

MANAGEMENT OF MUNICIPAL SOLID WASTE IN TIRANA: PROBLEMS AND CHALLENGES

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Professional paper

The rapid urbanization and high rates of economic and social development in the following 20 years impose a great challenge to the sustainable development of Albania. This paper examines the management of municipal solid waste (MSW) in Tirana, the capital of Albania and the biggest municipality of the country. Information on the amount and composition of MSW and an overview of the collection, treatment and disposal of MSW will be given in this paper. At present the daily amount of MSW generated per person is about 1 kg, food wastes make up about 44,1 % of a total of MNU. Humidity content in MSW is about 37,4 % and low heat value (LHV) is 8658 kJ/kg. These are the premises for incineration with energy recovery of MSW and a method to neutralize the problematic components of MSW. Actually the only method of MSW disposal in Tirana is the discharging of waste in the Sharra dumpsite. The Sharra dumpsite, an open dumping until two years ago, is now in the process of becoming a sanitary landfill. The former open dumping is a major source of pollution in Tirana and its surroundings. In this paper the problems and possibilities required for the management of MSW are analyzed and some suggestions are given for improving the management of the MSW system.

Keywords: *collection system, integrated management, municipal solid waste*

Upravljanje komunalnim čvrstim otpadom u Tirani: Problemi i izazovi

Strukovni članak

Ubrzana urbanizacija i visoka stopa gospodarskog i društvenog razvoja u sljedećih 20 godina nameću veliki izazov za održivi razvoj Albanije. U radu se razmatra upravljanje čvrstim komunalnim otpadom (MSW) u Tirani, glavnom gradu Albanije i najvećoj općini u zemlji. Podaci o količini i sastavu MSW i osvrt na prikupljanje, obradu i odlaganje MSW-a dat će se u ovom radu. Trenutačni dnevni iznos MSW-a generiran po osobi je oko 1 kg, otpaci hrane čine oko 44,1 % od ukupnog MNU-a. Sadržaj vlage u MSW-u je oko 37,4 % i niska toplinska vrijednost (LHV) je 8658 kJ/kg. To su pretpostavke za spaljivanje s obnovom energije MSW-a i metodu za neutralizaciju problematičnih komponenti MSW-a. Zapravo, jedina metoda odlaganja MSW-a u Tirani je pražnjenje otpada u odlagalište Sharra. Odlagalište Sharra, otvoreni istovar do prije dvije godine, sada je u procesu da postane sanacijsko odlagalište otpada. Bivši otvoreni istovar je glavni izvor zagađenja u Tirani i okolici. U ovom su radu analizirani problemi i mogućnosti koje su obveza kod upravljanja MSW-om te su dani neki prijedlozi za poboljšanje upravljanja MSW sustavom.

Ključne riječi: *integralno upravljanje, kruti komunalni otpad, sustav prikupljanja*

1 Introduction

Uvod

In these last 20 years the Albanian economy has undergone a change with high growth rates, but the ecological damage and environmental pollution have increased on a large scale. In this context, one of the main aspects of sustainable development of the country is resource conservation and environmental protection facilities.

The amount of MSW generated in our country has increased greatly in comparison with the past (note that this study area suffers from a lack of data and from inaccurate data, and currently there is still not an accurate database about the amounts of MSW generated for the entire country). In 2003 the amount of the MSW generating in the country was about 571 218 tons, in 2008 about 762 353 tons, a 33,5 % increase [8], but not characterized by the same amount of the population growth, which means that there is an increasing consumption of goods by the population.

In Tirana, the MSW generation for 2007 was about 1000 tons/day, while for 2008 it shows a very great change: around 1600 tons/day or about 78 % of the MSW generated in the country for 2008 [7]. Based on these quantitative data, only an integrated solid waste management (ISWM), which includes reduction, reusing, recycling, incineration and final discharging into a landfill will play an important role in the sustainable development of Tirana and the entire country, due to the benefits in terms of reducing the depletion of natural resources, reducing pollution caused by

the discharge of untreated waste and indirectly saving energy. The implementation of integrated management systems of MSW depends on several factors, such as the status of a country, environmental requirements, environmental management strategies, energy policy, economic and technological feasibility and environmental awareness and community education [4].

