



Support Waste Management in Kosovo

EuropeAid/133800/C/SER/XK

Waste Management Master Plan (WWMP) Executive Summary

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1 INTRODUCTION

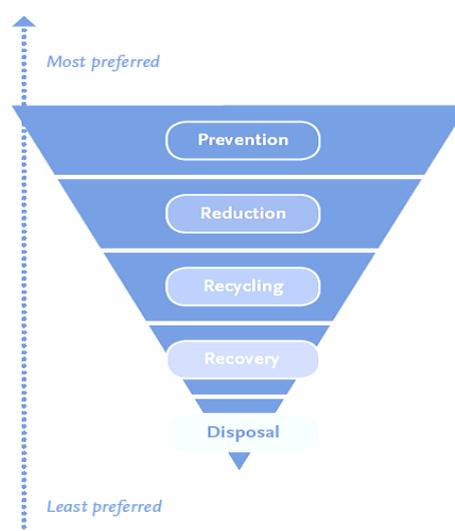
The present Master Plan (WMMP) for the determination of Waste Management infrastructure priority projects has been prepared under Task 2 of the EU Technical Assistance project for the “Support of Waste Management in Kosovo” EuropeAid/133800/C/SER/XK. The WMMP was developed under the project’s specific ToR, aiming to provide solutions for waste management treatment, in reference to the lack of existing infrastructure in the country, and promote waste generation reduction, reuse and recycling, according to the provisions of the EC Waste Framework Directive. Therefore, the WMMP does not refer to waste management in general and its goal is not to resolve the different problems related to Kosovo waste management issues.

The European Union has been an integral part of the international effort to build a new future for Kosovo since 1999. The European Union – both its Member States and its institutions, notably the European Commission - plays a prominent role in the reconstruction and development of Kosovo.

Kosovo lacks proper waste management for virtually all solid waste types (domestic, industrial, health care and hazardous). Collection, classification, recycling, and treatment systems, as well as infrastructure for municipal waste are missing. Illegal landfills and inappropriately constructed and managed industrial landfills abound. Appropriately constructed and operated hazardous waste facilities are lacking. These shortfalls cause serious health and environmental impacts, either from uncontrolled or poorly controlled waste disposal facilities or (particularly in rural areas) from the large amounts of waste simply uncollected, dumped at illegal dumpsites (often near rivers, causing additional environmental hazards), or burned. Large volumes of coal ash (from the lignite-fired power plants) and mining waste are also dumped each year, without any measures for recycling.

Determining the current status, what is missing, and how well the situation is being managed, is essential in order to develop a sound Master Plan for priority projects without going over old ground or leaving out important elements.

The objective of this Master Plan is to improve the present waste management status, which is disorganised, haphazard and under-resourced. It aims to remedy the problem by establishing a clear rationale for making waste management a national priority and providing an organized, logical set of steps to tackle the priorities for the future waste management in the country.



Source: UNEP (2011). Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication.



The Waste Management hierarchy that has been adopted by the Waste Management National Strategy in Kosovo indicates the order for action to reduce and manage waste.

2 CURRENT WASTE MANAGEMENT IN KOSOVO

Although significant progress was made in the recent years, Kosovo still lacks proper waste management for all solid waste types: domestic, industrial, medical and hazardous waste. National municipal waste collection is about 60%. About 40% of the remaining waste is dumped illegally or burned. Very little waste is currently recycled, mostly by the informal sector.

Kosovo has a network of (regional) solid waste landfill sites that, if managed properly, could be sufficient to cover most of the country's needs. However, the system is poorly functioning, facilities need upgrades, tariff collection is poor and big parts of the population are not served. From the population that receives waste collection services, 90% is located in urban areas and only 10% in rural areas. Little reliable data exist on solid waste quantities, but annual municipal solid waste generation is estimated at about 400,000 tonnes.

Current tariff for domestic waste collection and disposal is 5 € per month per household. The very low fee recovery rate, which is about 50%, is the main reason of poor performance and bad maintenance of the current system.

Kosovo legislation related to waste management is currently in, or in process of, compliance with EU regulations and Directives, following Kosovo's commitment for becoming a full EU-member, without however being possible so far to achieve the targets set. The Law on Waste (2012) and the "Strategy of Kosovo on Waste Management for the period 2013-2022" are the main legislative documents of waste management, whereas the "Kosovo Waste Management Plan for the period 2013-2017" includes the activities to be implemented.

Waste management problems in Kosovo are summarized below:

- ➔ population explosion, rapid urbanization, expansion of settlements,
- ➔ insufficient public education and community participation,
- ➔ rapid increase in the volume of municipal and industrial solid wastes, lack of waste reduction efforts,
- ➔ immature system of local autonomy,
- ➔ lack of coordination among sectors, organizations and municipalities,
- ➔ lack of a clear policy on waste pickers,
- ➔ a lack of capacities and the non contracting of public cleansing services as well as insufficient development programs for human resources,
- ➔ insufficient emphasis on waste minimization and realistic recycling opportunities,
- ➔ unsanitary disposal practice with open dumping,
- ➔ insufficient law enforcement,
- ➔ weak financial base,



- ➔ lack of organizational capacity in municipal waste management,
- ➔ inadequate operation and maintenance structure for machinery and equipment, low utilization rate,
- ➔ use of technology that is technically and economically inadequate.

The range of key issues that have to be tackled in order to improve solid waste management includes:

- ➔ improving public health and environmental protection,
- ➔ expansion of waste collection to areas not currently serviced and involvement of the private sector,
- ➔ improvement of the organization, resources, and technical skills to achieve cost savings and efficiencies,
- ➔ improvement of cost recovery from waste producers,
- ➔ upgrading the standard of land disposal of waste to make landfills last longer, operate more safely, and reduce existing on-site problems,
- ➔ revise the targets set in the “Strategy of Kosovo on Waste Management for 2013-2022”,
- ➔ introduce the concepts and practices of waste prevention, recycling and treatment.

In the framework of the assessment of the current waste management situation in Kosovo, the following **main conclusions** were drawn.

2.1 Kosovo legislation

The Kosovo legislation can be considered in compliance with the EU Directives (Waste Framework Directive, 2008/98/EC), even though the main separate collection targets are not defined neither in the primary legislation (Waste Law, No.04-L060 of 2012) nor in the specific regulations / Administrative Instructions (e.g.: main objectives related to packaging and collection of the WFD).

Best Available Techniques (BATs) are mentioned in the Administrative Instructions, but no detailed information is given on the criteria for adoption and upgrading of the waste treatment plants.

In general, the following issue related to waste management is not properly addressed or missing from the relevant (waste sector) legislation:

- The secondary legislation on the correct implementation of the “polluter pays” principle and “producer responsibility” is missing. The proper transposition of these two principles is necessary to start the separate collection of the main type of waste (e.g.: paper, glass, aluminum packaging etc)

The EU Waste Framework Directive has been transposed in Kosovo’s legislative framework, but some integrations and adjustments are necessary for the full transposition. The transposition of the *acquis communautaire* in waste management



sector has not been completed, and in particular some specific Directives ruling the treatment of specific supply chain of waste and polluters have not been transposed yet.¹

2.2 Waste collection and transfer

Waste collection, transport and disposal up to the landfill is administrated by 7 regional waste collection companies (RWCCs). The RWCCs provide collection of MSW from households, commercial stores and institutes, whereas many industries have direct contracts with private waste collection companies. The following types of waste collection are implemented: a) Waste collection from central points, b) Door-to-door collection and c) Waste collection upon request.

- ✓ The system in place does not meet the minimum requirements for health and environmental protection and it is characterized by very low collection coverage both in population and territory.
- ✓ The waste quantities are constantly increasing and the companies do not have the technical capacities to handle these services: most of the trucks are amortized and out of function. Maintenance is not good and the garages and the repair-shops are not in proper condition.
- ✓ Many containers are damaged from the waste burning, while the wheels and covers are occasionally taken to be used for scrap.
- ✓ There is an urgent need for proper maintenance and especially washing and sanitation of the bins.
- ✓ Road infrastructure in rural areas is in a bad shape and the companies can hardly have access to the clients (households) to collect waste.
- ✓ The separation system has not been established yet.
- ✓ Investments are required in waste bins (if no official bag system will be introduced).
- ✓ Investments are required in waste collection trucks.
- ✓ There is need for training of the personnel working in the RWCCs, in order to increase their efficiency and to improve organizational structure.
- ✓ There is low awareness of the population for the payment of the services.
- ✓ There is lack of knowledge of the waste generators, community, employees of companies and the public for the proper waste management and the good practices and trends in the other developed countries.
- ✓ There is a need that municipalities engage/involve the private sector in public waste collection services, for competition purposes.

¹ EU IPA 2010 Instrument for Kosovo, Twinning Contract Number KS 10 IB EN 01, Component 3: “Strengthening of Waste Management Institutional and Legal Framework”



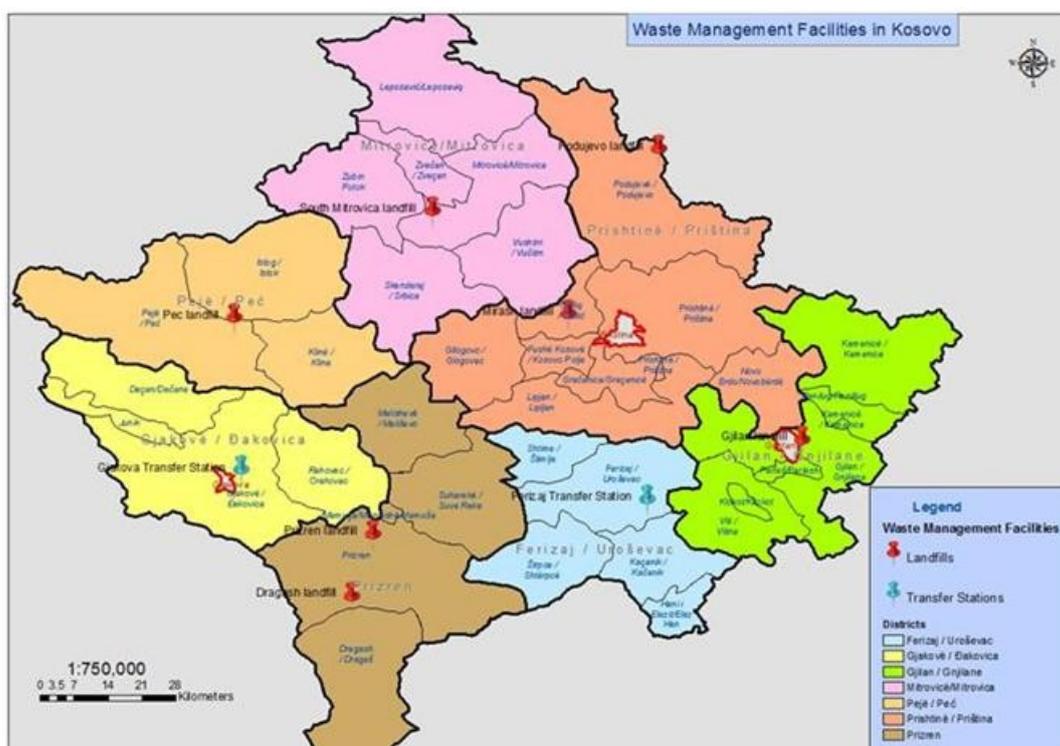
2.3 Illegal dumping

Illegal dumping consists of one of the most common problems in Kosovo, affecting both big and small municipalities alike. During 2013, KEPA identified the illegal landfills in 34 Kosovo municipalities. In total, 400 illegal dumpsites were identified with a total area of 301.18 hectares.

