

## CHALLENGES OF MUNICIPAL WASTE MANAGEMENT IN HUNGARY

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### Abstract

Aims, tasks and priorities of medium term development plans of national waste management were defined in the National Waste Management Plan, which was made for the period of 2003–2008 in Hungary. Supporting of the European Union is indispensable for carrying out of plan. The most important areas are related to the developing projects of municipal solid waste treatment (increasing the capacity of landfills, accomplishment of the infrastructure of selective waste collection, building of new composting plants). The national environmental policy does not focus sufficiently on the prevention of waste production. Due to the high expenses of investment and operation the energetic recovery and the incineration of municipal solid waste do not compete with the deposition. We inclined to think that the waste management of Hungary will be deposition-orientated until 2015. The main problems to the next years will be the lack of reprocessing industry of plastic and glass packaging waste. The high number of to-be-recultivated landfills and the attainability of necessary financial sources are also serious problems. There are many questions. What is the future in national waste management? How can we reduce the quantity of dumped waste? What are challenges of national waste management on the short and long term?

*Keywords:* municipal waste; selective waste collection; recycling; packaging waste; organic waste; landfill

### 1. Introduction

In Hungary 4.7 million tons municipal solid waste (MSW) generates per year and 85% of this quantity gets landfills. Among the old members of the European Union (E15) only Greece, Portugal and Ireland has high proportion of deposition in their waste management similarly Hungary. The ratio of disposal has to reduce to 60% by 2009 and to 50% by 2013. Theoretically there are three ways to carry out the obligations: prevention of waste, recycling waste as material and the thermic recovering. The national environmental policy preferred the thermic recovering between 2003 and 2006. According to conception incinerated-orientated treatment will be succeeded by deposition-orientated treatment by around 2015. In accordance with preference the National Waste Management Plan (NWMP) contemplated the reconstruction of Waste Incineration Plant of Budapest and building of other 6 regional incineration plants. The reconstruction was carried out in 2005 and that results the ratio of thermic recovering achieved 8% but planned regional incineration plants are not realized because of the environmental policy of European Union has been changed. EU preferred the waste prevention and recycling. Regulations of packaging waste had become strict. Percentage of

packaging waste which is utilized in thermic way decreases. Electricity which is produced with waste incineration is not classed in green electricity category.

## 2. The quantity, the composition and organized collection of generated municipal solid waste

The quantity of produced municipal solid waste was between 4.5 and 4.7 million tons per year during the period of 2000–2004 and its volume increased slowly. The minimal favourable changes in consumer habits slightly decreased the growing of consumption. There is an unfavourable change in the proportion of weight/volume of MSW. The reason for this is the growing of light – mainly plastic packaging waste – components.

One third of municipal solid waste is generated in the Central Hungary Region due to the capital, which contributes to this amount with 26%. The number of inhabitants and the specific quantity of waste, which is in connection with the state of development of a region, determinate the quantity of produced municipal solid waste in a region. For example, despite the fewer number of inhabitants more waste is generated in the Central Transdanubia Region than in the Northern Great Plain Region (Fig. 1).

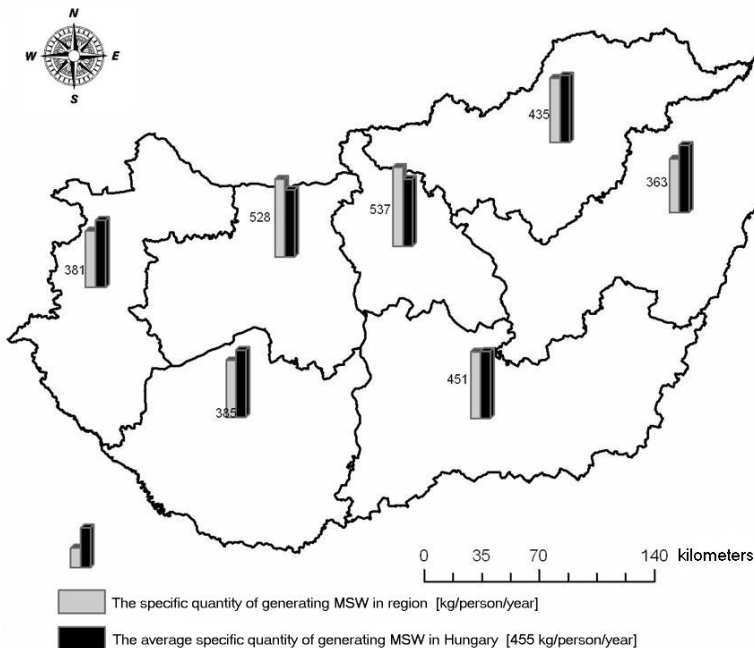


Fig. 1. The specific quantity of generated municipal solid waste in regions in 2004

The composition of produced municipal solid waste has not changed essentially in the last decade. One third of the waste consists of metal, glass, plastic and paper packaging and the other third is biodegradable organic materials (Fig.2).