Integrated management systems of MSW are successfully applied in developed countries such as Germany, Sweden, the Netherlands, Switzerland, Japan, etc., being accompanied by many changes in waste management strategies during 3-4 last decades [4]. Fundamental change of this new management system lies in the high rate of reduction, reuse and recycling of municipal solid waste. In addition, incineration and the composting of organic waste have become the prevailing methods of the solid waste treatment instead of disposal in landfills.

The Tirana city covers 42 km² and is divided into 11 mini-municipalities. Tirana is located in the central western area of Albania and is the biggest city and the capital of the country as well, with a registered number of about 650 000 inhabitants, but the actual number of population is higher [6]. With regard to population density we may say that Tirana is much like any other European city with 8161 inhabitants per km². Tirana is the center of education, economy and culture of our country, which has undergone a huge demographic boom and economic growth in these last 20 years. With regard to the management of MSW, the only method of MSW treatment is dumping it in open dumps all over the country.

The only dump in Tirana is the dump of Sharra, which until two years ago was an open dump, where the waste was

discharged without any prior treatment. Consequently, this dump is considered as one of the main causes of pollution in Tirana and is defined as a "hot spot" for the level of pollution caused by it [8]. It is currently in the process of becoming a sanitary landfill.

In this paper we analyze in detail the management of MSW in the Municipality of Tirana, solid waste characteristics and its mode of collection, treatment and disposal. The challenges facing this and the opportunities for MSW in Tirana are analyzed and some suggestions given for improving the MSW management in the future. However, the lack of important data makes it difficult to draw a general final picture with exact figures.

2 Generation and characteristics of the urban solid waste

Stvaranje i karakteristike gradskog krutog otpada

The amount of MSW generated in the Tirana municipality has increased with the growth of the economy and urban population. Fig. 1 shows the solid waste and inert & soil material amounts related to the years.

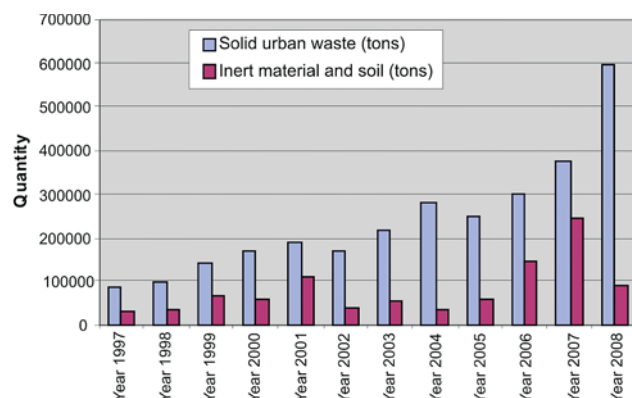


Figure 1 Generation of urban solid waste in the Municipality of Tirana by years (in tons) [7]

Slika 1. Generiranje gradskog čvrstog otpada u općini Tirana po godinama (u tonama) [7]

The amount of the generated MSW is not constantly growing as there are years when the generated MSW amount is less than in previous year(s), which is related to the non existence of accurate data for MSW, as mentioned above. The amount of soil and inert material has a different trend; this is mainly related to the development of construction sector in Tirana. In 1997 the total amount of the MSW was 87 140 tons and the total amount of inert and soil material was 30 290 tons. The average amount generated per day equaled 239,4 tons, and the daily amount generated per person was about 0,6 kg. In 2007 the annual total and average amount generated per day rose to 373 685 tons and 1026,6 tons, respectively, which means the daily amount generated per person rose to about 1,4 kg. Urban solid waste (USW) is mainly composed of domestic refuse, road cleaning and market refuse, office, business, school refuse, as well as construction and demolition refuse.

The composition and characteristics of MSW have changed during the years, as shown in Tables 1 (2001) and 2 (2009) [8, 9]. Comparing the results of these tables the percentage of the amount of paper, plastic, glass and inert materials has increased respectively, while the amounts (in percentage) of wood and textile, metal and organics