- ✓ The identification and recording of the illegal dumpsites in Kosovo is a start to address the problem, but it is not a sufficient solution by itself.
- ✓ There is an urgent need for identification and assessment of the illegal dumpsites according to their RISK to the environment.
- ✓ A set of criteria should be introduced in order to characterise illegal dumpsites, in terms of risk.
- ✓ Technical specifications should be introduced according to the characterization of the risk.

2.4 Landfills

The waste management sector is characterized by low levels of efficiency, limited private investment and inadequate experience in the use of modern technology. The waste disposal infrastructure, even though recently built, is not in very good condition. Waste disposal is administrated by the “Kosovo Landfill Management Company” (KLMC) and the Municipalities.



Six landfills, four of which are currently managed by KLMC, were built between 2003 and 2007, by the European Agency for Reconstruction. Lack of professional waste management knowledge, inadequate operational practices (e.g. absence of operation



manuals), lack of necessary equipment and infrastructure (e.g. absence of leachate / biogas treatment, environmental monitoring, etc) have led to the deterioration of the technical conditions of the landfills in a very short period of time.

- ✓ Compaction of waste is considered inadequate in all sites, resulting in storage capacity losses;
- ✓ Little or no soil coverage is applied resulting in smells, litter and high infiltration of water during rainfalls;
- ✓ There are no support utilities (buildings, tire washing units etc.). In general terms, the lack of support utilities is a serious problem for the health and safety of landfill workers and minimum operational standards are not met;
- ✓ The combination of non-compaction and no soil coverage results in very big leachate generation. The leachate is not treated, whereas recirculation is used as a means to reduce its volume and its content in microorganisms;
- ✓ There is no biogas management resulting in serious risks for high concentration of methane emissions;
- ✓ In several cases the lined area is exhausted and disposal takes place directly on soil without sub-soil protection;
- ✓ Mobile equipment (bulldozers, loaders, compactors) is old and inefficient;
- ✓ The personnel are not trained and in certain cases not qualified even for the current handling practices;
- ✓ No environmental monitoring mechanisms are in place;
- ✓ None of the disposal sites has an environmental permit. MESP is responsible for issuing the environmental permits and the authority to enforce them. The landfills that are not operated by KLMC are managed by the municipalities in which the landfills are located, namely by the regional public enterprises for waste collection;
- ✓ There is a need for substantial upgrade of landfills' operational conditions and a need for investments, in order to transform the disposal sites from engineered dumpsites to sanitary landfills;
- ✓ Despite the fact that penalties should have been issued for non compliance, no information is available for such incidents, in an effort not to create additional operational problems to the companies operating the landfills.

2.5 Transfer stations

There are currently 3 Transfer Stations in Kosovo: in Gjakova, Ferizaj and, a new one, in Drenas. The operational conditions at in Gjakova and Ferizaj are not better than the landfills conditions described above.

- ✓ No waste compaction is applied for long haul transport (use of press containers);
- ✓ Transfer of waste is done with usual open-top containers;
- ✓ Basic infrastructure is missing (hopper, fence, gate) or is out of order (weighbridge);
- ✓ Absence of environmental monitoring;



- ✓ Insufficient mobile handling equipment;
- ✓ Recovery of recyclables by scavengers living in houses adjacent to the Gjakova TS;
- ✓ There is a need for substantial upgrade of the Transfer Stations' operational conditions and a need for investments.

2.6 Recycling, recovery and treatment

In Kosovo there is no organized waste separation and recycling system. The recycling industry is driven by efforts made by local businesses and individual informal waste collectors.

- ✓ Waste source separation is a requirement stipulated by the Law on Waste besides the EU directives;
- ✓ Municipalities have the obligation to organize a system for waste classification and establish an appropriate infrastructure to enable this process;
- ✓ There is no waste separation system in any Municipality;
- ✓ The recycling industry could be further developed.

2.7 Waste management cost

The current cost of waste management is divided in collection – transfer and disposal cost. Collection and transfer is implemented by RWCCs, while disposal is implemented by KLMC in the 5 landfills and local entities in the other ones. It is important to notice that RWCCs are paying directly KLMC, so in their operational costs the disposal fees are already included.

- ✓ The current cost (the costs do not include amortization) of waste management has been assessed at:
 - 36-38 Euros per ton collected and disposed off – out of it 5.31 Euros per ton is the disposal fee and the rest refers to collection
 - 11-12 Euros per person served per year.
- ✓ These costs correspond to an almost 60% collection coverage on a national level.
- ✓ The disposal cost lacks elementary operational components that are essential for the sound operation of a sanitary landfill (cost for leachate treatment, biogas management, monitoring, future rehabilitation, insurance).
- ✓ Current tariffs in use were set by WWRO and they were valid until 31/5/2013.
- ✓ According to the Waste Law, Municipalities should have set their own tariffs; this is not done yet for two reasons: a) they are in a transit period due to the recent municipal elections and b) they lack the tools and the resources required to decide on their own tariffs in a structured and documented way.
- ✓ Despite the improvement in bill collection rates, the Office of Auditor General reported an average bill collection rate of 54%, if prior years' invoices are taken into consideration.
- ✓ RWCCs are not in a good financial position.
- ✓ RWCCs' low bill collection rate is the most important shortcoming of the current tariff and billing system.
- ✓ It is clear that the current system is not viable.



3 WASTE GENERATION AND COMPOSITION / PROJECTIONS

3.1 Current waste generation

Taking into consideration the data and information from all available resources, it is considered that the waste generation in Kosovo for the year 2012 was:

- urban areas: 0.9kg/capita/day or 229,069 tn/y
- rural areas: 0.4kg/capita/day or 163,270 tn/y
- **Total: 0.6kg/capita/day or 392,339 tn/y**

The aforementioned value of 0.6 kg/capita/day for Kosovo is close to the values estimated in other similar countries (e.g. Albania: 0.7 kg/cap/day according to the National Waste Management Plan).

3.2 Waste generation projections

The estimation of the municipal waste quantity to be generated in the next 10 years was based on:

- The projection of the population according to the national statistic services (ANNEX I CHAPTER 3).
- The project of the household consumption, which has been selected as the most representative measure of household income growth.

For the last 5 years the household consumption has been increased by 11.36%. In order to create the waste generation forecast it is assumed that household consumption will continue to grow about 10% every 5 years, resulting in an overall growth of 20% until 2024 (about 9,200 Euros per household).

The following graph presents the estimate waste evolution in Kosovo for the period 2012-2024. Analytical data is presented in Annex II Chapter 3.

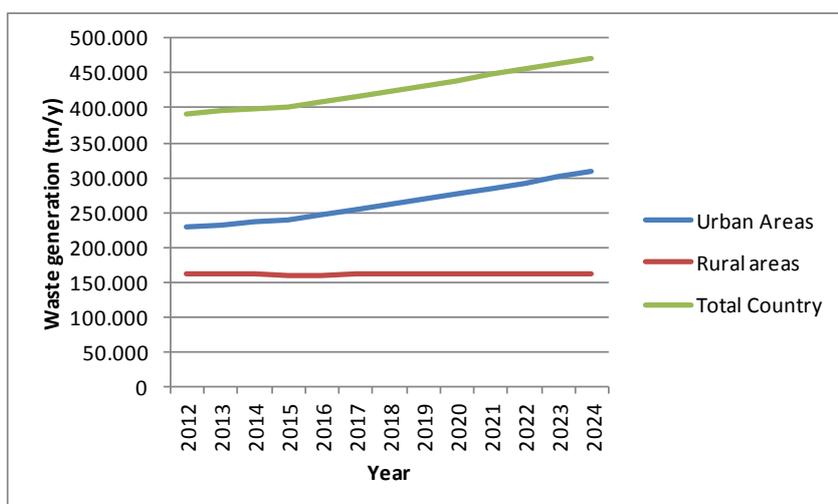


Figure 1: Projection of municipal waste generation in Kosovo



Overall, in the period between 2013 and 2024, the waste quantity will increase by almost 19%, but this will not be uniform. The increase in the urban areas is expected to be around 33%, while in the rural areas the waste is expected to remain constant (increase of less than 0.5%). The average annual growth rate is ~1.5%.

As for the per capita waste generation, it is expected to increase from 0.6 kg/cap/day to 0.68 kg/cap/day.

3.3 Current waste composition

There is no organized data collection with respect to waste composition in Kosovo. To assess the current MSW composition, existing information from various studies as presented in Chapter 3, as well as the results of the sampling tests elaborated recently in the frame of a project which runs in parallel, funded by the World Bank, was compared. The composition of waste considered for the baseline year of 2012 (referring also to today period) is presented in the following Table and Figure.

Table 1: Waste composition in Kosovo in 2012

Parameter	Urban	Rural	Average
Organic	58.8%	48.40%	54.5%
Plastic	12.4%	12.50%	12.4%
Paper/Cardboard	9.0%	6.20%	7.8%
Metals	1,0%	1.40%	1.2%
Glass	2.5%	2.10%	2.3%
Wood	0.8%	2.90%	1.7%
Others	15.5%	26.50%	20.1%
Total	100.0%	100.0%	100.0%

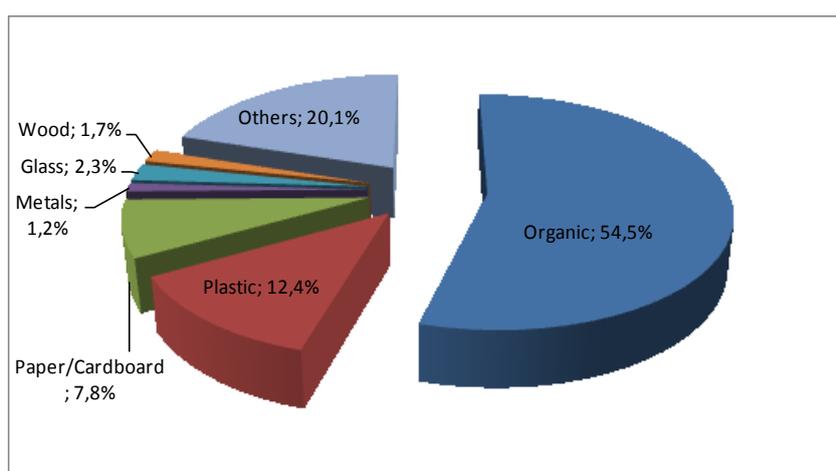


Figure 2: Waste composition in Kosovo in 2012



3.4 Future waste composition

The projection of the waste composition is mainly based on:

- Economic growth;
- Change in the way of living of the citizens (increase of the consumption of packaged goods and reduction of the level of preparation of in-house meals);
- Measures, which will be implemented in time for the prevention and reduction of the quantity of generated waste.

The projection of the composition of municipal waste is correlated with the projection of packaging waste generation. European statistics (e.g. Generation and recycling of packaging waste, CSI 017/WST 002, Assessment published Nov 2012) demonstrate that as income grows, recyclables (mostly packaging) grow 50% faster than the overall waste growth on a per capita basis, while the organic fraction is decreasing. Also UNEP, at its publication on green economy, suggests that packaging waste percentage increases with GDP and income growth while organic fraction percentage is decreasing accordingly.²

In this respect, it is considered that the recyclables fraction will grow 50% faster than the overall waste generation per capita. As presented in Annex II Chapter 3, the per capita waste generation will grow from 0.60 to 0.68 kg/cap/day, an almost 13% increase in 10 years (2015-2024). The increase in recyclable fraction generated per capita, for the same period (next 10 years), will be about 25%.

