyrocni-shrnuti, [cit. 5. 4. 2015]

6 *O keramickou popelnici 2014*. Retrived from: http://www.jaksetociodpady.cz/odpady/index.php?page=2-o-keramickou-popelnici-2014, [cit. 5. 4. 2015]

separation. People in villages e.g. have different possibilities in bio waste processing than people in towns.

The given households has the following features:

- 3 adults and 1 child (80 % of residual waste are infant nappies)
- heating by fireplace (usual paper and magazines are burnt there)
- possibility of bio waste processing

Tab. 5a.: Separation per resident – example of particular family (best judgement)

WASTE TYPE	volume of the waste bin/ sack (l)	number of collections	4 people / year (l)	1 person / year (l)	1 person / year (kg)
residual waste	110	12	1320	330	**150**
plastics	120	12	1440	360	**6**

source: own

Tab. 5b.: Separation per resident – example of particular family (best judgement)

WASTE TYPE	weight (kg)	number of collections	4 people / year (kg)	1 person / year (kg)
paper	4	2	8	**2**
glass	10	4	40	**10**

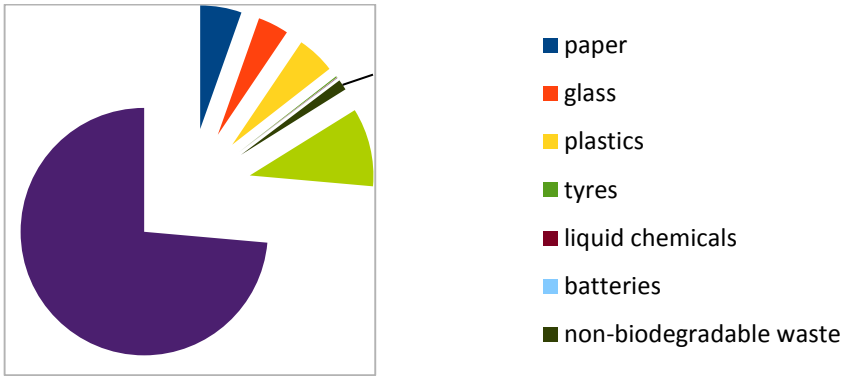
source: own

The table No 6 and the following graph show the diversification of waste in Velký Újezd in 2014 in global. A you can read from the different articles and analysis, the Czech Republic belongs to the best separating countries of the European Union. After studying the table and the graph, the result is not such positive. Three thirds of the total waste is still residual waste that end up on the landfill. According to the new law it will not be possible to place the residual waste in landfills.

Tab. 6.: Types of waste in 2014 (in tons)

YEAR	paper	glass	plastics	tyres	liquid chemicals	batteries	non-biodegradable waste	bulky waste	residual waste
2014	18,87	14,06	17,46	0,42	0,27	0,07	4,94	35,76	256,03

source: own, on the basis of the Reports



ECONOMIC ASPECTS OF WASTE SEPARATION IN VELKÝ ÚJEZD

As mentioned above, the town cooperates with the EKO-KOM company in waste separation. According to the EKO-KOM website *„The company and the town sign a contract to meet the duty of reverse take-offs and using the waste from packaging materials ….”*[7]

The table No 7 compares the costs spent on different types of waste. The numbers regarding separated, bulky waste and waste from cemetery in 2014 come from the annual report, the dates form 2004 were not available already.

Tab. 7.: Comparison of costs in 2014 and 2004

COSTS / YEAR	2014	2004
paper, plastics, glass	211 244 Kč	N/A
bulky waste + cemetery	107 299 Kč	
hazardous waste	10 142 Kč	10 582 Kč
residual waste	401 448 Kč	259 418 Kč
total	*730 133 Kč*	*270 000 Kč*

source: own, on the basis of the Reports

Important numbers are based on the comparison of the table No 7 and No 8. Regarding waste separation, the town spent 211 244 CZK and got 146 380 CZK back from the EKO-KOM company, which is nearly 70 % of the expenses. Here comes the question – is it better (for the municipality) to have more waste and thus to get more money?

Tab. 8.: Comparison of income in 2014 and 2004

INCOME FROM / YEAR	2014	2004
EKO-KOM	146 380 Kč	31 585 Kč
residents	527 786 Kč	267 000 Kč
total	*674 166 Kč*	*298 585 Kč*

source: own, on the basis of the Reports

Costs on hazardous and residual waste collection and processing are taken into account in specifying the fee on waste management that is paid by all residents. The amounts of the fee compared between the years 2004 and 2014 and between Velký Újezd and Přerov show the table No 9.

7 *Smlouva s obcí*. Retrived from: http://www.ekokom.cz/cz/obce-a-mesta/zapojene-obce/smlouva, [cit. 5. 4. 2015]

Tab. 9.: The fee in 2014 and 2004, in Velký Újezd and Přerov

RESIDENTS PAY IN / YEAR	2014	2004
Velký Újezd	**400 Kč**	**250 Kč**
	150	110
	250	140
Přerov	**650 Kč**	**400 Kč**
	186	225
	464	175

source: own, on the basis of the Reports

PAPER IN POST BOXES

One more analysis was done to make the picture about waste in household complete. The magazines from supermarkets and different offers that were delivered into the post box in the time of one week were put on the scale. Half kilo of paper (see Fig. 4.) was delivered during one week to one household in one town. That is 26 kg of paper a year in one household in one town. Luckily paper does not belong among the questionable materials. But still it is demanding for the environment and exhaustible resources.

Fig. 4.: The quantity (0,5 kg) of magazines per one week

source: own

CONCLUSION

People were used to glass in the Czech Republic till 1989. After 1989 we buy products in plastics and probably can´t imagine to carry e.g. mineral water in glass any more. That is development. We need innovations for our life. But sometimes the innovations mean the step back. It is 100 % true for the environment in this case.

Everyone of us can help to protect the environment. If the producers, the companies benefiting from packaging materials, the future waste, start to use the sources reasonably, then the change is possible and may be visible.

The waste in our households can be controlled by ourselves. Each of us can buy products that generate minimum waste and then deal with the necessary waste reasonably.

Regarding Velký Újezd, it may be interesting to monitor the amounts of waste after the containers for metal and bio waste were introduced.

The residual waste is a big question nowadays. On one hand we pay for landfills, on the other hand e.g. cement mills pay for the waste to burn it as alternative fuels.

We have lots opportunities on the level of high politics or in particular households to deal with the waste rationally, let´s do it.

LITERATURE

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[7] Regulations, reports and bookkeeping of Velký Újezd

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