Urban waste for biomethane grid injection and transport in urban areas

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Municipal waste management in Rzeszow/Poland

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UrbanBiogas website: www.urbanbiogas.eu

Content

1 Introduction

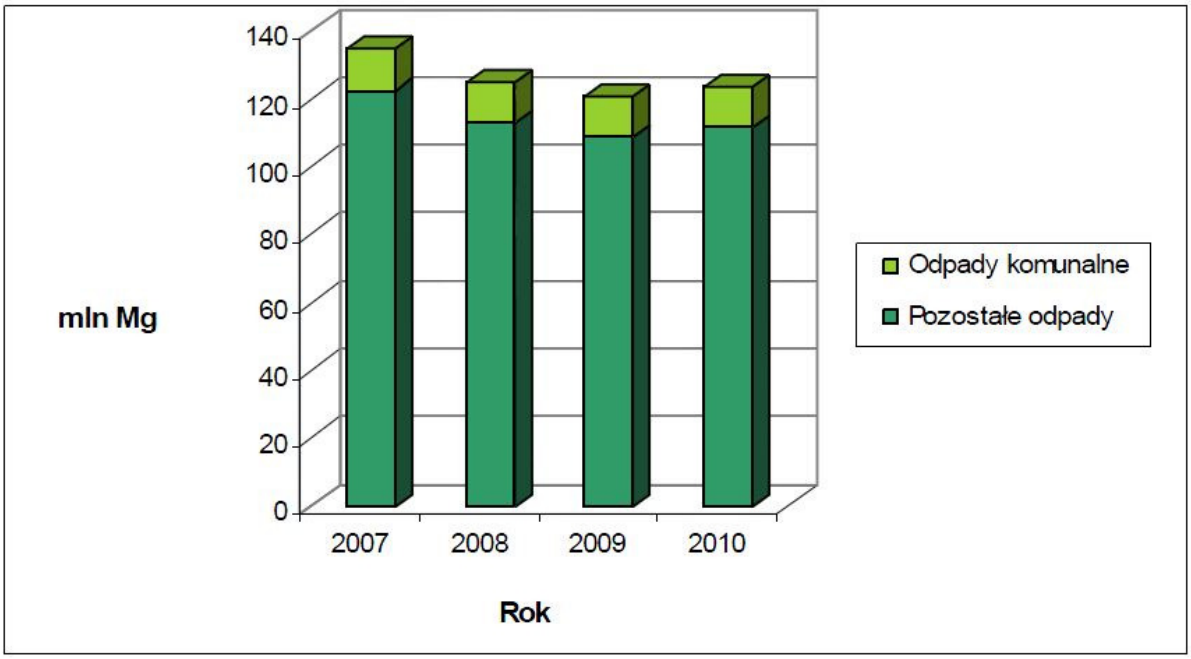
The main references of figures on municipal waste market are documents of the Central Statistical Office, and documents such as plans and reports Ministry of Environment. In particular it is the National Waste Management Plan drawn up for a period of four years and a report on its implementation. Main Data of the Statistical Office for the area in question are presented primarily in two cyclical industry publications: Environmental Protection and Municipal Infrastructure. For international comparisons the data from Eurostat were used.

2 Overview of municipal waste management

2.1 Municipal waste generation in Poland

As the chart below shows the amount of waste generated in 2007 amounted to 134 million tonnes (Mg) and decreased in the following years, reaching 120 million tonnes, followed in 2010 by the increase to 124 million tonnes. During this period, the amount of municipal waste accounted for approximately 9-10% of the total waste, amounting to just over 12 million tonnes. Comparing the year 2007 by 2010, decrease in the amount of municipal waste generated was less than 1.8%.

Pic.1 Amount of total waste generated in Poland: light green – municipal, dark green - others



It must be remembered, however, that not all municipal waste generated was collected.