Assuming uniform changes, the following Figure presents the evolution of the waste composition for the years 2012, 2015, 2020 and 2024.

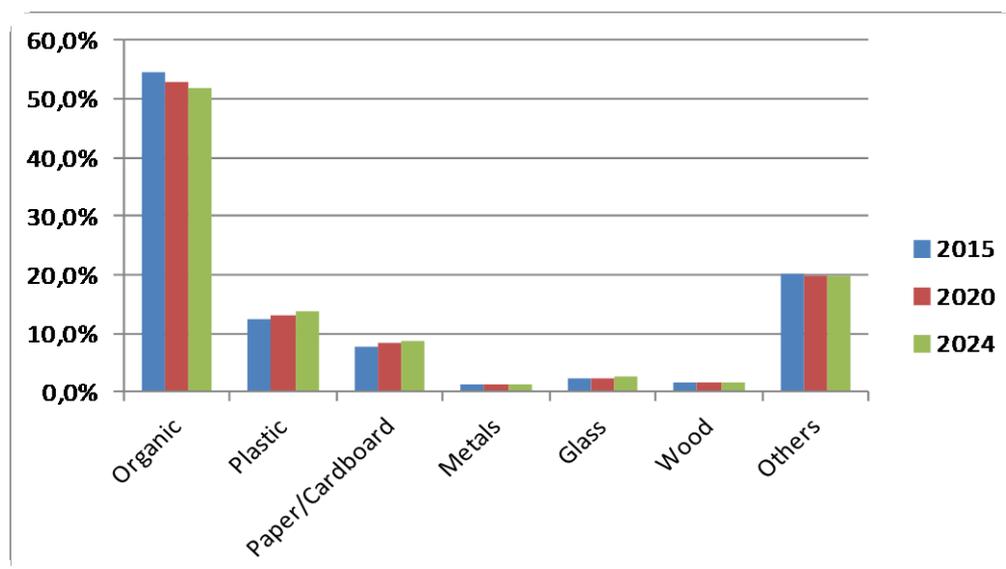


Figure: 3: Estimated future waste composition in Kosovo

² UNEP: Green Economy Report 2011



The following Table presents the main information related to the waste quantities that need to be managed in Kosovo.

Table 2: Waste generation and characteristics

Year	Urban areas		Rural areas		Total				
	tn/y	Kg/cap/d	tn/y	Kg/cap/d	tn/y	Kg/cap/d			
TOTAL WASTE GENERATION									
2012	229,069	0,90	163,270	0,40	392,339	0.59			
2015	240,098	0,90	160,065	0,40	400,164	0.60			
2020	277,141	0,95	162,237	0,41	439,377	0.64			
2024	308,520	1,00	162,873	0,42	471,393	0.68			
BIODEGRADABLE WASTE GENERATION									
2012	157,141	0,62	93,880	0,23	251,021	0.38			
2015	164,707	0,62	91,477	0,23	256,185	0.38			
2020	187,276	0,64	89,953	0,23	277,229	0.40			
2024	205,911	0,67	89,977	0,23	293,888	0.42			
PACKAGING WASTE GENERATION									
2012	38,174	0.15	25,723	0.06	63,898	0.10			
2015	40.635	0.15	25,051	0.06	65,686	0.10			
2020	50.362	0.17	27,046	0.07	77,409	0.11			
2024	58.464	0.19	28,189	0.07	86,652	0.12			
WASTE COMPOSITION (%)									
	2015	2020	2024	2015	2020	2024	2015	2020	2024
Organic	58.8%	57.5%	55.9%	48.40%	45.9%	44.0%	54.5%	53.0%	51.8%
Plastic	12.4%	13.0%	13.7%	12.50%	13.3%	13.9%	12.4%	13.2%	13.8%
Paper/Cardboard	9.0%	9.4%	10.0%	6.20%	6.3%	6.4%	7.8%	8.4%	8.7%
Metals	1.0%	1.1%	1.1%	1.40%	1.5%	1.6%	1.2%	1.2%	1.3%
Glass	2.5%	2.6%	2.8%	2.10%	2.2%	2.3%	2.3%	2.5%	2.6%
Wood	0.8%	0.8%	0.9%	2.90%	3.2%	3.6%	1.7%	1.7%	1.8%
Others	15.5%	15.6%	15.6%	26.50%	27.6%	28.2%	20.1%	20.0%	20.0%
TOTAL	100.0%								



4 OBJECTIVES & TARGETS

Some of the set targets in the “Strategy of Kosovo on Waste Management for 2013-2022”, given the fact that currently the basic waste management practice in Kosovo is sanitary landfilling, are considered rather optimistic, while others require definitions or corrections, in order to be under the scopes of the Waste Framework Directive and the Directive on the landfill of waste (Dir. 1999/31/EC). **Today the country is well behind the ambitious targets set by the Strategy.**

As in many developing countries, so in Kosovo, the state chose to upgrade its legislative framework by copying EU legislation and trying to adopt the same technological features as those applied in developed countries, causing multiple problems. The problem that can arise from the adoption of a “mature” legislative framework, such as the European that took more than 40 years to evolve, is that there is no room left for phased development and usually no further steps are undertaken.

Targets are the tools used in SWM planning in order to materialize the objectives and usually relate to the performance and coverage of SWM services. As long as they are realistic, they can be an effective tool for driving forward improvements.

Taking into account the WFD, the targets for Kosovo are proposed to be set with an **extension of four (4) years**, thus for the year 2024, in order to allow for the necessary infrastructure to be constructed and operate.

With regards to Biodegradable Municipal Waste, the target in the 1999/31/EC Directive on Landfill of waste is set in the following way: *“biodegradable municipal waste going to landfills must be reduced to 35 % of the total amount (by weight) of biodegradable municipal waste produced in 1995 or the latest year before 1995 for which standardised Eurostat data is available”*.

Taking into account that no standardised Eurostat data exist for Kosovo for the year 1995, or the latest year before this, it is proposed that no specific target is set. For Kosovo the reference year (1995 in the Directive) should be a matter of negotiation with the EC. It is obvious that no data for 1995 or before exist, so more recent years should be considered as reference years in Kosovo, taking into account the availability but also the credibility of data.

The following Table provides some proposed targets in relation to the ones mentioned in the Waste Management Strategy.



Table 3: Proposed Targets for MSW Management in Kosovo

Goals	Targets set in Kosovo Strategy						Proposed Targets			
	Percentage/ year						Percentage/ year		Comments	
	2010	2013	2016	2020	2021	2022	2020	2024		
Municipal waste collection	50	70	80	90			90	90	The target is considered realistic but needs a lot of effort in order to be achieved.	
The amount of separated municipal waste	0	20	30	50			-	20	<p>The proposed target is defined as the amount of source separation of materials, as a percentage of total amount of MSW produced, % w.w. and it includes all streams, meaning:</p> <ul style="list-style-type: none"> • source separated organic waste and • source separated recyclables <p>This target as set in the Strategy is considered rather optimistic. Practically, in order to reach the 50%, <u>very high percentage of source separation of organic waste would be necessary</u>, since this stream equals to more than 50% of total waste produced, while in the same time currently no organic waste is source separated, this target cannot be reached.</p>	
Amount of treated waste	10	20	35	40			40	40	<p>This target is defined as the amount of waste materials, as a percentage of total amount of MSW produced, % w.w. that enters a treatment plant.</p> <p>This includes source separated materials (organic waste and dry recyclables) that enter a biological treatment plant or a recycling facility respectively and the amount of mixed waste that enters a mechanical biological treatment plant.</p> <p>The target is not set higher for the year 2024 because the 4-year period (from 2020 to 2024) is not considered long enough, so that an increase in the amount of waste treated is achieved.</p>	
The amount of waste disposed in landfills	90	80	65	60			60	60	<p>This target is defined as the amount of waste materials, as a percentage of total amount of MSW produced, % w.w. that is left for direct disposal in sanitary landfills.</p> <p>This target equals with:</p> <p>Amount of waste disposed = (1-amount of treated waste)x100%</p>	



Goals	Targets set in Kosovo Strategy						Proposed Targets		
	Percentage/ year						Percentage/ year		Comments
	2010	2013	2016	2020	2021	2022	2020	2024	
The amount of biodegradable waste disposed with municipal waste	95	85	70	40			-	-	
Packaging Waste Reuse						65			
Packaging Waste Recycling						55			
Amount of source separation of dry recyclables (paper+glass+metals+plastic), as a percentage of total amount of dry recyclables produced, % w.w							-	65	<p>The targets set in the Strategy for source separation ³ (collection) of recyclable materials in 2021, do not seem to fit with the targets for the recycling of packaging waste, as set for the year 2022. Taking into account that packaging paper, glass, etc, is <i>included</i> in the more generic term “paper”, “glass”, etc., the set collection rates are quite low and it does not seem possible to recycle 55% of packaging waste, out of the materials collected.</p> <p>Additionally, there is lack of data regarding the analytical composition of MSW. For instance, it is not known which part of plastic waste is packaging plastic and which, is other types of plastic.</p> <p>For that reason, targets for source separation of dry recyclables are set, without any specific targets for packaging waste, until more data on waste composition is obtained. The targets are set for the year 2024, so that enough time is available for the organisation of the recycling schemes.</p>
-Source separation of paper, % w.w					30			55	
-Source separation of glass, % w.w					20			50	
-Source separation of plastic, % w.w					30			50	
-Source separation of metal, % w.w					80			65	

³As defined in Article 3 of the WFD



Goals	Targets set in Kosovo Strategy						Proposed Targets		
	Percentage/ year						Percentage/ year		Comments
	2010	2013	2016	2020	2021	2022	2020	2024	
Amount of recycling ⁴ of dry recyclables (paper + glass + metals + plastic), as a percentage of total amount of dry recyclables produced, % w.w							-	45	<p>These targets are set in accordance to Art. 11 of the WFD. For some “difficult” materials, the targets are below 50% w.w., but given the current situation the proposed targets are considered difficult but more realistic.</p> <p>As explained above, the lack of data regarding waste composition, does not allow for specific targets on packaging paper, packaging glass etc., at least not for the time being.</p>
<i>-Amount of total recycled plastic, as a percentage of total plastic produced, % w.w.</i>							-	40	
<i>-Amount of total recycled metals, as a percentage of total metals produced, % w.w.</i>							-	65	
<i>-Amount of total recycled glass, as a percentage of total glass produced, % w.w.</i>							-	45	
<i>-Amount of total recycled paper, as a percentage of total paper produced, % w.w.</i>							-	45	

⁴ As defined in Article 3 of the WFD



Goals	Targets set in Kosovo Strategy						Proposed Targets		
	Percentage/ year						Percentage/ year		Comments
	2010	2013	2016	2020	2021	2022	2020	2024	
<p>Amount of source separation of biowaste (kitchen waste, garden waste), as a percentage of total amount of biowaste produced, % w.w.</p>							-	10	<p>In the Strategy, there have been targets for recycling of 5% of kitchen waste until 2021 (currently 0%) in the urban zones, recycling of 20% of kitchen waste in rural areas until 2021 (currently 1%) and recycling of 50% of market waste until 2021 (currently 0.05%). The targets refer to Prizren, but we assume that they apply nationwide.</p> <p>In order to set such specific targets for urban and rural areas and for different categories of biowaste (kitchen waste, market waste, etc), more data are necessary for the production of each stream and for the area in question (urban and rural).</p> <p>Therefore, a more generic and realistic target is set.</p>



5 LOCATION SELECTION FOR WASTE MANAGEMENT INFRASTRUCTURE PROJECTS

Waste management is a complex process which implies a control of the entire waste management system (from waste generation, through collection and transportation of waste, to waste treatment and disposal), along with the support of legislation and appropriate institutional organization. An important step for the selection of locations for waste management infrastructure is to define selection criteria.

