

THE RECENT TRENDS AND PERSPECTIVES FOR FINAL REFUSING OF THE HAZARDOUS WASTE IN THE REPUBLIC OF MACEDONIA

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ABSTRACT

As a result of the developments of industrial production and increased consumption with produced hazardous waste, although in the last two to three decades technological processes has been reported, the amounts of hazardous waste has been significantly increased, which is a worrying problem for today's civilization. The current state of treatment of waste can qualify as irregular and chaotic. This unfavorable situation is result to lack of a system for integrated management of the waste in the municipalities.

Key words: industry, modern approach, reduction, recycling of waste.

INTRODUCTION

Major problems and constraints in the field of waste management in Macedonia are present in almost all areas of the existing system of waste management, as in all relationships in society concerning waste management, legal framework, organization of institutions and human resources, coverage of costs and financing of services and investment, awareness of stakeholders and informing them of all phases of technical management from collection to disposal of waste, the existence of environmental burdens, the impacts on human health and the environment environment with potential impact on the Macedonian economy.

Hazardous waste generated by the Macedonian mining and manufacturing industries encountered serious problems: odlagalishtata waste from certain processes are abandoned, there is little or no information about the history of odlagalishtata waste and environmental consequences, the legal legacy in terms the same is unclear.

Development of the Republic of Macedonia towards sustainable waste management will require further harmonization of domestic legislation with the EU, institutional changes and large changes in the general practice of waste management. Successful changes in waste management can initiate government by setting specific strategic goals and practice of modern waste management, taking into account existing damage to the environment and the use of its legislative and regulatory power, but ultimate success in practice can be achieved only if all representatives of society understand the relationship between improper waste management and negative effects on the environment and human health, if you become aware of their responsibilities, duties and tasks in the field

of waste management if they are motivated organizational and even more with economic measures.

Waste definition and classification-genesis of solid waste associated with the earliest period of human activities. Solid waste is a direct product of human existence, whether he lives alone or in community (rural or urban). The process of urbanization and industrialization affect the rising problem of collection and disposal of solid waste. Therefore this problem is an important and complex tasks within the communal activities.

The adequate solution of this task depends on human health and environmental protection. Population growth, urbanization and industrialization lead to an increase in the amount of waste. Besides the quantitative change, comes to the qualitative change of solid waste. All this gives rise to the surface that are disposed waste. The increase of solid waste represents one of the important issues of our time and from environmental, sanitary and epidemiological, technological, urban, hydrological, construction, energy and others. Under the solid waste means waste generated as a result of everyday human life and work, and waste generated on open surfaces. Solid waste represents a complex heterogeneous material, which under normal conditions is hard. It may be of natural origin such as leaves, snow, fallen branches etc.. [1], [2]

The basic composition of solid waste can be: organic, with rapid period of decay (food, animals, waste vegetable oil); waste (organic or inorganic, which have a long period of delay). Depending on the place of creation and the properties of the waste, the waste can be classified into the following categories: Municipal solid waste is waste generated in daily life ie housing, dvornite, business premises and land (waste from households, waste food, vegetable, fruit and other crops, paper towels, scrap wood, plastic, rubber, metal and other waste).

This waste can be further classified in several ways. The usual classification is in the following categories: Food waste, paper, glass and ceramics, metals, plastics, rubber and leather, textiles, stones and ashes, garden waste technological (industrial) waste is waste that results from production processes in industry and in institutions, and its abundance of composition and properties differ from municipal wastes. There is little similarity in the type of waste is thrown out of different industries. Forecasting the quantity of industrial waste is harder to predict than municipal wastes. Mining waste which is produced by extractive operations, ie operations that are involved in the processing of mineral raw materials are one of the largest generators of hazardous waste. Improper disposal of mining waste pose a major threat to the environment and man.