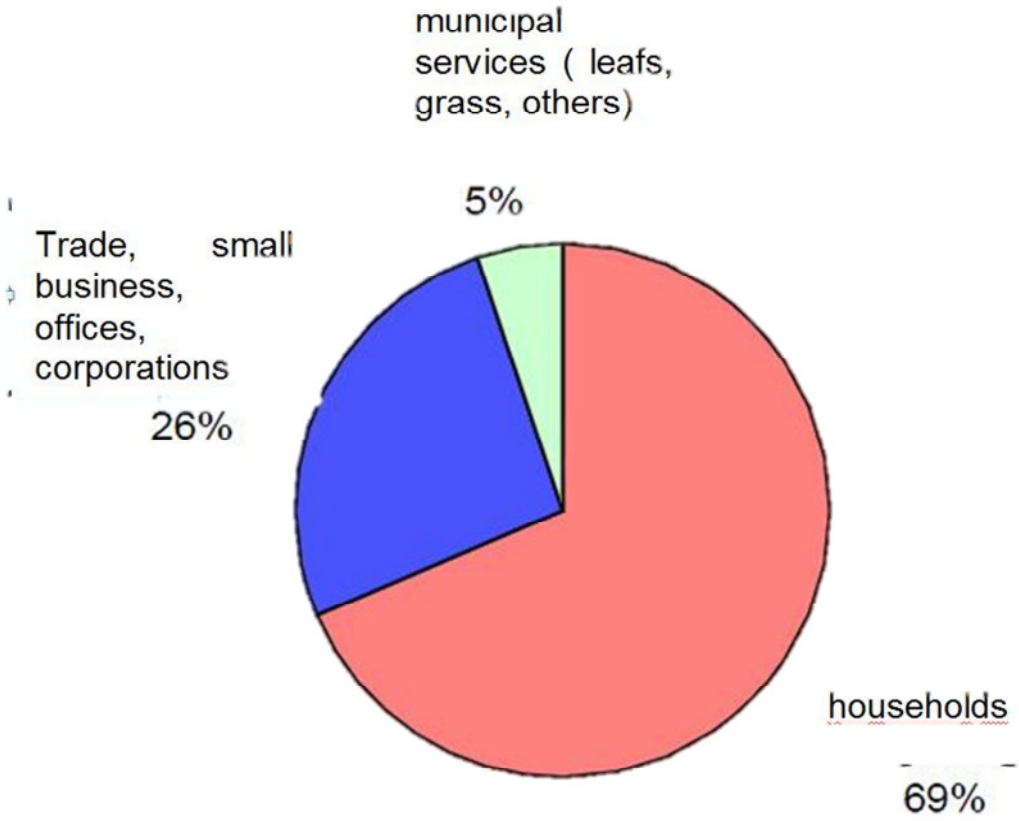
According to estimates, nearly 10% of the generated municipal waste in Poland is disposed in unreported environmentally unsound manner. In 2010 Poland produced 11.8 million Mg (tons) of municipal waste, including:

- 10.4 million Mg unsorted municipal waste,
- 243 thousand. Mg of municipal waste collected selectively,
- 440 thousand. Mg of waste from gardens, parks and from markets,
- 251 thousand. Mg of waste collected from streets and squares,
- 451 thousand. Mg large dimensions waste.

The largest amount of waste was produced in the southern Polish region in Śląskie (41.9% of the total flow), Lower Silesia (26.9%) and Lesser Poland (7.3%). The smallest amount of waste created in the Lubuskie (0.5%), Warmia-Mazury (0.5%) and Podlaskie (0.7%).