In general there are two groups of criteria. The first group includes the so-called **exclusion criteria** that are used in the first phase of the site selection process. Exclusion criteria are defined relative to the specific situation and they represent restriction criteria.

The second group of criteria is the **site selection criteria**, which are used in the second phase of the site selection process. In that phase and in cooperation with local institutions and experts, certain number of sites is nominated for which a multi-criteria evaluation is carried out. In this context, criteria based on which each candidate site will be evaluated in the same way are defined (geological/hydro-geological/geotechnical, environmental, physical planning, technical & operational, financial and social criteria).

5.1 Exclusion criteria for waste management infrastructure site selection

The exclusion criteria reflect minimum acceptable sitting practices and are intended to be applied as minimum standards that must be met by all solid waste management facilities.

Taking into consideration the Administrative Instruction No.01/2009 on “CONDITIONS FOR SELECTING THE LOCATION OF THE WASTE STORAGE CONSTRUCTION” and the criteria for selecting the location of waste storage construction (Article 8), the exclusion criteria are:

Table 4: Exclusion criteria for selecting locations for waste management infrastructure

Id	Exclusion Criteria	Distance of Exclusion Areas
EC1	Outside of the potential zones of flooding	Outside
EC2	Minimum distance from river beds and lake embankments	>1000m
EC3	Outside of the zones with high seismic dangerous scale	Outside
EC4	Outside of areas where erosion exists and where doesn't exist the location stability and there's possibility of harmful and negative impacts in case of the accident	Outside
EC5	Outside of water-supply zone	Outside
EC6	Minimum distance from water-supply	>2000m



Id	Exclusion Criteria	Distance of Exclusion Areas
EC7	Outside of protected areas and areas of increased ecological significance	Outside
EC8	Minimum distance from the closest settlement with concentrated development or residential zones of urban settlements and from the legal individual inhabitant houses outside settlements	>500m
EC9	Minimum distance from the zone of historical monuments, cultural and religious	>600m
EC10	Minimum distance from hospitals	>2000m
EC11	Minimum distance from each type of the airport	>4000m
EC12	Minimum distance from railway	>50m
EC13	Minimum distance from the pipes of gas - supply	>60m

5.2 Site selection criteria for waste management infrastructure

The location of a waste treatment / disposal facility affects all environmental media (soil, water and air). Also the neighbouring areas are affected, due to the nature of the developed activity.

The selection criteria for the sitting of the waste management infrastructure, and especially disposal sites (landfills) and treatment plants, should include all relevant parameters (technical, environmental, social) that are connected with their operation, in order to minimize the possibility of the system to fail.

In order to assess alternative locations for waste management infrastructure, it is not enough to evaluate against one critical parameter, but it is necessary to evaluate against set of specific criteria (**multi-criteria analysis**). These criteria, as well as their relevant significance are the same for all locations the selection of the criteria is as much important as the conclusions they may result in.

Six basic groups of criteria have been introduced; each group contains a number of sub criteria:

- ✓ SC1: Geological / Hydro-geological / Geotechnical Criteria
- ✓ SC2: Environmental Criteria
- ✓ SC3: Physical Planning Criteria
- ✓ SC4: Technical & Operational Criteria
- ✓ SC5: Financial Criteria
- ✓ SC6: Social Criteria



The proposed ranking of weighting factors for the six main categories of site selection criteria presented in the next Table.

Table 5: Proposed ranking for the six main categories of site selection criteria for waste management infrastructures

Main Categories of Site Selection Criteria	Proposed Ranking
SC1: GEOLOGICAL / HYDRO-GEOLOGICAL / GEOTECHNICAL CRITERIA	20%
SC2: ENVIRONMENTAL CRITERIA	20%
SC3: PHYSICAL PLANNING CRITERIA	20%
SC4: TECHNICAL & OPERATIONAL CRITERIA	15%
SC5: FINANCIAL CRITERIA	15%
SC6: SOCIAL CRITERIA	10%



6 OPTION ANALYSIS

6.1 Waste prevention

A waste prevention program should not be a mere list of top-down measures prescribed by the national government but a plan which integrates the interests and concerns of interested and affected parties (stakeholders) based on a commitment to carry on the programme. As at the moment there are no provisions in Kosovo regarding waste prevention, it is advisable to start actions for introducing waste prevention in the biggest cities (Municipalities) in the country, i.e. Pristina, Prizren, Peja, Ferizaj, Mitrovica, Gjilan and Gjakovë and to prepare a sound program / plan to serve these actions with a time horizon of at least 5 years. In parallel, a National Plan regarding Waste Prevention should be developed.

Having in mind the current situation in Waste Management in the country; a practical answer shall be given to the following: *“What Kosovo has to expect from a Waste Prevention Program?”*. Avoidance of waste landfilling is a reasonable answer and a very important reason to attempt implementing a prevention program, with multiple benefits for the entire waste management cycle (collection, transportation, lifetime of landfills etc). This is in accordance with the vision that has been adopted in the National Strategy, i.e. *“Vision for the waste management in the Republic of Kosovo is based on the concept – creating less waste for disposal”*.

Taking into consideration that the priority of the Municipalities in Kosovo is first to collect the waste generated in their territory (coverage of both urban and rural areas), as well as to develop the necessary basic waste management infrastructure, it is premature and pointless to implement at this point strict measures and tariffs in order to prevent waste generation. In this respect and in order to start changing the citizens mentality towards waste generation, **well organized and targeted waste prevention campaigns should be firstly planned and then implemented.**

The following Table tabulates the proposed actions.

Table 6: Proposed Actions on waste prevention

Actions	Target material	Target group	Promotion measures (indicative)
Home composting	Food and garden waste	Municipal level individual houses or housing complexes	Subsidize the purchase of bins
Community composting	Food and garden waste	Houses, neighbourhoods, public green spaces and gardens	Create a web site
Promote the return and reuse of Packaging Products	Packaging waste	Consumers, super markets, restaurants, hotels	Information campaigns
Promotion of reduction in the use of single-use plastic bags	Plastic and paper	Consumers, retailers (markets, shops, supermarkets)	Free distribution of reusable bags



6.2 Waste collection and transport

It is considered of prior importance that the selected options for each waste management stage are in line with the needs and restriction of the upstream / downstream activities. In other words, **waste treatment technology depends on the collection scheme** that will be selected.

The detailed waste management strategy proposed for Kosovo stipulates the achievement of the following targets for waste collection:

- Connection rate with sanitation services of 90% in 2020 and 100% in 2024;
- Separate collection of waste reaching 50% in 2020;
- Separate collection of biodegradable waste reaching approximately 10% at national level;
- Modernization of waste collection systems and of waste transport systems.

In addition to that, for the purposes of the present Master Plan, it is considered that, by 2024, 100% of waste will be collected.

The following Table indicates the municipal solid waste quantities that need to be collected in Kosovo in the two target years (2020 and 2024).

Table 7: Design quantities of generated municipal solid waste (tn/year)

Source	2020			2024		
	Urban areas	Rural areas	Total	Urban areas	Rural areas	Total
Zone 1 - Pristina	91,562	23,839	115,401	101,929	36,805	138,734
Zone 2 – Peje	25,838	18,263	44,101	28,763	23,254	52,018
Zone 3 – Mitrovica	40,621	13,367	53,988	45,220	19,441	64,662
Zone 4 – Prizren	50,935	29,969	80,904	56,702	39,111	95,813
Zone 5 – Gjilan	26,720	13,343	40,063	29,745	17,864	47,609
Zone 6 – Ferizaj	24,980	14,039	39,019	27,807	18,447	46,254
Zone 7 – Gjakova	16,486	5,479	21,965	18,352	7,951	26,303
Total Country	277,142	118,299	395,441	308,518	162,875	471,393

The analysis of the technical options for waste collection has been carried out from a qualitative point of view based on the current situation in the country, the objectives and targets which have to be reached, taking into account the existing technical documents at European level. The qualitative analysis of the technical options for collection (mixed and separate) has been carried out by quantifying the performance of each option having in view the following criteria:

- financial;
- environment protection;
- social acceptance;
- compliance with the legislation in force.



6.2.1 Residual waste collection

Considering the current situation in Kosovo, the proposed option consists of:

- Collection based on a door-to-door system for the individual households in urban areas and in rural areas, where this system is already implemented;
- Collection through bring systems using collection points mainly with 1,1 m³ containers for the area of blocks of flats, both in the urban areas and in rural areas in the areas with a difficult access.

The containers shall be placed so that a container is used by maximum 125 inhabitants.

The next Table imprints bin demands for residual waste collection for the two target years.

Table 8: Bin demands for residual waste collection

Source	2020			2024		
	Urban areas individual houses (no. of 120 lt bins)	Urban areas blocks of flats (no. of 1,1m ³ containers)	Rural areas (no. of 120 lt bins)	Urban areas individual houses (no. of 120 lt bins)	Urban areas blocks of flats (no. of 1,1m ³ containers)	Rural areas (no. of 120 lt bins)
Zone 1 - Pristina	14,439	1,507	38,092	15,361	1,604	37,345
Zone 2 – Peje	4,075	426	24,068	4,335	453	23,596
Zone 3 – Mitrovica	6,406	670	20,122	6,815	712	19,727
Zone 4 – Prizren	8,032	839	40,479	8,545	892	39,685
Zone 5 – Gjilan	4,214	440	18,489	4,483	468	18,126
Zone 6 – Ferizaj	3,939	412	19,092	4,191	438	18,718
Zone 7 – Gjakova	2,600	272	8,229	2,766	289	8,068
Total Country	43,705	4,566	168,571	46,496	4,856	165,265

6.2.2 Recyclable waste collection

As a conclusion of the performed analysis, the best option is the collection through bring system through street collection points, mainly due to the economic advantages. Regarding the number of fractions for the separate collection of recyclable waste, there are the following options:

1. Collection per four or several fractions: glass waste – per separate colours or mixed, paper and cardboard waste, plastic waste, metal waste;
2. Collection per three fractions: glass waste, paper / cardboard waste and plastic waste together with metal waste;
3. Collection per 2 fractions: glass waste and paper and cardboard waste together with plastic waste and metal waste;
4. Collection of recyclable waste in a single container (one fraction).



It is obvious that from an economic point of view, the best option is the last one, where all recyclable waste is collected in a single container. However, this option does not ensure the technical quality requirements for the materials to be recycled and, thus, it cannot ensure the achievement of the recycling targets. Furthermore, the mixed collection of glass waste with other types of waste causes problems during the operation of the sorting plants, both from the point of view of health and safety, as well as the lifetime of the conveyor belt.

The proposed option for the collection of recyclable waste within the country, consists in the collection of waste through bring systems through collection points. The collection shall be carried out per two fractions: glass waste and paper/cardboard together with plastic and metal waste. Due to the low quantities of glass waste resulting from rural area and taking into account the operation costs, it is proposed that first to implement the separate collection of glass in a small scale with 3-10 containers for glass collection in each of the rural communes.