Hazardous waste is waste containing substances that have one of these properties: explosiveness, reactivity, flammability, irritability, toxicity, infectivity, carcinogenicity,

mutagenicity, teratogenicity, Ecotoxicity and the properties of discharges of toxic gases through a chemical reaction or biological decomposition.

It is important to emphasize that hazardous waste in agriculture and livestock is present and has a negative impact on the environment. Hazardous waste is the use of online resources for plant protection products for protection of livestock, as well as infectious hazardous waste through the dead and infected animals. In current practice (especially in our country) often waste deposited in landfills that do not meet standards for a landfill. Given these reasons are more tries before depositing waste should be: Preventers i.e. reduction / minimization of waste; Reuse, recycling / composting; Utilization of energy contained in waste by combustion; Disposal. The purpose of this procedure is to eliminate and neutralize the amount of waste that will be deposited and will be able to separate hazardous waste from utilities.

Summary and evaluation of the current state of waste management in Macedonia

The current state of waste management in Macedonia can be characterized as substandard in terms of the financial and human resources, and insufficient and ineffective in terms of monitoring and enforcement of regulations prescribed, resulting in a variety of dysfunctional systems in society and many related adverse effects on the environment and human health. That level of environmental awareness and waste problem in Macedonia is low, in fact people are not aware of the problems resulting from improper management of waste and the negative effects on their health and the environment and nature. People have no awareness of their own responsibility and role as generators of waste. On the other hand, public attitudes may be manifested in strong opposition to any permanent changes in the practice of waste management, such views are relying on management and real concerns, as well as insufficient information and lack of practice for public access information about the importance of properly treating the waste.

The current legislation regarding waste based on the concept of hierarchy in waste management. This means ideally waste should be prevented, while that which can not be prevented should be re-used, recovered or recycled as little as possible because it is the worst option for the environmental implication of loss of resources. Hierarchy of waste management should be viewed as hard and quickly accessible accessible goal, especially when having in mind that there are different methods of waste treatment that have different impacts on the environment of waste treatment and different impacts on the environment. However the goal of moving towards recycling and recovery of waste represents a move towards hirarhijata in waste management and reduced use of landfills.

Prevention of waste generation should take place initially, because reducing waste means reducing the need for its collection and treatment which is correlated with cost

and environmental impact. Prevention of waste in terms of use of tangible goods, services in such a way that their production, use, reuse, recycling will result in the least possible waste production. Prevention of excessive waste production is just one part of the concept of cleaner production, which is promoted by the United Nations Environment Programme.

Most of the municipal solid waste and other collected waste is deposited without pretreatment of municipal landfills such as old tires, car batteries, oil-based automotive components and other wastes. Landfills are working without work permits, without any techniques that apply to landfills and no regular monitoring in terms of environmental impact. There is no record of delivered waste, not carried out any visual inspection of the characteristics of waste to be deposited. Deposition of mixed hazardous and hazardous waste and incineration of municipal waste, waste plastics plant tissues and the open space, represent the most serious risks and consequences for the environment. One third of the existing 51 landfills are classified in the class with the highest risk assessment of their risk in terms of environment and their closure or remediation is a priority. [7], [8], [9]

Hazardous waste generated by the Macedonian mining and manufacturing industries encountered serious problems, odlagalishtata waste from certain processes are abandoned, there is little or no information about the history of odlagalishtata waste and environmental consequences, the legal legacy in terms the same is unclear. Sixteen major industrial areas and dump the waste is identified as "hot spots" based on the identified environmental impacts and the high potential of danger. In both situations, this is done with little or no involvement and supervision by authorized veterinarians, mainly in an uncontrolled way and far from the required sanitary standards. Packaging contaminated with pesticides and other agrochemical waste characteristic are disposed together with municipal waste and open burning, where the remains of pesticide solutions usually discharged into the aquatic environment. Development towards sustainable waste management will require further harmonization of domestic legislation with EU policies [5], [6], changes in institutional organization and major changes in the general practice management. Successful changes in waste management can initiate government by setting specific strategic goals and practice of modern waste management [10], [11], taking into account existing damage to the environment and the use of its legislative and regulatory power, but ultimate success in practice can be achieved only if all representatives of society understand the relationship between improper waste management and negative effects on the environment and human health, if you become aware of their responsibilities, duties and tasks in the field of waste management if they are motivated organizational and even more with economic measures. [3], [4]