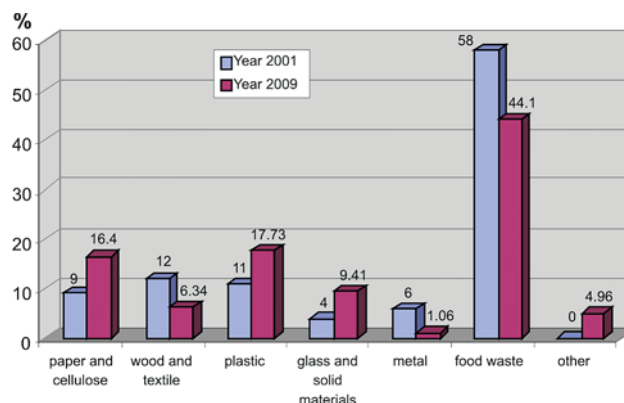


Figure 2 Composition comparisons for two different periods [7]
Slika 2. Usporedbe sastava za dva različita razdoblja [7]

declined over the years. The concentration of food waste in urban solid waste makes up the highest proportion, 58 and 44,1% respectively, followed by plastics, paper and cellulose, glass and inert material, wood and textile, metal. Characteristics of the MSW composition are shown in Tab. 2, where the percentage of paper and fiber, plastics, glass and inert material has increased, the LHV has increased from 6721 (2001) to 8658 kJ/kg (2009) as well, and the MSW daily amount generated is 850,3 tons (2009).

Table 1 Composition of urban solid waste in the Tirana Municipality (%) (2001 and 2009) [8, 9]

Tablica 1. Sastav gradskog čvrstog otpada u općini Tirana (%) (2001. i 2009.) [8, 9]

Composition, %	2001	2009
paper & cellulose	9	16,4
wood & textile	12	6,34
plastic	11	17,73
glass & solid materials	4	9,41
metal	6	1,06
food waste	58	44,1
other	0	4,96
in total	100	100

Table 2 Characteristics of urban solid waste in Tirana (2001 and 2009) [8, 9, 1]

Tablica 2. Karakteristike gradskog čvrstog otpada u Tirani (2001. i 2009.) [8, 9, 1]

Characteristics	2001	2009
Food waste percentage, %	58	44,1
Paper and fiber, %	9	16,4
Combustibles, %	19,67	23,75
Ash content, %	16,19	18,16
Moisture content, %	45,56	37,40
Low calorific value, kJ/kg	6721	8658

3 Urban solid waste management

Upravljanje gradskim čvrstim otpadom

In the field of solid waste management numerous laws have been adopted aimed at protecting the environment and people from pollution and making sure the disciplinary measures referring to the current situation of solid waste in the country are observed as well as the solid waste management at every stage: creation, collection, separation, storage, transportation, recycling, processing and disposal in order to reduce the waste and its negative impact on environment and to use the techniques and best

environmental practices. These laws rely on the principle of sustainable development by introducing the concepts of prevention and reduction to the creation, recycling and reuse. In the year 2006 "National Environmental Strategy" (NES) [8] was drafted containing basic measures that should support and improve the operations of government, business and individuals to ensure the achievement of sustainable economic development and environmental protection. The NES is an action plan to enable Albania to move towards meeting the environmental standards required for the EU accession and includes measures to ensure safe drinking water for all people, **to improve waste management** and reduce the risk to human health. Although the legal framework for this area is developed, these laws are often not followed by legal acts and targets set year after year to improve the situation of waste management. So currently the state in view of the solid waste management in our country is not good and in fact it seems that the only way of the MSW disposal is discharging it in open dumpsites.

The responsibility for MSW management is left to local authorities (municipalities and communes) in our country. Actually the situation of the solid waste management in Tirana is one of the main problems since the city is growing rapidly. The overloaded containers and the thrown-off refuse lying around is the site inevitable in some densely populated, mostly peripheral, parts of the city and those where the low income population lives. Tirana is one of the most polluted cities in Albania and Europe. According to the pollution data, Tirana has a 5 times higher pollution than the European standard norms allow [8]. Among the main causes of pollution is the Sharra dumpsite [8].

Waste management practices, as far as collection and disposal are involved, have been historically a major concern of the Tirana council in its efforts to diminish the causes that lead to the deterioration of public health. Under the national laws and regulation of solid waste management, treatment and disposal, there are local regulations and laws related to MSW management, such as "Strategic Planning for the environment protection in Tirana city (2005-2008)", "Tirana Municipal fees for cleaning and waste disposal", "Environment Strategy for Tirana Municipality" [6], in which the issue about solid waste management is one of the five priorities of Tirana Municipality. The responsibility for environmental management problems is on Directorate of Environmental Management in Tirana Municipality. The solid waste management system includes mainly collection sites, roads washing and cleaning, recycling (partially) and final disposal.