The collection points for recyclable waste shall be placed as follows:

- One collection point for every 240 inhabitants in the area of individual households in urban areas;
- One collection point for every 125 inhabitants in the area with apartment buildings in urban areas;
- One collection point for every 300 inhabitants in rural areas.

Table 9: Bin demands for recyclables waste collection

Source	2020			2024		
	Urban areas individual houses (number of containers)	Urban areas blocks of flats (number of containers)	Rural areas (number of containers)	Urban areas individual houses (number of containers)	Urban areas blocks of flats (number of containers)	Rural areas (number of containers)
Zone 1 - Pristina	313	1,507	813	333	1,604	797
Zone 2 - Peje	89	426	514	94	453	504
Zone 3 - Mitrovica	140	670	430	148	712	421
Zone 4 - Prizren	175	839	864	186	892	847
Zone 5 - Gjilan	92	440	395	98	468	387
Zone 6 - Ferizaj	86	412	408	91	438	400
Zone 7 - Gjakova	57	272	176	60	289	173
Total Country	952	4,566	3,600	1,010	4,856	3,529



Table 10: Bin demands for glass waste collection

Source	2020			2024		
	Urban areas individual houses (number of containers)	Urban areas blocks of flats (number of containers)	Rural areas (number of containers)	Urban areas individual houses (number of containers)	Urban areas blocks of flats (number of containers)	Rural areas (number of containers)
Zone 1 - Pristina	19	48	28	31	76	28
Zone 2 - Peje	6	14	18	9	22	18
Zone 3 - Mitrovica	9	22	16	14	34	16
Zone 4 - Prizren	11	27	30	17	42	30
Zone 5 - Gjilan	6	14	14	9	23	14
Zone 6 - Ferizaj	6	13	14	9	21	14
Zone 7 - Gjakova	4	9	6	6	14	6
Total Country	61	147	126	95	232	126

6.2.3 Biodegradable waste collection

The proposed option for separate collection of biodegradable waste refers to bring systems using 1,1m³ containers. It is expected for the majority of waste to derive from major biodegradable waste producers namely restaurant, public markets, hotels, etc.

Table 11: Bin demands for biodegradable waste collection

Source	2020		2024	
	Urban areas (number of containers)	Rural areas (number of containers)	Urban areas (number of containers)	Rural areas (number of containers)
Zone 1 - Pristina	105	79	179	119
Zone 2 - Peje	31	50	51	75
Zone 3 - Mitrovica	48	42	80	63
Zone 4 - Prizren	59	83	100	126
Zone 5 - Gjilan	31	38	53	58
Zone 6 - Ferizaj	30	40	49	60
Zone 7 - Gjakova	20	17	33	26
Total Country	324	349	545	527

6.2.4 Need for additional bins

The following Table presents the total number of bins that are necessary in each waste management zone, in order to implement the waste collection system proposed, as well as the additional number of bins that need to be acquired in order to implement the system, provided that a significant number of bins already exist.

Table 12: Bin demands for waste collection ⁵

	2020									
	Needed capacity			Available capacity				Additional capacity needed		
	120 L	1100 L	1500 L	120 L	240 L	1100 L	Other	120 L	1100 L	1500 L
Zone 1 - Pristina	52,531	4,324	30	2,040	30	1,614	600	50,461	2,710	0
Zone 2 – Peje	28,143	1,537	13	3,900		210	9	24,243	1,327	4
Zone 3 – Mitrovica	26,528	2,000	15			398	68	26,528	1,602	0
Zone 4 – Prizren	48,511	2,862	20	180		420		48,331	2,442	20
Zone 5 – Gjilan	22,703	1,438	10		2,700	330		20,003	1,108	10
Zone 6 – Ferizaj	23,031	1,388	10	3,055	660	215	5	19,316	1,173	5
Zone 7 – Gjakova	10,829	814	7			138	28	10,829	676	0
Total Country	212,276	14,363	105	9,175	3,390	3,325	170	199,711	11,038	39
	2024									
	Needed capacity			Available capacity			Additional capacity needed			
	120 L	1100 L	1500 L	120 L	1100 L	1500 L	120 L	1100 L	1500 L	
Zone 1 - Pristina	52,706	4,636	66	52,531	4,324	50	175	312	16	
Zone 2 – Peje	27,931	1,633	25	28,143	1,537	13	0	96	12	
Zone 3 – Mitrovica	26,542	2,135	31	26,528	2,000	57	14	135	0	
Zone 4 – Prizren	48,230	3,048	45	48,511	2,862	20		186	25	
Zone 5 – Gjilan	22,609	1,534	23	22,703	1,438	10		96	13	
Zone 6 – Ferizaj	22,909	1,479	23	23,031	1,388	10		91	13	
Zone 7 – Gjakova	10,834	870	13	10,829	814	23	5	56	0	
Total Country	211,761	15,335	226	212,276	14,363	183	194	972	79	

⁵ it is noted that it is considered that 40% of the available bins will become obsolete due to damage or expiration of lifetime



6.2.5 Transport needs

6.2.5.1 Truck demands

Taking into account the existing situation in relation to trucks availability it is proposed to use the following types of trucks:

- 16m³ trucks in Pristina city in urban areas with multistory buildings for residual waste collection and recyclables
- 12m³ trucks in the rest urban areas with multistory buildings for residual waste collection and recyclables
- 5m³ trucks for urban areas with single houses and for rural areas for residual waste collection organic waste and recyclables
- Open trucks 10m³ equipped with crane for the glass fraction in case bell containers are used for glass collection

The vehicle selection was made considering the best available option combining capital and functional cost, daily and future collection needs, transfer stations / waste management facilities accessibility, manoeuvrability.

The following Table presents the number of trucks needed for each waste management zone for waste transport. The analytical calculations are presented in Annex I CHAPTER 5. It is noted that in the areas where waste collection frequency is 3 times per week it is assumed that the same truck will be used for both residual waste collection and recyclable/biodegradable waste collection (on different days). Also in the rural areas, where waste collection occurs once per week, it is considered that the trucks serving the urban areas will also be used.



Table 13: Truck needs for waste collection

Source	2020				2024			
	Number of 16 m ³ compaction trucks	Number of 12 m ³ compaction trucks	Number of 5 m ³ compaction trucks	Number of 10 m ³ trucks	Number of 16 m ³ compaction trucks	Number of 12 m ³ compaction trucks	Number of 5 m ³ compaction trucks	Number of 10 m ³ trucks
Zone 1 - Pristina	9	5	67	3	11	5	68	4
Zone 2 – Peje		5	42	1		5	42	2
Zone 3 – Mitrovica		8	36	2		8	36	2
Zone 4 – Prizren		10	71	2		11	70	3
Zone 5 – Gjilan		5	33	1		5	33	1
Zone 6 – Ferizaj		5	34	1		5	34	1
Zone 7 – Gjakova		4	14	1		4	15	1
Total Country	9	42	297	11	11	43	298	14



6.2.5.2 Need for additional trucks

The following Table presents the total number of trucks that are necessary in each waste management zone, in order to implement the waste collection system proposed as well as the additional number of trucks that need to be acquired in order to implement the system, provided that a significant number of trucks already exist. It is noted that it is considered that 10% of the available trucks will become obsolete due to damage or expiration of lifetime.

Table 14: Truck demands for waste collection

Source	2020			2024		
	Needed capacity (m ³)	Available capacity (m ³)	Additional capacity needed (m ³)	Needed capacity (m ³)	Available capacity (m ³)	Additional capacity needed (m ³)
Zone 1 - Pristina	559	288	271	606	559	47
Zone 2 - Peje	285	89	196	285	285	0
Zone 3 - Mitrovica	296	36	260	291	296	0
Zone 4 - Prizren	495	277	218	507	495	12
Zone 5 - Gjilan	235	0	235	240	235	5
Zone 6 - Ferizaj	240	36	204	245	240	5
Zone 7 - Gjakova	133	0	133	133	133	0
Total Country	2,243	726	1,517	2,307	2,233	69

The next Table presents an indicative proposal of the type of trucks to be acquired in each zone, based also on the available equipment for 2020.

Table 15: Truck demands for waste collection

	16 m ³	12 m ³	5 m ³	10 m ³
Zone 1 - Pristina	5	3	29	1
Zone 2 - Peje		3	30	1
Zone 3 - Mitrovica		5	36	2
Zone 4 - Prizren		4	32	1
Zone 5 - Gjilan		5	33	1
Zone 6 - Ferizaj		2	34	1
Zone 7 - Gjakova		4	15	1
Total Country	5	26	209	8

In 2024, the additional needs are minimum (2 trucks 16m³, 1 truck 12m³ and 5 trucks 5m³) corresponding to 69 m³.



6.3 Civic Amenity Sites (CAS)

Civic Amenity sites are facilities where the public can bring and discard various types of bulky household waste, domestic hazardous waste as well as recyclable materials.

Unlike Bring-In Sites, where only paper, plastic, metal and glass can be delivered, Civic Amenity sites also cater for the disposal of:

- Furniture, mattresses, carpets and clothing
- White goods such as fridges, cookers and microwaves
- Electronics such as computers, monitors, mobile phones, printers, electronic toys and tools
- Garden waste
- Edible oil and lubricant oils
- Batteries, spent bulbs and neon tubes
- Expired medicines and used syringes
- Solvents, chemicals, paint and other hazardous waste
- Small quantities of household construction waste such as stone and tiles
- Tyres

The waste collected at these sites is either exported overseas for treatment, treated locally, re-used for other purposes or recycled. In fact the purpose of these centres is to optimise the collection of certain types of waste and increase the recovery of secondary materials.

The social contribution of the network of CAS is important and creates the basis for radical changes over time.

The establishment of CAS whenever this is desirable from the local authorities should be encouraged all over Kosovo

6.4 Transfer stations

There are three transfer stations (Ferizaj, Gjakova and Drenas) in Kosovo. Although waste transfer stations help reduce the impacts of trucks travelling to and from disposal sites, they can cause an increase in traffic in the immediate area where they are located. If not properly sited, designed and operated they can cause problems for residents living near them. Cost effectiveness also varies: transfer stations generally become economically viable when the hauling distance to the disposal facility is greater than 25-35 km. ⁶

In the present Master Plan the transfer station network is considered sufficient regarding the siting. The two out of the three transfer stations urgently need upgrading. The next Table tabulates the recommendations for each transfer station in Kosovo.

⁶ Waste Transfer Stations: A manual for decision making, US EPA

**Table 16: Recommendations for the existing transfer stations**

TS	Recommendations	Short description of works
Ferizaj	Upgrading, environmental monitoring	<ul style="list-style-type: none"> • Environmental Monitoring system • New TS equipment supply (hopper / bulldozer / loader/press containers) • Repair current facilities (fence, gate, leachate collection etc) • Construction of infrastructure for the management of special waste streams (hazardous, bulky etc) • New digital weighbridge
Gjakova	Upgrading, environmental monitoring	<ul style="list-style-type: none"> • Environmental Monitoring system • New TS equipment supply (hopper / bulldozer / loader/press containers) • Repair current facilities (fence, leachate collection access road etc) • Construction of infrastructure for the management of special waste streams (hazardous, slaughterhouse etc) • New digital weighbridge • Departure of scavengers from site – compensation
Drenas	Upgrading, environmental monitoring	<ul style="list-style-type: none"> • Environmental Monitoring system • New TS equipment supply: hopper / press containers • Establishment of infrastructure • electricity, water supply • road construction



6.5 Waste recycling and treatment

The design of a waste recycling and treatment scheme depends heavily upon the targets to be fulfilled by the country within the legislative framework and the current situation that exist. In order to meet the targets, the following obligations emerge:

- The need for the establishment of a separate collection scheme for “dry” recyclables: paper, glass, metals and plastic;
- The need for the establishment of a separate collection scheme for biowaste, namely kitchen waste, garden waste and waste from markets;
- The need for the treatment of waste the various collected streams, before landfilling.