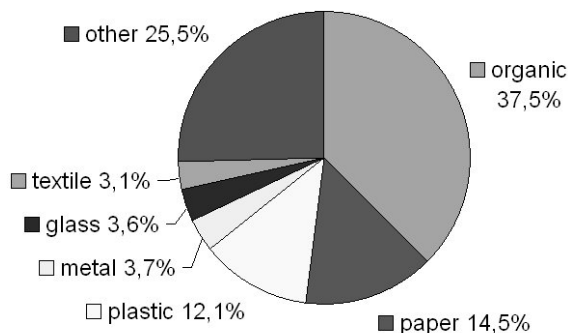


Fig. 2. The composition of produced municipal solid waste (Source: The developing strategy of municipal solid waste management 2007–2016)

The proportion of utilizable (as secondary raw material) waste is 40-45% (V/V). The ratio of paper (by 25%) and plastic (by 15%) waste will strongly increase in the future. The ratio of glass and metal waste will slightly increase. The proportion of inorganic (by under 20%) and biodegradable organic (by around 30%) waste will decrease. The calorific value of waste will increase (from 6000-6500 kJ/kg to 7500-8000 kJ/kg) (Fazekas, 2005).

The basic condition of recycling is selective waste collection, which was available for 4.2 million inhabitants (with an average proportion of 1160 persons per collection island in rural areas) in 2006. However, the infrastructure of solid waste collection does not fill every requirement. In other words collection islands are not available within 200 meters from every household in every settlement [3]. According to our questionnaire only 15% of the inhabitants use the current infrastructure of selective waste collection effectively. In Hungary the percentage of selectively collected waste is only 2-3% within the whole amount of collected waste while that percentage achieves 15-20% in Western European countries. At the same time, the very same index achieves 25-30% in some countries (e.g. in Austria, Germany, Holland, Switzerland and Sweden) (Fazekas, 2005). As a further aim of the strategy selective waste collection should have been available for 60% of the inhabitants by 2009 and 80% by 2013. This is statistically possible but the number of citizens who effectively participate in selective waste collection will not increase. Neither will increase the quantity of selectively collected waste if the backbone of selective waste collection is made up of collection islands only.

### **3. Reducing of generated waste and prevention**

The national environmental policy does not focus traditionally on the prevention of waste production. NWMP simply prognosticates the increasing of municipal solid waste from 4.7 million tons to 5.2 million tons in this decade.

There are two alternatives to prevent the generating of waste. The first is the application of clean technologies (low waste technologies). Either waste is not generated in this alternative or the volume of waste is low. The second alternative is the producing of recyclable articles. It means articles stay in producing-consuming process for a long time.

The EEOP helps in waste prevention through the developing possibilities of "Sustainable lifestyle and consumption patterns" priority axis, which budget is 27.2 million euro during the term of 2007-2008 [1].

### **4. Recycling of packaging waste**

The 94/62/EK directive on packaging waste prescribes that the member states of the European Union have to recycle 50% of the packaging waste in that way that 25% of the waste have to be thermic and 25% of the waste have to be recycled as material. The recycling percentage of different material groups such as paper, glass, metal and plastic packaging waste have to be at least 15%. Hungary got temporary exemption to carry out these tasks in the Treaty of Accession by the end of 2005. In the case of glass waste the expected percentage was carried out, our country achieved 22%. The recycling percentage of paper waste was beyond 50% instead of the expected 15%. The case of metal waste was similar to paper waste with the percentage of recycling approximately 40%. Plastic packaging waste causes the main problem. The percentage of recycling was 12% instead of 15%.

According to the 2004/12/EK and 2005/20/EK directives of the EU a further aim is that 60% of the recycled packaging waste should have been recovered in that way that 55% of it should have been recycled as material and only 5% in energetic way. These tasks have to be achieved by 2012. The expected recycling percentages of different types of waste have changed: in the case of glass it is 60%, in the case of paper it is 60%, in the case of metal it is 50% and in the case of plastic it is 22.5%. There is a problem with glass waste as in Hungary there is not stained glass reprocessing. In the interest of increasing the recycling of stained glass and mixed collected glass products either a proper background industry or the export of waste is needed. The solution to increase the recycling percentage of metal waste is to expand the selective collection (Fazekas, 2006).