3.1 Collection system Sustav prikupljanja

Source-separated collection of household - generated MSW is one of the key steps for integrated solid waste management (ISWM). Source – separated collection means that the MSW is first classified into several different parts such as composting material (food waste), combustible materials (fiber and paper) and recyclable materials (metals and glass). Once classified these different waste types are then collected and forwarded to the appropriate users. Unfortunately the source – separated collection at the household level has not yet been implemented in Tirana city. At present the main collection systems of the MSW are as

follows:

- a) Residential refuse: individual households place the refuse into a container nearby, then the refuse is collected and sent directly to the dump by the private service operators, which the Tirana Municipality has contracted to. In order to prevent pollution caused by waste, waste bins are provided with a cap. But this does not prevent the scavengers to take out recyclable waste and then leave the bins open. Actually there are six contracted collection and transportation companies that cover this service in Tirana city. Services that are covered by private service operators are collection and transportation of waste and waste markets; cleaning the roads and pavements; cleaning of urban areas with workers; washing and disinfection of waste bins; collection and transportation of solid waste and large volume waste; main road maintenance. Institutions place their refuse into the road containers too, except for paper, plastics and juice cans that are collected from individual companies or scavengers in order to be recycled.
- b) Road and public places cleaning refuse: the cleaning of roads, public areas and disposal of this refuse is mainly the responsibility of a particular enterprise run by the Environment Directorate in Tirana Municipality. The cleaning refuse is first collected into nearby containers and is sent then to the Sharra dumpsite by collection vehicles. This enterprise has to do the following tasks too: cleaning service roads, pavements and apartment blocks which are not included in contracts with private companies for cleaning; cleaning markets; removal of voluminous solid waste; removal of body and skeletal remains; collection of waste by hand in residential areas or roads.
- c) Separated collection: this kind of collection is in two forms: organized and not organized. According to this second method, the parts of waste such as aluminum and other metals, paper, cardboard and plastics are collected by scavengers from roads, markets and garbage bins and then sold. Batteries, electronic waste, etc. are collected in Tirana in this way today. Over the years, many campaigns have been organized by the Tirana Municipality and others [6] to raise the awareness of the need to collect separately different solid urban waste. For this purpose containers have been placed along the roads. Nevertheless the campaigns were not very successful, mostly for two reasons: the first and the main reason is related to the scavengers who generally collect cans, ferrous metal, plastics and sell them individually; the second reason refers to the community which did not show too much understanding for the idea.

The organized separated collection is especially performed for paper and cardboard: so, a private company, in agreement with the Municipality of Tirana [7], draws every day from some markets the quantities of 1-5 tons of paper and 3-4 tons of cardboard, toilet paper, napkins, etc. with a daily manufacturing capacity of 4-5 tons. The main sources of collecting paper for recycling are: commercial streets, embassies and international institutions and private firms [7]. The Municipality is not paid for this attractive amount of paper waste, but the profit lies, first, in reduction of the waste amount that will be sent to landfill and, secondly, in the saving of natural resources and the saving of energy. The Municipality of Tirana has built a whole

structure to achieve integrated management of solid urban waste.

At present MSW is collected in a mixed state, but residents can volunteer to participate in the source-separated collection.

3.3 Recycling and treatment Recikliranje i obrada

Until the early 2009 the only way of waste disposal was disposal in the open dumpsite, where a part of organic waste was subjected to decomposition. So, almost 100 % of collected waste was disposed in an open dump. Regarding recycling, although a part of waste was separated for recycling, unfortunately there are no accurate data for this quantity.

3.3.1 Recycling Recikliranje

In recycling, waste materials are processed for industrial use and then changed into new or similar products. Recycling is often viewed as a resource conservation activity and it may also offer a greater return for many products in energy saving, but also serve as a source of income for those who collect. The recycling materials in Tirana are paper and cardboard, plastic and metal. In Tirana each recyclable glass bottle is worth about Lekë 4-11 (depending on the type of bottle) (US\$ 0,04-0,1), aluminum can waste, Lekë 90 (US\$ 0,8) per kg, and plastic waste, Lekë 25 (US\$ 0,227) per kg. Waste paper and cardboard are worth about Lekë 3,5 to 5 (US\$ 0,03-0,045) per kg. These recyclable materials are often collected at the source or from waste bins by scavengers. After collection, these items are sent to factories for recycling, with the exception of aluminum waste, which is exported as there is not any kind of this industry in our country. A good experience in this area is the collection of glass bottles by firms that trade their products to them with, for example, beer bottles.