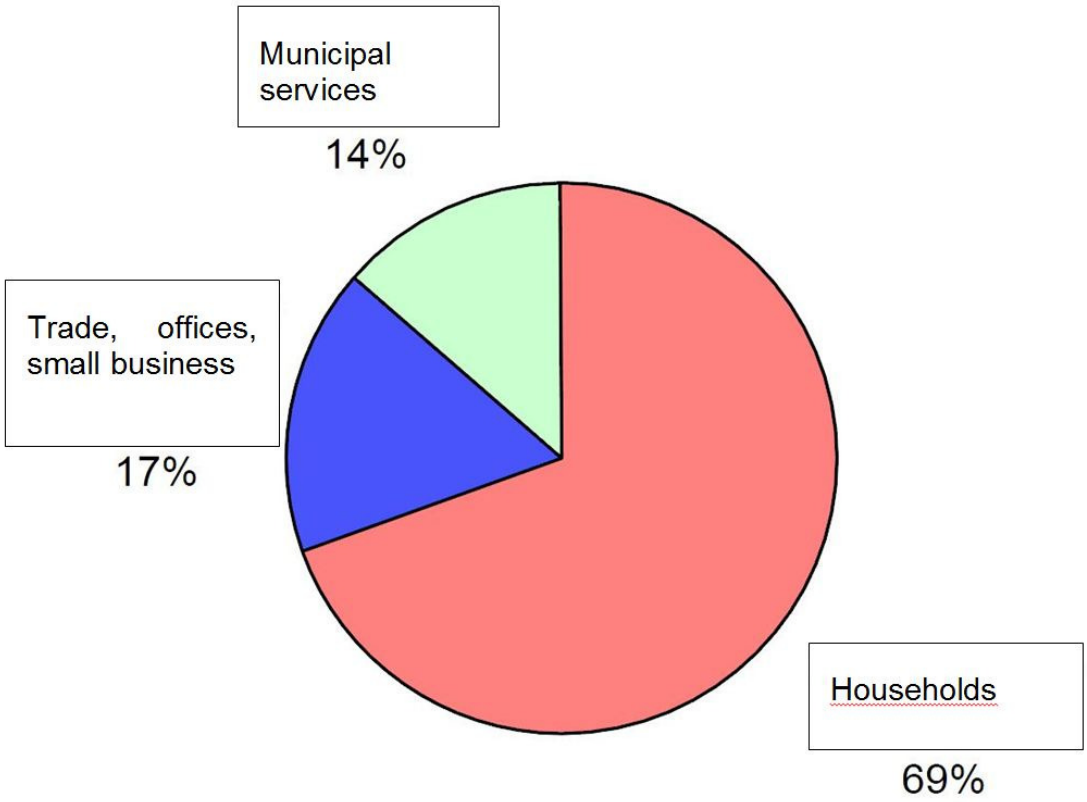
The quality of the waste is only statistically known. However, this numbers cannot be used for biogas production planning.

Pic.2 The structure of mixed municipal waste collected by location and methods of collecting in 2011



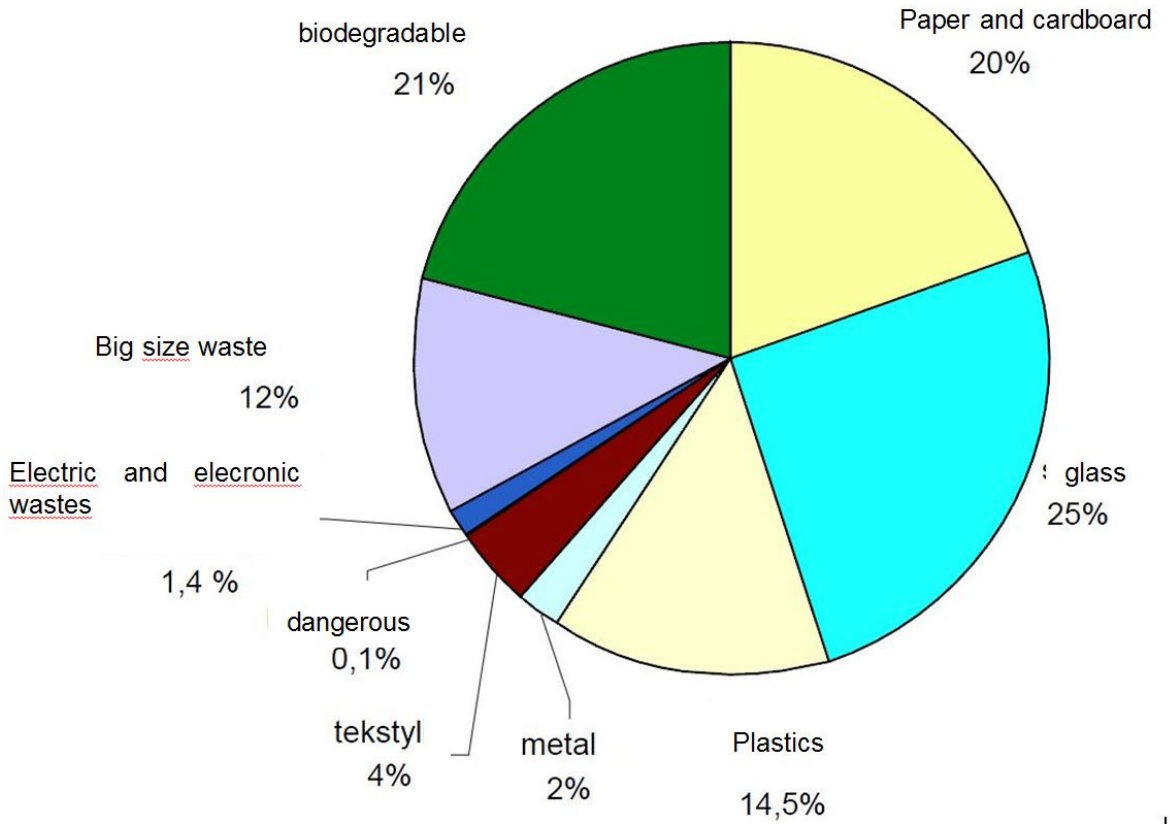
The above chart shows that about 69% of mixed municipal waste collected is produced by households. In this structure can also be distinguished companies and institutions (26%) and cleaning services (street cleaning, emptying bins in parks and on the streets), which provided for the development of 5% of the collected municipal waste.