Incineration of waste with energy recovery is another option for avoiding landfills. [12], [13] Deposition of waste in landfills is the lowest possible option in waste management,

but still the most dominant method used here. Landfills in our country often improperly managed and do not meet minimum standards. A challenge is to reach certain standards in building the landfill be closed and inadequately managed and maintained sites. Accurate and timely data on waste is one of the key elements for long-term prevention of illegal places of disposal of waste. Inadequate information can lead to inappropriate decisions regarding the legislation on waste and the establishment of an inadequate infrastructure for waste management. Municipalities are generally responsible for organizing effective management of solid waste on their territories, except for hazardous waste, which under legislation is the responsibility of the state. Public enterprises providing utilities (mainly in urban areas), which consist of solid waste, or collect, transport and disposal at the expense of municipalities. The system of waste management must introduce landfills for hazardous and non-hazardous waste and other facilities for waste removal, fully harmonized with European standards. Data on the quantity produced Hazardous Waste in Macedonia Quantities of waste generated are estimated based on data from the State Statistical Office in 2004 and the analysis within the study of waste management in southwestern Macedonia made in the same period. Although this study presents indicators for the creation of waste solely in the southwestern region of Macedonia, according to the analysis made in the quantities of MEPP waste generated in other parts of the country, they are compatible with the results of the study, and fully applicable to the entire territory. Based on these results, defined is equal to the production of municipal waste per capita in the Republic of Macedonia, which is: 0.7 kg / day for urban areas (which comprises 60% of the total population); 0.5 kg / day for rural areas (where live 40% of the total population).

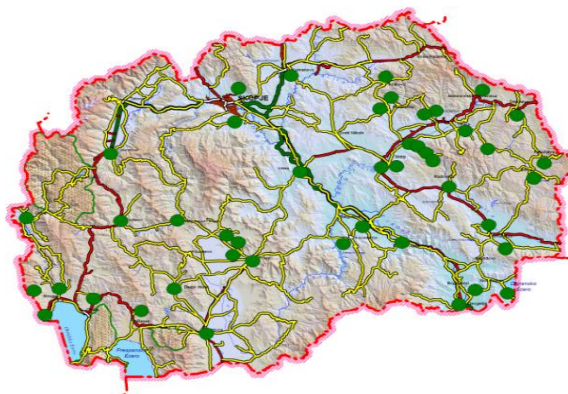


Figure 1. Municipal landfills in the Republic of Macedonia
Picture first Municipal landfill

In other words, the annual production of municipal waste in Macedonia is 470.00 tons, 322.00 tons of which are disposed in municipal landfills, and 148.00 tons in rural areas near the settlements. Figure 1 is marked municipal landfills. Data on hazardous waste does not exist except for medical waste, while the generation of waste oils is estimated at 3859 tons per year, and will create conditions for treating the same in Macedonia. It has 101 more health institutions, mainly hospitals and specialized health

institutions of secondary and tertiary health care centers and primary health care. The total number of hospital beds at tertiary and secondary level, including private hospitals is around 10 000. In addition there are private and 745 dental clinics and 117 veterinary clinics and veterinary stations. The number of pharmacies is 498 and has 54 laboratories. Medical waste is produced in the Republic of Macedonia has no organizational system for the management and collection, with the exception of the capital Skopje, where there is no organized system of collection, transportation and incineration of medical waste. Incinerator the landfill is located Drisla. For the purposes of medical institutions in the City of Skopje, in accordance with decision of the Ministry of Health of Drisla performs collection and disposal of medical waste, or its processing. Ministry of Health prepared a plan for treatment of medical waste in two stages, namely the City of Skopje and other cities. For now only be collected from Skopje. In the treatment of this type include selection as is done in health care organizations, picking and transport to landfill and incineration furnace. According to the landfill monitor work, medical waste combustion for the period 2000-2006 period is presented in table 1.