3.3.2 Composting Kompostiranje

This second means of recapturing the value of MSW is through the use of the natural biodegradation process. Composting is widely used in Western countries and had been used in our country in the past (period in which the daily amount generated per person was very low), but today is rarely used because of some reasons:

- Because sorting urban wastes is not widely practiced by residents, the sorting equipment must first be purchased before composting can take place. The equipment cost would make the price of compost higher than that of a fertilizer.
- The public acceptance of composting is low, because most farmers have psychological resistance to the products derived from wastes.
- The usefulness of compost is limited. Compost has less fertility than a chemical fertilizer. Compost can only be used to grow non-food products such as public green spaces. This lack of demand would cause serious

problems for survival of a compost company.

- Strict regulations, monitoring and quality standards which prevent the second pollution of compost are not adequate in our country; therefore, composting is currently not a recommended method.

3.3.3 Incineration Spaljivanje

The third approach to recapturing the value of MSW is to convert the energy stored in waste by incineration. Although many combustibles are recyclable, there is often a higher total value in burning the waste for energy than in recycling it. Currently, the incineration of MSW is not used in Tirana or the country. The incineration of MSW is mentioned as one of the integrated management options of MSW in the "National environmental strategy" and "Environmental status report 2007-08" [8], but with the lack of laws and measures to support this method of treatment. It would be more effective that instead of uncontrolled burning of MSW that often occurs in the open area of our country, the waste incineration is applied with energy recovery.

3.4 Disposal systems Sustav odlaganja

3.4.1 Simple landfill Jednostavno odlagalište

Until two years ago, a simple landfill or an open dump was used for solid waste disposal in Tirana city. This simple landfill treatment method is still broadly used all over Albania.

The dump of Sharra, only 7 km away from the center of Tirana, with an area of about 5 hectares, was designated as a "hot spot" area because of the pollution it caused. Fires were present at all times and the smell felt up to some quarters of Tirana. Problems hampered further here as long as hazardous waste were sent together with urban waste in that open dump. Waste was often exposed to the elements, vectors and scavengers, and susceptible to open burning or combustion.

3.4.2 Sanitary landfill Sanitarno odlagalište

Because of the harm caused by the open dump, Tirana is now using a new and standardized MSW treatment method to protect the environment and the people's health. The first standard sanitary landfill in our country is just the Sharra landfill and it is still in the process of improvement. For three or four years now in the field of Sharra a project worth 4.6 million euros from the Italian Government has been carried out aimed at controlling the environmental situation connected with the urban waste collection site. This money, provided by "Cooperazione Italiana" [6], will be used for construction works, machinery and equipment necessary to transform the open dump into a sanitary landfill. "Waste Management of Tirana" is a project that will reduce the health and environmental risks of the Sharra area. The waste collection and treatment in the landfill will be carried out in

accordance with the technical concept of a sanitary landfill. The landfill gas, generated in it, will be collected by the respective piping and will be burned in the place by torch. The first parcel entered the exploitation at the end of 2008 and currently efforts are being made to create a second parcel for the deposit of waste [6]. The daily treatment capacity of the landfill is about 1000 tons, while the overall capacity of this area, after reconstruction, will be 1,9 million cubic meters [6]. Since the respective waste density, after compression in landfill, is about 600-650 kg per cubic meter, this landfill will be used for about 4-5 years, knowing that the daily amount of MSW generated is about 1000 tons [3]. Another landfill will be built in the future for Tirana city, but we have no data for this new project.