Pic.3 The structure of municipal waste collected selectively by location and methods of collecting in 2011



The share of households in collected segregated waste was almost identical as in the structure of mixed waste at around 69%. It is important to note that the much larger portion of the waste is collected separately outside the household such as at collection points - special bins placed on the street or in stores. The result is a much larger share of waste from municipal cleaning services in the waste selectively collected as compared to mixed (14% - selective compared to 5% - mixed).

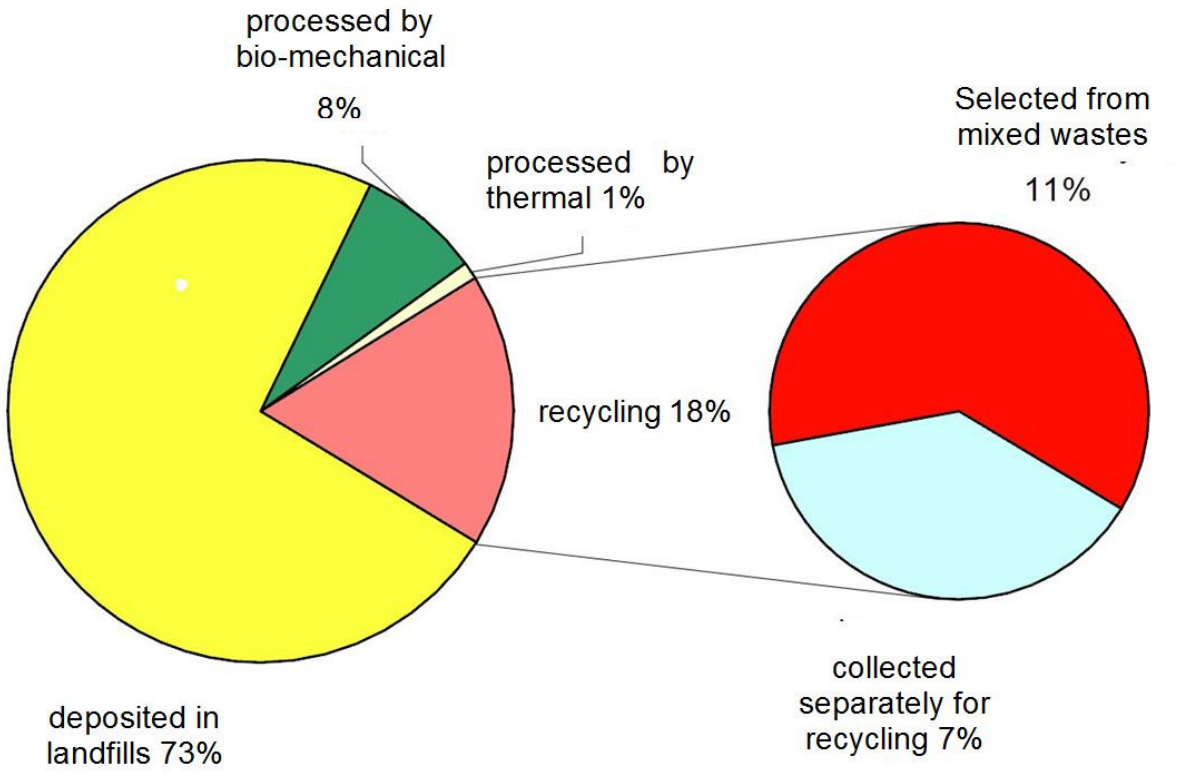
Pic.4 The share by weight of each category of waste of municipal waste collected separately in 2010