## 5. Recycling of organic waste

According to the 1999/31/EK directive on waste deposition the quantity of deposited biodegradable organic waste has to be decreased by 35%, 50% and 65% by the year 2006, 2009 and 2016 compared to the level of deposited organic waste in 1995. The capacity of projects which will have been realized 2009 and 2010 will not be enough for the 50% recycling therefore newer capacities are needed to be built up using the financial sources of the European Union [3].

There are several ways to recycle the biodegradable organic waste: selective collection and composting of bio waste (households waste) and green waste; production of biogas; selective collection and recycling of paper; thermic treatment and energetic recovery (e.g. pyrolysis, incineration).

Compost preparation of bio and green waste realizes in 22 composting plants and in households. The composting capacity was 200 thousand tons in 2004 and 11% of the generated compostable waste was recycled. Thanks to the increasing capacity that percentage will have increased more than 20% by 2009.

The collection and composting of green waste (20-40 kg/person/year) which is generated in suburbs, public parks and other green spaces are coming along well. On the contrary collection of bio waste (70-90 kg/person/year) generating in cities and housing estates is in initial stage. It is serious deficiency of the national waste management.

3.8 toe biogas is generated in Hungary every year and from this 25 GWh electricity is produced. Considering the mentioned quantities Hungary is one of the last countries in Europe in despite of our potential possibilities. The quantity of agricultural biomass is 8-10 million tons per year and producible electricity is 7-9 PJ. Unfortunately only few biogas plants have considerable capacity in Hungary (Nyírbátor, Pálhalma, Kunhegyes). Biogas exploiting wells work in 14 waste dumpsites but that biogas can mostly operate low capacity gas engines. The exploited biogas is 100-120 million m<sup>3</sup> and the produced electricity which derives from MSW is 7.6 GWh. Considerable regional wastewater treatment plants utilize the generated sewage gas but in general, the produced electricity is only enough to operate the sites themselves. Only the largest plants (e.g. North-Pest Wastewater Treatment Plant) input electricity to the national network.

The thermic treatment of MSW is realized in the Waste Incineration Plant of Budapest, which is the only one municipal waste incineration plant in Hungary [2]. Electricity is produced from the forming heat of incinerated waste. Between 2002 and 2005 the complete reconstruction of the plant took place and from 2006 it has operated with total capacity which is 420 thousand tons per year [3]. Recently not

entirely 4% of all the quantity of MSW is recovered in thermic way. According to the developing strategy of MSW management that percentage will increase above 8%. The high expenses of investment and operation and the new directives of the EU on packaging waste, which prefer the material recycling to energetic recovery make the execution doubtful and questions its reasonableness.

Experimental projects realized to incinerate and pyrolysis of few selective collected waste type (e.g. plastic packaging waste, tyre).

## **6. Disposal**

In Hungary the deposition of waste is the determining treatment manner and it is likely to stay in the future.

In January 2003 a PHARE supported survey was finished which mapped 2667 dumping sites of MSW countrywide and 665 of them had operational permit [4]. Approximately 1900-2000 dumpsites operate illegally. 60-65% of the illegal landfills were official closed by local governments. The economic considerations were primary in the process when local governments selected the places of dumpsites. The authorities preferred economically valueless and destructed places. Most of the landfills were built too close to settlements and 45% of them were located in former open pits. The environmental considerations were secondary in siting. The waste tips environmental properties were remarkably unfavourable in two-thirds of the sites and those sites were in pollution sensitive areas. Due to unfavourable properties the numbers of operating landfills with operational permit decrease in the last few years (Fig.3).

57 dumpsites of present landfills will operate after 2009. One of the most serious challenges of national waste management to recultivate closed and unpermitted landfills due to high financial and technological requirements. There are application possibilities of dumping sites within the Environment and Energy Operational Programme (EEOP) and the Regional Operational Programme (ROP).

The European Union had decided on the financial support of 12 Hungarian waste management projects by 2004. The realization of the approved projects is in progress but they are expected to be accomplished by the middle of 2009, in some cases by the end of 2010. 21 regional waste dumping sites are being built within the framework of ISPA. After the EU-accession the Cohesion Fund (CF) took over the financial support of ISPA projects and additionally one Cohesion Fund waste management project had been accepted until 2006. The 13 regional projects (Fig.4) significantly contribute to the fulfilment of the aims of waste management. Due to the building-up of selective collection systems and treatment plants of

biodegradable organic waste the quantity of material recovered waste will increase, hereby the quantity of deposited waste will decrease.