4

Cost and tariff setting

Troškovi i određivanje naknade

The financing of the waste management infrastructure and systems in Albania is provided by the municipalities. The management of MSW is associated with a significant cost, which is to be borne by all those who need this service (community and businesses) by paying the "green and cleaning tax". The determination of waste tax is within the competences of the Municipal Council of Local Government and therefore differs among various municipalities. In order to bear the costs of waste management, the Tirana Municipality has changed the amount of the tax over the years. In 2009 the residents paid 3000 Lekë/year (about US\$ 30/year), while in 2010 this tax is 5000 Lekë/year (about US\$ 50/year). The taxes are collected by the civil state office. The commercial sectors pay according to their activity. The revenue from the solid waste service does not cover the cost of offering the service. According to the data of the Tirana Municipality [9], the rate of cost recovery of the services offered is 61 % and the rest of 39 % from other income. The increase of waste tax will affect the clearance of this balance in the future.

5

Problems and perspectives

Problemi i perspektive

5.1

Problems

Problemi

5.1.1

Pollution caused by simple dumpsite and unsuitable collection site

Zagađenje uzrokovano jednostavnim odlagalištem i neodgovarajućim mjestom prikupljanja

As the Tirana city develops economically and grows in population, the problems of solid waste management will become more and more important to solve. I think that over time, Tirana's urban population will grow spreading into the less populated surrounding areas of the city. The only landfill site, formerly located in the suburb, is in a populated zone now. Because it is an open dump all the chemicals are discharged into the groundwater polluting the water, land and air as well as endangering the health of more and more people. After the landfill site closes, a future challenge for Tirana is to find a way to speed up the recovery and stabilization of the landfill site so that the land can serve a

new purpose.

5.1.2

The LHV of the MSW is a premise for implementation of incineration

Niska toplinska vrijednost komunalnog krutog otpada pretpostavka je za provedbu spaljivanje

In the framework of integrated waste management all the waste treatment options should be considered and implemented, of course, in accordance with the specific conditions in the case study. The incineration of solid urban waste is ranked in the Environment Ministry Reports [8] as one of the options that will improve waste management in our country.

The reasons for which I think incineration should be implemented are:

- The considerable amount of waste generated in Tirana, the LHV not lower, the difficulties to provide space available for new landfills - constitute premises in favor of the waste incineration. The waste incineration can be implemented not only for Tirana city, but for the entire region of Tirana - Durres, or further, because the distances to be performed are not very long.
- The biggest hospital centers of our country are concentrated in Tirana and the media have often highlighted that their incinerators are not always running. This means that hospital waste is often mixed with urban waste and sent to the landfill together.
- In Tirana city are set up and operate a great number of private health centers (such as hospitals, diagnostic clinics, dental clinics, etc.) and they put their waste in the waste bins.
- Many types of hazardous waste such as domestic appliances, electronic devices, batteries, etc., are collected together with solid urban waste, because there is no selected collection with special bins or centers.

5.1.3

Lack of an efficient and suitable MSW collection method

Nedostatak učinkovite i prikladne metode prikupljanja komunalnog čvrstog otpada

A sight not pleasant to look at and a polluted environment are caused by the sorting that scavengers do at the refuse disposal sites. The refuse in waste containers gets mixed with solid waste but scavengers sort it out to remove recyclable and reusable items. After they are through with it, waste bins with lids remain open and parts of the waste spread out across the land. Therefore on the one hand waste scavengers play an important role as an informal waste recovery system, but on the other hand they create some problems. For example, rummaging through the solid waste has a negative impact on the health and hygiene of these scavengers. In addition, the waste collectors are quite selective about which types of waste they will take away; waste with economic value will be sorted and removed but other types of waste such as batteries are left behind causing harm to the environment. Unfortunately, these informal waste recovery systems make it harder to regulate and implement a more efficient and standardized waste treatment system. This kind of informal waste recovery system occurs in other cities of Albania too.

5.1.5

Lack of comprehensive legislation and accurate data

Nedostatak sveobuhvatnog zakonodavstva i točnih podataka

In Albania, the responsibility for waste service provision has been delegated to the lower level of local government (municipalities and communes), but that has not always proved efficient. Furthermore, this allocation of responsibility is not associated with the establishment of service provision quality level standards; in addition, local government units suffer the lack of financial resources through which to sustain and improve public services, among which the waste service.