As can be seen from the above chart, segregated municipal waste, otherwise known as collected selectively include: glass (25%), biodegradable waste (21%), paper and cardboard (20%), plastics (14.5%). From the point of view of Urban Biogas project the most interesting is the biodegradable part. However, it is only randomly tested for dangerous substances but not for using in biogas plants.

As mentioned earlier in this chapter, the same waste collection e.g. municipal reception from the locals is just the initial step in the process of management of municipal waste. After that, there always comes a time to development through disposal (landfill or deposit processing) or recycling. The share of individual management methods of municipal waste has been presented in the following graph.

Pic .5 Structure (in percent) of management methods for collected municipal waste by the number of tonnes in 2011.



Specific issues governed by the law of waste management include:

- Act dated 13 September 1996 on maintaining cleanliness and order in the communities
- Act dated 20 January 2005 on recycling of end-of-life
- Act dated 24 April 2009 on batteries and accumulators
- Act dated 29 July 2005 on electrical waste and electronic equipment
- Act dated June 1997 on the prohibition of the use of products containing asbestos
- Act dated 11 May 2001 on packaging and packaging waste
- Act dated 11 May 2001 on the obligations in the field of management of certain waste and the product fee and deposit fee
- Act dated June 2007 on the international shipment of waste
- Act dated 16 March 1995 on the Prevention of Pollution from Ships
- Act dated February 4, 1994 - Geological and Mining Law
- Act dated 10 July 2008 on mining waste
- Act dated 29 November 2000 Nuclear Law

The targets are specified in the Polish Parliament resolution of 22 May 2009 on the adoption of the "National Environmental Policy for 2009-2012 with perspectives till Year 2016".

At the central level there has been adopted National Waste Management Plan. Plans adopted at lower levels should take into account the findings of higher-level plans. The waste management plans shall be updated at least every four years. For this moment the valid document is The Council of Ministers Resolution No. 233 of 29 December 2006 on the "National Waste Management Plan 2010".

The updated Polish National Waste Management Plan provides for the construction of a network of regional waste management facilities (170) for achieving the required levels of recovery and waste: biodegradable, large-scale construction, hazardous waste (composting, sorting, fermentation equipment, dismantling stations bulky waste and construction and repairs).

There will also be construction of 10 objects of thermal utilization of municipal waste. There is one planned in Rzeszow, as well.

The most important area of the agglomeration in the Podkarpackie region is the city of Rzeszow . Its area in 2006 was 68 km2, accounting for 0.4% of the province.

According to art. 3 of the Act on waste, municipal waste is the waste generated by households and waste containing hazardous waste from other waste producers, which, because of its nature or composition, is similar to waste from households.

The sources of municipal waste are:

- Households,
- Infrastructure facilities such as trade, services and crafts, education, industry in the "social", tourist facilities, markets, and more.

Table 1 Waste production in Rzeszow.

City Rzeszow	YEAR				
	2007	2008	2009	2010	2011
	t	t	t	t	t
Total	52465,73	55347,67	56944,39	61038,03	No data:
Households	31087,09	43436,60	30953,01	33957,30	No data:
Stored on landfills [%]	100,00	99,95	n/a	n/a	n/a
Numer of companies that collects waste	No data	No data	6	5	4

The morphological composition of municipal waste generated in the urban area of Rzeszow, according to the National Waste Management Plan, is shown in table 1.