The selection of the appropriate waste recycling and treatment scheme was made by using the “**WASTE-C-CONTROL**” Tool. The WASTE-C-CONTROL software tool assists decision-makers to design and evaluate different integrated waste management systems, from the level of waste generation up to the level of waste treatment and disposal, on the basis of overall **Greenhouse Gas (GHG) emissions and cost**. In addition, the evaluation is extended also to ancillary environmental impacts, such as generation of air pollutants. The tool has two objective functions: a) the Net Present Value of the system over the 20-year horizon (monetary objective or criterion) and b) the CO₂-equivalent emissions (environmental objective or criterion).⁷

The model on which the Tool is based, is developed as a multi-objective mathematical programming model. As the name suggests, multi-objective optimization (or multi-criteria optimization) involves optimisation in the presence of more than one (usually conflicting) objective functions (criteria). The main difference between single and multi-objective optimization is that in the case of the latter, there is usually no single optimal solution, *but a set of equally good alternatives with different trade-offs*, also known as Pareto-optimal (or non-dominated or efficient) solutions.

Two scenarios have been developed for each zone:

Scenario 1: Three-bin collection system: This system includes three bins: one bin for metals, glass, paper and plastics, one bin for biowastes and one bin for the rest waste. The technological options for the treatment of these streams are:

- ✓ **Material Recycling Facilities.** The options examined include three types of MRF: low mechanical intensity and more hand-picking operations, medium mechanical intensity and high mechanical intensity
- ✓ **Biological Treatment Facilities.** The options examined include two families of processes that are further divided into 5 types of options:
 - Family 1 - Composting Systems:
 - Open Composting system (open windrow composting)

⁷ the WASTE-C-CONTROL Tool (<http://www.epem.gr/waste-c-control>) was developed under the EU LIFE Program “Waste Management Options for Greenhouse Gases Emissions Control” LIFE09 ENV/GR/000294



- Composting in covered windrows
- Tunnel Composting
- Composting in boxes
- Composting in closed halls (bays)
- Family 2 – Anaerobic Digestion Systems
 - Dry Anaerobic Digestion (AD) followed by open air windrow composting
 - Dry AD followed by covered windrows composting
 - Wet AD followed by open air windrow composting
 - Wet AD followed by covered windrow composting
 - Complete Dry AD, or Dry Fermentation
- ✓ **Mechanical Biological Treatment Facilities:** the rest waste that is collected in the mixed waste bin will be treated in an MBT. *This option is only examined for the Pristina waste zone, where waste production is higher.* The options included in the analysis comprise of 18 different types of MBT configurations.

Scenario 2: Four-bin collection system: This system includes four bins: one bin for metals, glass, paper and plastics (comingled recyclables bin), one bin for biowastes and one bin for the rest waste, while the additional bin is for the separate collection of glass. Even though some glass can still be found in the “comingled recyclables bin”, most of its quantity will be found in a dedicated bin, increasing its purity and therefore its after-sales value.

The technological options for the treatment of these streams are as described in Scenario 1, since the glass collected in the “glass-bin” will be simply stored in the MRF and does not require further processing.

The two scenarios as presented above, where applied for each zone in Kosovo, with the use of the Waste-C-Control Tool and the Pareto curves where created for each scenario, per zone.

The necessary infrastructure per zone is presented in the following Table:

Table 17: Necessary Infrastructure and Capacity, per zone

Type of investment	Capacity, tons for 2024						
	Zone 1 - Pristina	Zone 2 - Peje	Zone 3 - Mitrovica	Zone 4- Prizren	Zone 5 - Gjilan	Zone 6 - Ferizaj	Zone 7 - Gjakova
Material Recycling Facility	25,000	9,200	11,800 (3,200 tons in N. Mitrovica & 8,600 tons in S. Mitrovica)	16,200	8,500	8,200	5,000
Composting plant (open windrows)	-	2,700	3,600 (1,100 tons in N. Mitrovica & 2,500 tons in S. Mitrovica)	5,000	2,500	2,500	1,000
Anaerobic Digestion plant	7,500	-	-	-	-	-	-
Mechanical Biological Treatment Plant	110,000	-	-	-	-	-	-



Type of investment	Capacity, tons for 2024						
	Zone 1 - Pristina	Zone 2 - Peje	Zone 3 - Mitrovica	Zone 4- Prizren	Zone 5 - Gjilan	Zone 6 - Ferizaj	Zone 7 - Gjakova
Landfills	58,604	44,536	54,963 (14,873 tons in N. Mitrovica & 40,090 tons in S. Mitrovica)	82,455	40,692	39,516	22,586

6.5.1 Recycling and other products per zone based on Model results

The achieved recycling rates (from the recovery of materials in MRFs and in the MBT of Pristina), are presented below:

Table 18: Achieved recycling rates, per zone

	Pristina	Ferija	Gjakova	N. Mitrov.	Peje	S. Mitrov.	Gjilan	Prizren	TOTAL
Paper	52%	43%	43%	43%	43%	43%	43%	43%	45,7%
Glass	56%	48%	48%	48%	48%	48%	48%	48%	50,4%
Metal	83%	61%	61%	61%	61%	61%	61%	61%	67,3%
Plastic	62%	35%	35%	35%	35%	35%	35%	35%	42,9%

The production of compost, CLO and energy per zone are presented in the next Table:

Table 19: production of compost/CLO and energy, per zone

	Ferija	Gjakova	North Mit	South Mit	Peje	Gjilan	Prizren	Pristina	TOTAL
Compost	1,327	531	584	1,327	1,433	1,327	2,655	3,267	12,452
CLO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14,428	14,428
Energy from biogas, MWh/y	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17,284	17,284

6.6 Disposal – Sanitary landfills

In Kosovo there are currently 7 landfills. The major conclusion is that all the landfills urgently need upgrading and in some cases expansion. The next Table tabulates the recommendations for each landfill in the country.

**Table 20: Recommendations for the existing landfills**

Landfill	Recommendations	Short description of works
Pristina	Expansion, upgrading, leachate treatment, biogas management, environmental monitoring	<ul style="list-style-type: none"> • Sealing and preparation of new landfill cell above current waste volume • Removal of leachate lake • Infrastructure for leachate management • Infrastructure for landfill gas management • Environmental Monitoring system • New landfill equipment supply (Compactor / bulldozer / loader) • Repair current facilities (fence, road, etc.) and construct new necessary ones (administrative building, tire laundry, etc.) • Construction of infrastructure for the management of special waste streams (hazardous, slaughterhouse etc.) • New/additional weighbridge
Gjilan	Upgrading, leachate treatment, biogas management, environmental monitoring	<ul style="list-style-type: none"> • Infrastructure for leachate treatment • Infrastructure for landfill gas management (even passive aeration) • Environmental monitoring system • Repair current facilities (fence, road, etc.) and construct new necessary ones (administrative building, tire laundry, etc.) • New landfill equipment supply (Compactor / bulldozer / loader) • Departure of scavengers from site – compensation • New digital weighbridge • Visual isolation
Prizren	Expansion of the landfill to the adjacent area is the only available solution in the near future. Upgrading, leachate treatment, biogas management, environmental monitoring	<ul style="list-style-type: none"> • Infrastructure for leachate treatment • Infrastructure for landfill gas management (even passive aeration) • Environmental monitoring system • Construct support facilities (administrative building, tire laundry, etc.) • New landfill equipment supply (Compactor / bulldozer / loader) • Departure of scavengers from site – compensation • New digital weighbridge • Visual isolation • Study for the potential of expansion



Landfill	Recommendations	Short description of works
Podujevo	Upgrading, leachate treatment, biogas management, environmental monitoring, connection to the electricity grid	<ul style="list-style-type: none"> • Infrastructure for leachate treatment (they do currently recirculation) • Infrastructure for landfill gas management (even passive aeration) • Environmental monitoring system • Construct support facilities (administrative building, tire laundry, etc.) • New landfill equipment supply (Compactor / bulldozer / loader) • New digital weighbridge • Other construction works(according specific needs)
Dragash	The waste that was placed in the unlined area should be removed. The area should be lined and the operation should be continued in the entire basin. leachate treatment, biogas management, environmental monitoring.	<ul style="list-style-type: none"> • Expansion of the landfill in the available area • Closure and rehabilitation of current cell • Infrastructure for leachate management • Biogas management system • Environmental Monitoring system • Landfill equipment (Compactor / bulldozer / loader) • Weighbridge • Other construction works(according specific needs)
South Mitrovica	Upgrading, leachate treatment, biogas management, environmental monitoring.	<ul style="list-style-type: none"> • Sealing and preparation of new landfill cell above current waste volume • Infrastructure for leachate management • Biogas management system • Environmental Monitoring system • New landfill equipment (Compactor / bulldozer / loader) • New digital weighbridge • Other construction works (according specific needs)
Peja	There is an urgent need for expansion. As the configuration of a new cell has been initiated, the finalization of the new cell is crucial for the region. In any case the new cell should be served by a leachate treatment facility which also will serve the old landfill.	<ul style="list-style-type: none"> • Construction of the lining system in the new cell of Peja Landfill and possible changes in the configuration in order to maximize the life time of the new cell • Infrastructure for leachate management • Biogas management system • Environmental Monitoring system • New landfill equipment supply (Compactor / bulldozer / loader) • New digital weighbridge • Other construction works (according specific needs)



7 FINANCIAL AND ECONOMIC ANALYSIS

For the proposed projects (as presented in Chapter 6) the followings have been conducted:

- ✓ Financial and economical analysis
- ✓ Affordability analysis

The financial aspects of the proposed project in terms of the: i) Investment and re-investment costs, ii) Operations and maintenance costs and iii) Revenues from the utilization of secondary products (recyclables, energy, compost), are presented.

The financial net present value (FNPV) for the above is presented together with a Dynamic Prime Cost (DPC). Please note that all costs reported are based on constant prices of 2014 and the NPV is based on 5% discount factor. The DPC is calculated on waste billed, namely on waste generated from households and economic operators, which pay the fees. It is assumed that 10% of the waste generated is not billed as they are generated in parks, markets, streets etc.

Following the economic analysis of the system is presented, namely the calculation of the economic net present value, which takes into account the externalities which lead to economic, social and environmental costs and benefits, which have not been considered in the financial analysis as they are no revenue or expenses generators.

The social discount factor is assumed to be 5.5%.

Finally an affordability assessment of the proposed project is presented. It is considered that the system is affordable in case the tariffs imposed to each citizen/household do not exceed 1.5% of the average disposable income.

A sensitivity analysis was also undertaken to assess the impact of investment cost, operational cost and revenue.

An investment cost Table is presented below and includes the temporal profile of the investment and reinvestment costs in constant 2014 prices.