Table 1. Incinerated Medical waste for 2000-2006 year

Incinerated medical waste (kg)	2000	2001	2002	2003	2004	2005	2006
	114.90	231.900	248.600	255.060	322.670	375.648	327.006

The amount of solid medical waste is produced annually in hospitals and other medical institutions in Macedonia are estimated at 1625 tonnes, of which about 380 tons per year represents a solid medical waste, which Skopje is only about 114 tons. Estimates for the total medical waste (solid and liquid) from zdravstvenite institutions in the Republic of Macedonia amounted to 2178 is 2004.



Figure 2. Incinerator-Drisla

Table 2. Evaluation on quantities create medical waste in Republic Macedonia

Assessment of quantities produced medical waste in Republic of Macedonia for 2004 year							
Infective		Potentiality toxic		Toxic		Corrosive	
Solid/kg	Liquid /l	Solid/kg	Liquid/l	Solid/kg	Liquid /l	Solid/kg	Liquid /l
Skopje							
114.000	45.000	387.000	66.870		38.890		635
Macedonia total							
380.000	150.000	1.290.000	222.900		129.630		2.120
Drugs -solid phase (tablets, capsules, etc.)(kg)				Drugs liquid phase (infusions, solutions, tc.)(kg)			
2500				2000			

Table 3. Collected and burned quantities of solid medical wastes in the interval 2000-2003

Collected and burned quantities of solid medical wastes in the interval 2000-2003 year				
Year	2000	2001	2002	2003
Quantity kg	114.900	231.190	248.600	255.000

Table 4. Data on hazardous waste generated in the Republic of Macedonia in 2005 year

Type of waste	Total waste/year	Hazardous waste (tons/year)	Hazardous Waste (tons / year)	(%)
Waste from mining	17.246.000	12.700.00	4.546.000	26
Waste from thermal processes	2.090.726	2.015.379	75.347	3.6
Waste from other processing industries	108.877	106.830	2.047	1.9
Total	19.446.603	14.822.209	4.623.394	24

CONCLUSION

Development of the Republic of Macedonia towards sustainable waste management will require further harmonization of domestic legislation with the EU, institutional changes and large changes in the general practice of waste management. Successful changes in waste management can initiate government by setting specific strategic goals and practice of modern waste management, taking into account existing damage to the environment and the use of its legislative and regulatory power, but ultimate success in practice can be achieved only if all representatives of society understand the relationship between improper waste management and negative effects on the environment and human health, if you become aware of their responsibilities, duties and tasks in the field of waste management.[8], [13]

Literature (REFERENCES)

- [1] Alan E. Kehju: Geology for Engineers and environmental experts.
- [2] Bernd G. Lotermozzer: mine-waste characteristics, treatment, and ecological consequences.
- [3] Annual amount of waste generated by industry in 2008 in Macedonia.
- [4] Annual report of the processed data on environmental quality in 2007.
- [5] EUROSTAT:
<http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=ten00109>
- [6] EEA-European Environment Agency:
www.eea.europa.eu/soer/countries/it/soertopic_view?topic=waste
- [7] European commission environmental:
http://ec.europa.eu/environment/index_en.htm
- [8] European commission environmental-Directorate-General Environment: Costs for Municipal waste management in the EU.
- [9] European commission environmental: Hazardous waste generation in EEA member countries.
- [10] European commission-Directorate-General Environment: Thematic Strategy on the prevention and recycling of waste, 2005th
- [11] EU focuses of waste management.
- [12] The incineration of waste in Europe: issues and perspectives.
- [13] European-waste-management-waste-policy-and-legislation.