The largest share of municipal waste by weight, more than 30%, is biodegradable kitchen waste, which can be used in biogas plants. Based on these data amounts of the individual fractions of municipal waste, were estimated. It should be noted that these quantities, as indicated earlier, are only estimates. Due to incomplete records of municipal waste, you cannot determine the actual amount of waste generated.

In Rzeszow municipal waste is collected mainly in widely available tanks and containers, in - areas dominated by multi-family buildings with a capacity of containers 1 100 dm3. In larger estates, multi-storey buildings are equipped with chute chambers. On some estates, sheds with waste containers were built, with the consent of the inhabitants. At single-family housing neighbourhoods waste is mostly collected in containers with a capacity of 60, 80, 120, 180 and 240 dm^3.

In general, the frequency of emptying the container is adapted to the area and population density of the city. It is diverse and averages 1 - 2 times per week, and in rare cases, more (3 times per week).

Collection of recyclables is organized on the bases of the network of specialized vessels, spaced at designated points in the city, in the vicinity of other waste containers.

According to information contained on the Website of Rzeszow, selectively collected waste is collected in containers.

Separately collected waste, after thoroughly cleaning, is transferred to the recovery, and mixed waste (98% of collected municipal waste) is transported for disposal by landfill.

In Rzeszow, in 2010 5 entities were entitled to be active on the municipal waste collection. According to a survey by the UOKiK in 2011, four companies worked actively in this market, as evidenced by a signed agreement. Among them were one cross-regional operator (holding company TRANS-formers) and a firm belonging to the city.

Of these, two subjects declared that they operate in the area covering 25% or lower part of the surface, one - 25% to 50%, one, - a company owned in 100% by the city, -between 75%

and 100%. It was the largest operator in the market according to the amount of waste collected.

This company also had a high proportion of the total number of agreements, including agreements with both residents and businesses, and institutions, as well as in a number of agreements with residents of multi-family and single-family homes.

Of the four companies all declared that they operate outside Rzeszów. In addition, only one company reported that it uses its own municipal waste management system (the largest on the market, and belonging to City - Municipal Waste - Rzeszow LTD).

2.2 Bio-waste collection systems / approaches

The basic method of municipal waste management which is generated in the town is storage. The waste is disposed of in a landfill in Kozodrzy and Mlyny.

Municipal Waste Landfill in Kozodrza is located about 47 km from the city, so the waste is first transported to the transfer station located at st. Cieplownicza (installation MPGK Rzeszow), where they are transferred to larger vehicles with a load capacity 20 - 25 Tons and transported to a landfill.

The first landfill is located in Kozodrza in the Ropczycko -Sędziszowski county, in the municipality of Ostrow. It started its activities in 1990, and its operation is expected to 2015. The system has an integrated permit issued by the Governor Podkarpackie.

Municipal Waste Landfill in Mlyny is an object located in the municipality of Radymno, in the district of Jarosław, at a distance of 89 km from the city. It started its activities in 1998, and the closing is expected in 2012. In addition to municipal solid waste (20 03 01, 20 03 03) there can also be stored the waste from sewage treatment plants (19 08 01, 19 08 02, 19 08 09), and the asbestos-containing waste. This site also has an integrated permit.

In order to implement the requirements for municipal waste management contained in the Act on Waste to maintain cleanliness and order in municipalities, Municipal Waste LTD. In Biala took the initiative in leading to the creation of the Department of Waste Management in Rzeszów (ZUO), which is located in the MPGK LTD (waste company). In Rzeszow currently, one of the key elements is ZUO transfer station where waste is reloaded from the smaller containers and to garbage cars with greater capacity. Tipped waste from garbage trucks land on the floor in the transhipment hall.

On the floor level it is handled with the charger for cars with capacity of approximately 60 m3 (20 - 25 Mg) arranged below the floor level. With this solution, MPGK saves on transport of waste collected in the city, and then transported to landfills 47 and 89 km away from Rzeszow. ZUO complex has also room to collect dead animals.