Table 21: Temporal Profile of Investment Costs (constant 2014 prices)

Type of facility	Cost (€ without VAT)	Type of facility	Cost (€ without VAT)
Transfer stations	1,144,000	Treatment plants	28,342,503
Ferizaj	737,000	Pristina	28,342,503
Gjakova	407,000		
Sorting plants	28,365,953	Landfills	23,430,000
Pristina	5,351,268	Pristina	9,790,000
Peje	3,320,832	Podujevo	1,210,000
South Mitrovica	3,059,938	Peje	3,850,000
North Mitrovica	2,711,438	South Mitrovica	4,070,000
Prizren	3,715,457	Prizren	1,210,000
Gjilan	3,281,369	Dragash	2,090,000
Ferizaj	3,264,457	Gjilam	1,210,000
Gjakova	3,084,057		
Composting plants	8,200,500	TOTAL	89.482.956
Peje	1,175,900		
South Mitrovica	1,175,900		
North Mitrovica	1,140,700		
Prizren	1,226,500		
Gjilan	1,171,500		
Ferizaj	1,171,500		
Gjakova	1,138,500		



The following Table presents the initial investment cost for each proposed facility–zone.

Table 22: Investment Costs of each facility – zone (€ constant 2014 prices)

Type of investment	Zone 1 - Pristina	Zone 2 - Peje	Zone 3 - Mitrovica	Zone 4 - Prizren	Zone 5 - Gjilan	Zone 6 - Ferizaj	Zone 7 - Gjakova	TOTAL
Collection	8,729,100	5,159,400	6,143,400	8,140,700	5,067,700	4,781,000	2,745,700	40,767,000
Transfer stations	0	0	0	0	0	737,000	407,000	1,144,000
Sorting plants	5,351,268	3,320,832	6,348,514	3,715,457	3,281,369	3,264,457	3,084,057	28,365,953
Composting plants	0	1,175,900	2,316,600	1,226,500	1,171,500	1,171,500	1,138,500	8,200,500
Treatment plants	28,342,503	0	0	0	0	0	0	28,342,503
Landfills	11,000,000	3,850,000	4,070,000	3,300,000	1,210,000	0	0	23,430,000
TOTAL	53,422,871	13,506,132	18,878,514	16,382,657	10,730,569	9,953,957	7,375,257	130,249,956

The temporal profile of the operational and maintenance costs of the proposed project is provided in constant prices in the following Table. The costs are broken down for collection, transfer, sorting, treatment and disposal.

Table 23: Temporal Profile of Operations and Maintenance Costs (constant prices@2014)

Type of investment	Average €/tn in 2018	2018
Collection	33.11	14,018,966
Transfer stations	16.36	930,800
Sorting plants	73.13	6,135,282
Composting plants	116.99	2,023,910
Treatment plants	22.03	2,588,570
Landfills	31.37	9,265,635
TOTAL	82.58	34,963,163

The next Table provides the temporal profile of the revenues of the proposed project in constant prices. Revenues are broken down for recyclables, compost and energy.

Table 24: Temporal Profile of Revenues (constant prices@2014)

Type of revenue	€/tn or €/MWh	2018
GLASS	10	61,567
PAPER / CARDBOARD	45	846,784
METALS	166	676,309
PLASTIC	65	1,812,897
COMPOST	5	62,260
ENERGY	71	1,232,349
TOTAL	11.08	4,692,166



An estimate of the Net Present Value of the overall investments and operations and maintenance costs is provided in the following Table. Also the revenues and net project costs are presented.

Table 25: Net Present Value of Total Project Costs (Euro)

Type of Cost / Revenue	FNPV @5% discount rate (€)
INVESTMENT COSTS	
Collection	35,991,387
Transfer stations	1,175,355
Sorting plants	29,138,616
Composting plants	8,567,100
Treatment plants	26,902,344
Landfills	20,713,400
TOTAL INVESTMENT COSTS	122,488,202
OPERATION AND MAINTENANCE COSTS	
Collection	155,773,682
Transfer stations	9,931,078
Sorting plants	69,328,815
Composting plants	21,838,443
Treatment plants	28,014,242
Landfills	105,513,564
TOTAL O&M COSTS	390,399,825
TOTAL PROJECT COSTS	512,888,027
RESIDUAL VALUE	8,904,960
DPC TOTAL GROSS COSTS (NET OF RESIDUAL VALUE)	120.37
DPC of investments (net of residual value)	27.13
DPC of O&M cost	93.24
REVENUES	
Recyclables	36,889,626
Compost	644,431
Energy	12,224,858
TOTAL REVENUES	49,758,914
TOTAL NET PROJECT COSTS	454,224,152
DPC TOTAL NET COSTS	108.48
DPC of investments (net of residual value)	27.13
DPC of net O&M cost	81.36

According to the above, an annual DPC of €120.37 per tonne (in NPV terms @5%) has been estimated for the proposed project considering the total project costs (net of residual value) and the total tonnage of collected municipal waste, In relation to the total net project cost the DPC is estimated at €108.48 per tonne.

The following Table presents the ENPVs of costs and benefits for a social discount rate of 5.5%.

Table 26: ENPV of the system with external costs incorporated

ENPV of Investment costs (€)	- 91,866,152
ENPV of Residual value (€)	6,678,720
ENPV of Operation cost (€)	- 209,665,334
ENPV of Recycling benefits (€)	35,585,410
ENPV of benefits from disposal reduction (€)	39,926,565
ENPV of benefits from leachate management (€)	8,823,737
ENPV of benefits from improved waste services (€)	147,767,573
ENPV of benefits from greenhouse gases reduction (€)	66,887,816
TOTAL	4,138,336

The total ENPV (@ 5.5% social discount rate) of the proposed system is 4,138,336 €.

Especially for the environmental benefits the contribution of each parameter is depicted in the following Figure.

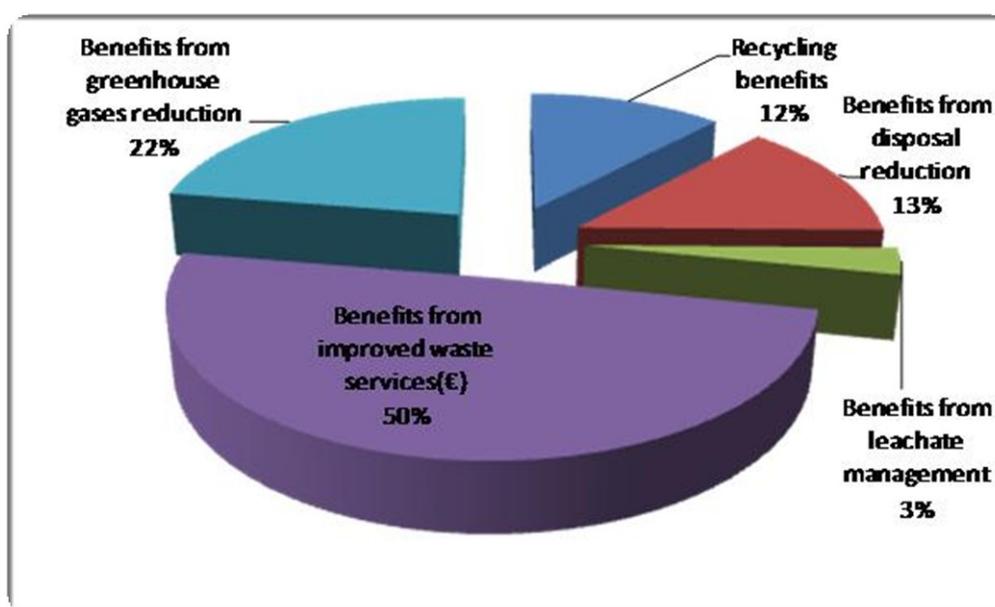


Figure 4: Contribution of each parameter in the environmental benefit



The affordability analysis has concluded that the proposed project would be affordable based on the assumptions used, if other funds are available in order for the project to be viable.

As the analysis reveals, the proposed system cannot ensure the revenues needed in order to cover its operational needs and hence the citizens should pay a certain fee in order for the system to become viable, This fact is valid for all waste management systems, which in principle do not lead to profit via their revenues (i.e., without the contribution of the citizens) but seek to achieve social benefits via environmental protection and improvement of the living conditions of the citizens.

It is noted however, that the fee that needs to be imposed to the citizens is within affordable limits, corresponding to 76.61 €/HH/year in 2014.

The main benefits from the system implementation are presented in the following table.

Table 27: Benefits from the development of the proposed system

Description	Comments
Elimination of improper disposal	The current practice of disposal of mixed waste in improper landfills is totally against basic EU and national standards and requirements and is associated with great environmental risks, The proposed system will eliminate this improper or uncontrolled waste disposal Environmental and socio-political benefit
Increase in recycling / reduction of disposal needs	Recyclables, compost and energy will be utilized preserving raw materials, while waste treatment will reduce disposal needs Financial and Environmental benefit
Increase of biodegradable waste treatment	Biodegradable waste will be treated/utilized, reducing the disposal needs and the respective environmental impacts associated with emissions of greenhouse gases Environmental benefit
Increase in employment	Several job opportunities are developed Social benefit
Country image	Each actions contributing to recycling and sustainable waste management improves the country image towards its citizens and internationally, Socio-political benefit



8 PRIORITY INVESTMENT PLAN

The waste management systems proposed to be developed will be the first stage of a long-term phased investment programme designed to fully comply with the relevant EC Directives.

This first stage will include the priority measures with a positive impact on quality and quantity of the provided services and on environmental protection, and will represent the projects to be developed in the next 10 year period.

The investment programme will take into account in particular:

- ➔ The waste management strategy of the Country which sets the waste management targets to be met in the next ten year period
- ➔ Affordability of the proposed investment for the population.
- ➔ Local implementation capacity
- ➔ Maximising impact in the shortest period

8.1 Prioritization of the measures

The measures are prioritised in a series of steps as follows:

- 1 Prioritisation of measures, which are required for compliance with basic EU requirements and national laws over other measures.
- 2 Prioritisation of those measures which are in concordance with the principal strategic documents (National Waste Strategy and Plan).
- 3 Prioritisation of those measures which can be performed within current local capacity.
- 4 Prioritisation of those measures, which will have maximum impact on targets for improvement of the waste management situation.

The criteria that have been used are:

- Compliance with basic EU requirements
- Concordance with National Strategy
- Local Capacity
- Impact
 - Coverage of the population (10%)
 - Increase in the tonnage of collection (15%)
 - Increase in the tonnage of recycling (20%)
 - Decrease in the tonnage of biodegradable waste (20%)
 - Increase in the tonnage of waste treated (35%)

In order for a waste management system to be able to operate it is critical for the waste collection system to be in place. Therefore, these costs are assumed to be the top priority and are no further examined in the prioritization analysis.



The availability of landfills is also a prerequisite for the system to be implemented. Landfills already exist in all areas, and in several cases, these landfills require expansion or upgrade. In the frame of another project which runs in parallel, funded by the World Bank, the expansion of several (at least 2) landfills is foreseen. Therefore, this Master Plan focuses on the development of other types of facilities (treatment plants, composting plants, sorting plants and transfer stations) rather than landfills which either already exist or will be expanded in the frame of other projects.

Based on the above, the prioritization of the main infrastructure is presented in the following table.