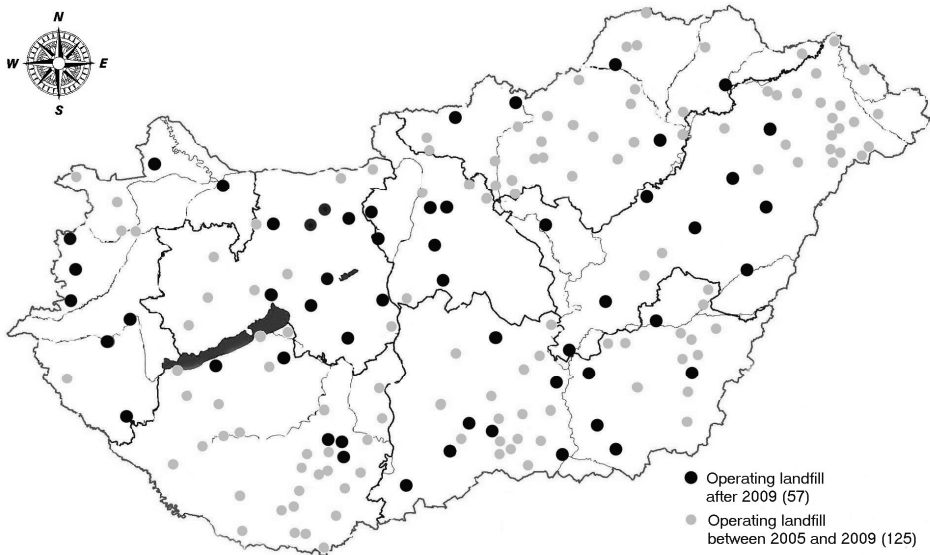


Fig. 3. The operating landfills between 2005 and 2009 and after 2009 (on the basis of the data of Ministry of Environmental Protection and Water 2005 and Hevesi 2007)

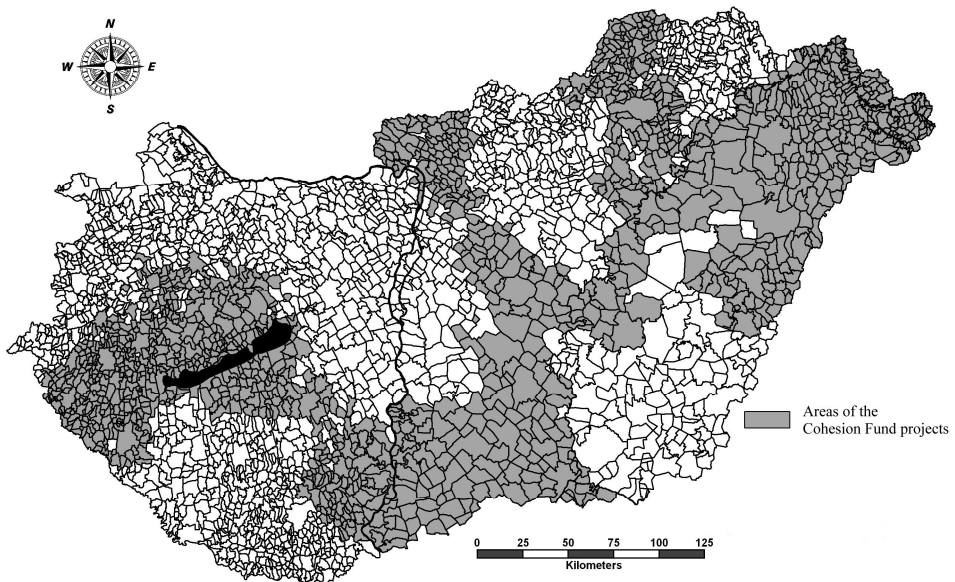


Fig. 4. Cohesion Fund waste management projects

According to the calculation the capacity of deposition will not be enough after 2015 without building new capacities and increasing the capacities of existing deposition. The developing and increasing of capacities from 2009 are needed first of all in Western Transdanubia Region, Central Transdanubia Region and Central Hungary Region. The developing and increasing mean the building of new dumping sites and increasing the capacity of existed waste tips. Utilization-orientated waste management zones and reprocessing industry are needed to be organized but we can not see the possibility of realizing.

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