ZUO complex is planned to contain other devices including:

- construction waste crushing line with capacity 5 000 t / a, enabling the development of such rubble,
- waste crushing line with capacity of about 50 t / a, which allows for the removal of bulky waste, including the removal of waste from dismantled parts and hazardous substances,
- line for waste from cleaning of streets and squares with a capacity of 1 500 t / a,
- organic waste composting prism from sorting unit. Composting target capacity is 6000 t / a year(2014),
- green waste composting plant with a capacity of 2 500 t / a year

The city has decided to build in the nearest future thermal utilisation facility in cooperation with PGE company which delivers electrical and heat energy to the city. This decision must be treated as final as the city authorities refuse any further discussion about this subject and refused to join in works at Urban Biogas project.

3 Economic and organisational considerations

3.1 Current and future costs of disposal

The current costs of disposal in the city are unknown as the cost from different waste companies are confidential and could not be identified.

3.2 Contract durations

At this moment the waste market is shared by waste companies. After 1st January 2013 there will be changes caused by modifications in legislation, which makes local authorities responsible for waste utilisation. This situation makes all key actors waiting.

3.3 Legal requirements and improvements for bio-waste management

The new legislation is applicable from 1 January 2012.

Work on the assumptions of the draft law on the amendment of the Act on maintaining cleanliness and order in the communities, for several years. The main reason for the amendment of the Act was liabilities associated with the Polish accession to the European Union. Entering the EU, Poland committed to reducing the waste disposal składowiska34. Another motive changes was the implementation of EU legislation, in particular the new directive on waste, which was adopted after accession.

Poland, by signing the accession treaty with the EU, pledged, among other things to comply relevant legislation (directives) on waste, according to which Member States are required to reduce the weight of biodegradable municipal waste that is currently landfilled:

- Up to 16 July 2006 - 75%,
- Up to 16 July 2009 - 50%,
- Up to 16 July 2016 - 35%,

The reference date for the weight of the biodegradable waste is 1995. At the same time these terms can be extended for four years in the case of Member States, which in 1995 placed the landfills more than 80% of its municipal waste. This level is also characterized by Poland. Currently, Poland exceeds the permissible level of waste transfer landfill by more than 1 million tons.

4 Involved parties in the bio-waste management chain in Rzeszow

At this moment the key actors are companies which remove waste from city area. There are 2 main actors: Municipality Waste Company –MPGK Rzeszow which belong to the city and Trans Formers – a private holding which works all over the country. There are two more companies, but their share in market is dramatically smaller.

Two types of customers can be defined. Administrations of huge amounts blocks of flats, which can negotiate the price for waste removing and single customers which practically have no choice of waste operator. The situation of the second group is affected by the problem of "the one street" – from commercial point of view gathering waste from the same street by two companies causing that both have no profit in area. That is main reason of refuse to sign contracts with waste generators (for e.g. one client on street with 50 houses).

The situation will change after 1st January 2013 when the waste management will be in the responsibility of local authorities.

5 Strategy for bio-waste use for biomethane production in Rzeszow

The bio-waste collection system (wet fraction separate collecting) exists in some parts of city. In the past year the authority of Rzeszow considered different ways of developing the waste management and decided to build a thermal utilization facility (incineration plant for MSW). This plant will be situated in area between the collection facility of ZUO and the main heating plant of Rzeszow. This option was found as most relevant solution from economic and environmental point of view.

As an improvement of the waste chain PAE proposes a separate anaerobic digestion plant for bio-waste in the vicinity of the existing waste water biogas plant.

This solution can be realized only if the wet part of the waste is separately collected at the beginning of the waste chain in the whole area of city as well as in rural areas in the neighbourhood of the city where the same waste companies are operating.

The produced biogas gathered from the two sources - waste water and bio-waste - could be purified and upgraded in one upgrading facility. Biomethane obtained at the end of chain could be used in vehicles of the waste companies or in public transport.

6 References

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UOKIK (2012) Raport o odpadach. – whole document