Actually the appropriate policies regarding solid waste treatment are missing. Even though in some parts of the legislation or in different strategic documents some references regarding waste treatment are made, still those are only fragments of a comprehensive strategy. For example, often the reports of central government set goals and tasks related to waste management, but the reports that follow do not say whether these goals and tasks are achieved and performed. The lack of standards in the field of waste management creates difficulties for the process of construction of treatment plants. Endorsement of these standards remains a priority issue for the investments into the urban and rural infrastructure, accompanied with a significant financial cost. Unfortunately, there are not yet accurate quantitative data on the waste being generated in the country. There are discrepancies in different data sources, despite the fact that in the plans drafted by the Ministry of Environment the tasks are often set for a construction of a waste database. The accurate information about the quantity and the type of material being generated is a basis to carry out studies that will lead the effective management of municipal solid waste.

5.2

Opportunities and perspectives

Mogućnosti i perspektive

To meet the needs of an integrated solid waste management system, the following aspects should be improved in the future:

5.2.1

MSW collection methods should be specialized according to the different area situations

Metode prikupljanja komunalnog čvrstog otpada trebaju biti specijalizirane u skladu s različitim situacijama područja

An efficient and effective separation and collection of solid waste materials may require different methodologies. As a matter of fact, the Tirana Municipality has performed a considerable work to improve the separate collection through awareness campaigns in schools or institutions or through pilot projects in different areas of the capital. The investigation shows that citizens are highly aware of the usefulness of sorting the refuse; they understand that sorting their refuse before collection will reduce the amount of solid waste produced and facilitate the recycling of materials as well as reduce the overall cost of waste disposal. In addition, sorting out the food waste from MSW and converting this

organic refuse into compost, will reduce the overall moisture content of the MSW. The reduction of MSW moisture will further improve the waste features to be then incinerated. Regarding the incineration of waste it is already confirmed that matters concerning the health effects of emissions of dioxins and furans are reduced significantly due to the progress made in plants and emission control interventions as well as to the new, stricter government regulations, which have led to considerable reduction of the amount of dioxin and furan emissions.

5.2.2

Improving the waste collection systems

Poboljšanje sustava prikupljanja otpada

Currently, Tirana has an informal waste sorting, collection and recovery system made up of scavengers and reusable waste collectors, except for paper and cardboard separated collection. The local government should consider organizing and managing this informal system so that it can be better regulated and formalized into a waste collection plan overseen by the municipal institutions. This would not only improve the efficiency of urban solid waste collection and recovery, but would create employment opportunities for the informal waste collectors and better protect their health.

5.2.3

Implementing an integrated disposal method

Provedba integriranog načina odlaganja

After the implementation of separated collection at a high level, the characteristics of the waste used as a fuel will be of help in explaining the advantages of waste incineration. The ash generated after incineration could be disposed at the landfill site. This integrated final disposal method would reduce the quantity of the urban solid waste, thereby reducing the demands for large areas available for new landfills and increasing the existing landfill life.

6

Conclusions

Zaključci

The rapid urbanization, economic development and population growth, have resulted in the increasing of the MSW amount at a rate of about 13 %. In the Tirana city the average amount of SUW generated was about 1 kg/d per capita in 2008. Compared to 2001 when it was 0,739 kg/d per capita, the increase was by about 35,3 %. Tirana's MSW has an average LHV of 8658 kJ/kg. Food waste accounts for about 44,1 % and appears to have decreased during these years, due to the increase of packaging materials, as a result of a change in consumption patterns. The remaining of the waste is made up of plastic (17,73 %), paper and cellulose material (16,4 %), wood and textile (6,34 %), glass and solid materials (9,41 %), metals (1,06 %).

Sorting and separating waste at the source is considered to be an effective method of recycling waste items. At present, MSW collection consists of different categories of waste items mixed together, however some attempts of sorting before collection have been made with street-side road refuse. An investigation of the public awareness and education indicates that residents are concerned about solid waste removal and believe that there are advantages in

sorting waste before removal. These results show that along with the economic growth the standard of living increases. The Community is becoming more and more concerned about environmental conditions and corresponding effects on their health. To address these concerns, the Tirana Municipality should implement a system that encourages citizens to separate their waste before collection.

The open Sharra dumpsite is in the process of becoming a sanitary landfill, ending the pollution caused by the uncontrolled dumping of waste; since 2008 over 90 % of Tirana's total MSW is disposed in sanitary landfill. Since the LHV of Tirana's MSW meets the requirements for successful incineration, an integrated disposal management should be implemented in Tirana. This waste integrated management should include the following: (a) improving the waste collection systems; (b) separated collection of different waste items; (c) implementing an integrated disposal management.

7

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