Table 28: Prioritization of basic infrastructure

	Measures	Cost (m€)	Benefit (points)	BCR	
1	Zone 7 - Gjakova: Transfer station	0.41	5	13.00	
2	Zone 6 - Ferizaj: Transfer station	0.74	9	12.07	
3	Zone 7 - Gjakova: composting plant	1.14	11	9.39	
	<i>Zone 6 - Ferizaj: composting plant</i>	<i>1.17</i>	<i>24</i>	<i>20.18</i>	<i>Rejected</i>
4	Zone 5 - Gjilan: composting plant	1.17	24	20.25	
5	Zone 2 - Peje: composting plant	1.18	26	22.52	
6	Zone 4 - Prizren: composting plant	1.23	48	39.29	
	<i>Zone 7 - Gjakova: composting plant + Transfer station</i>	<i>1.55</i>	<i>11</i>	<i>6.92</i>	<i>Rejected</i>
	<i>Zone 6 - Ferizaj: composting plant + Transfer station</i>	<i>1.91</i>	<i>24</i>	<i>12.39</i>	<i>Rejected</i>
	<i>Zone 3 - Mitrovica: composting plant</i>	<i>2.32</i>	<i>32</i>	<i>13.97</i>	<i>Rejected</i>
	<i>Zone 7 - Gjakova: sorting plant</i>	<i>3.08</i>	<i>24</i>	<i>7.71</i>	<i>Rejected</i>
	<i>Zone 6 - Ferizaj: sorting plant</i>	<i>3.26</i>	<i>41</i>	<i>12.42</i>	<i>Rejected</i>
	<i>Zone 5 - Gjilan: sorting plant</i>	<i>3.28</i>	<i>42</i>	<i>12.71</i>	<i>Rejected</i>
	Zone 2 - Peje: sorting plant	3.32	46	13.85	<i>Rejected</i>
	<i>Zone 7 - Gjakova: sorting plant + Transfer station</i>	<i>3.49</i>	<i>24</i>	<i>6.81</i>	<i>Rejected</i>
7	Zone 4 - Prizren: sorting plant	3.72	81	21.86	
	<i>Zone 6 - Ferizaj: sorting plant + Transfer station</i>	<i>4.00</i>	<i>41</i>	<i>10.13</i>	<i>Rejected</i>
	<i>Zone 7 - Gjakova: sorting plant + composting plant</i>	<i>4.22</i>	<i>29</i>	<i>6.90</i>	<i>Rejected</i>
	<i>Zone 6 - Ferizaj: sorting plant + composting plant</i>	<i>4.44</i>	<i>54</i>	<i>12.14</i>	<i>Rejected</i>
	<i>Zone 5 - Gjilan: Total (composting plant + sorting plant)</i>	<i>4.45</i>	<i>55</i>	<i>12.36</i>	<i>Rejected</i>
	<i>Zone 2 - Peje: Total (composting plant + sorting plant)</i>	<i>4.50</i>	<i>60</i>	<i>13.43</i>	<i>Rejected</i>
	<i>Zone 7 - Gjakova: Total (composting plant + sorting plant + Transfer station)</i>	<i>4.63</i>	<i>29</i>	<i>6.29</i>	<i>Rejected</i>



	Measures	Cost (m€)	Benefit (points)	BCR	
8	Zone 4 - Prizren: Total (composting plant + sorting plant)	4.94	108	21.84	
	<i>Zone 6 - Ferizaj: Total (composting plant + sorting plant + Transfer station)</i>	<i>5.17</i>	<i>54</i>	<i>10.41</i>	<i>Rejected</i>
9	Zone 1 - Pristina: sorting plant	5.35	128	23.91	
	<i>Zone 3 - Mitrovica: sorting plant</i>	<i>6.35</i>	<i>57</i>	<i>8.92</i>	<i>Rejected</i>
	<i>Zone 3 - Mitrovica: Total (composting plant + sorting plant)</i>	<i>8.67</i>	<i>76</i>	<i>8.75</i>	<i>Rejected</i>
10	Zone 1 - Pristina: treatment plant	28.34	351	12.37	
11	Zone 1 - Pristina: Total (treatment plant + sorting plant)	33.69	451	13.4	
12	Total project	66.05	834	12.62	

Combinations in italics are seen to have less impact than other less expensive options and are therefore rejected: they are shown here merely for completeness.

This leaves 11 possible combinations of measures, which can be chosen, based on the available funds.

Based on the Zone prioritization, as presented earlier, and the maximisation of the benefit cost ratio (BCR), **four options are highlighted (in bold) where an immediate increase in spending would decrease the average BCR: these are options 2, 8, 9 and 10 above.**

8.2 List of prioritised investment measures

The following table is **the list of priority investments that was presented to the EU Office and MESP in December 2014.** It was considered that even though the sorting plant in Pristina presented higher BCR than the treatment plant, the treatment plant should be developed first, since it would actually be the only facility in Kosovo that would contribute significantly in the targets related to diversion of municipal waste and biodegradable waste from disposal.

Table 29: Waste Management Infrastructure Priority Projects

1. Transfer station in Ferizaj	737,000 €
2. Composting and sorting plant in Prizren	4,941,957 €
3. Treatment plant in Pristina	28,342,503 €
4. Sorting plant in Pristina	5,351,268 €
5. All facilities	66,052,956 €



Following the consultation with MESP (DEP and Working Group on the WMMP) and international donors, for the determination of the 3 priority project to be implemented, the following list consists of the final proposed priority investments:

Table 30: Final List of Proposed Waste Management Infrastructure Priority Projects

1. Upgrade of the Existing Transfer Station and Construction of a Material Recycling Facility and Civic Amenity Site, in Ferizaj
2. Construction of a Material Recycling Facility and a Composting Plant, in Prizren
3. Construction of a Material Recycling Facility, in Peja

8.3 Financing options for addressing prioritized investment measures

Modern and efficient infrastructure and services are a necessary precondition for successful and sustainable economic growth. The “infrastructure gap”, defined as the difference between available resources and the amount of investment required to meet a country’s core infrastructure needs, has a negative impact on economic growth and job creation.

The waste management list of prioritised investments proposed to be developed require financial funding in a form of a long-term phased investment programme that is designed to fully comply with the relevant EC Directives.

Waste sector in Kosovo is in urgent need of expanded and more efficient public infrastructure and services. Nevertheless, the Government has limited financial resources to devote to capital expenditures and expanded public services. As a result the waste infrastructure gap for the prioritised investment measures, estimated 66 million Euros, is large.

In order to bridge the gap between available public resources and the cost of needed infrastructure and services, as well as to ensure that infrastructure and services are delivered as efficiently and cost-effectively as possible, this plan foresees several possible options for financing on the prioritised projects, as well as other waste infrastructure projects. This plan is considering several financing options for priority project including:

Internal/domestic financing options:

- Kosovo Budget
- Municipality bonds
- Public Private Partnership
- EKO Fund – to be established in Kosovo

**External /International Financing options:**

- International Donors and Grants
- International Financial Institutions (World Bank, IFC, EBRD, KfW, IDB etc)
- Municipal Infrastructure Development Facility (MIDF) – established to support infrastructure projects in the Western Balkans with headquarters in Frankfurt.

The realisation of the proposed investments in the waste sector is quite challenging, considering that the Kosovo government is facing an “infrastructure gap”, and the amount of investment required to meet the country’s waste infrastructure needs is very difficult to be secured through the Kosovo Government Budget. Nevertheless, the Government has limited financial resources to devote to capital expenditures and expanded public services. As a result the waste infrastructure gap for the prioritised investment measures, estimated 66 million Euros, is large.

On the other hand the waste sector in Kosovo is in urgent need of expanded and more efficient public infrastructure and services. The lists of prioritised investments proposed to be developed require financial funding in a form of a long-term phased investment programme that is designed to fully comply with the relevant EC Directives.

The best options for filling-in the priority investments need in the waste sector remains to be the European Union assistance via its IPA II component and, alternatively, the Public Private Partnerships.



9 INSTITUTIONAL ANALYSIS

Kosovo, in overall terms, has developed a legislation framework that promotes modern waste management. The **Waste Law** (No.04-L060, of 2012) is, in good extent, harmonized with the EC Waste Framework Directive, regulating issues such as waste management principles, competent authorities, planning documents etc. Likewise, the Ministry of Environment has issued more than 28 Administrative Instructions, which transpose the majority of the EU Directives concerning special waste streams.

The Kosovo institutional framework is also encouraging a contemporary waste management system. The Ministry of Environment is the main stakeholder, setting sector policies and strategies, licensing of service providers and monitoring the waste management situation. Waste collection and waste disposal is provided by service providers (RWCCs and KLMC) on commercial basis. Private operators are also legally allowed to conduct waste collection, waste processing and recycling, including generation of district heating. Despite the modern waste management basis, there are missing elements that give rise to the poor waste management situation.

The “**Strategy of Kosovo on Waste Management for the period 2013–2022**” and the “**Kosovo Waste Management Plan for the period 2013–2017**” are two new documents that are added to the planning apparatus, complying thus with the obligations coming out from the Law on Waste. They define priorities, activities and resources that need to be undertaken on the short and medium term period. Moreover, the Waste Strategy is the first document of its kind to set quantitative objectives with specific timetables for the realization of strategic goals, such as service coverage, source separation, recyclables disposal etc. This indisputably provides one qualitative dimension to the action framework.

In the present Master Plan a number of **recommendations** are proposed:

- ✓ For the advancement of the legislation framework:
 - *Deficient economic regulation for waste services*
 - *Lack of regulation on minimum services standards of waste collection and waste disposal services*
 - *Incomplete provisions, authority and procedures for dumpsites closure and after closure care*
 - *Missing link on polluter pays and extended producer responsibility*
 - *Lack of subsidiary framework for specific waste streams*
 - *Completion of framework for heating generation from waste processing*
 - *Consistency in setting waste management quantifiable objectives*
- ✓ For the missing elements that give rise to the poor waste management situation:
 - *Enhance KEPA and KEPI role in waste management*
 - *Insufficient level of economic regulation in waste sector*
 - *Capacity deficit of municipalities to effectively manage waste system*



- *Governance and accountability issues between RWCCs and Municipalities*
- *Local waste management vis-à-vis regionalization concept*
- *Lack of performance monitoring hinders sustainability*
- *Difficulties with the bill collection and social categories*
- ✓ For issues that have to be addressed regarding policy and planning framework:
 - *Understated priority status of waste sector*
 - *Realistic planning of objectives and targets*
 - *Subsidiary framework shall adopt time frame approach*
 - *Lack of private sector participation on the infrastructure investment budget*
 - *Missing tariffs impact of the investment costs*
 - *Performance improvement of service providers*



10 ACTION PLAN FOR PROJECTS' IMPLEMENTATION

Having set the county targets and objectives, as well as the measures via which these targets will be achieved, an implementation plan (Action Plan) for the proposed interventions is prepared. This plan focuses on the first phase of the project implementation (to be funded readily) and the respective main infrastructure investments, but it also gives an indication of all future activities (infrastructure or light activities) that will need to be implemented.

Kosovo is certainly not unaware of the environmental pollution and solid waste management problems that is facing. Public awareness regarding the need for improvements in environmental quality is growing, and the importance of proper waste management is becoming more widely recognized. This growing awareness is reflected in the number of requests for development assistance or technical cooperation in the field of waste management. However, proper waste management can be achieved only through consideration of its close connection to the state of the society, which is in turn based on the state of its economy and institutions, as well as its history and culture. The simplistic transfer of waste management technologies or the transplanting of waste management systems from industrialized countries, more advanced in environmental pollution abatement issues, may be unproductive.

Kosovo, through the Waste Management Strategy, has set targets for the coming years (2016-2020), which are very ambitious. In Chapter 4 a **new set of targets is proposed**, which are more realistic and take into consideration what has happened up to now and the current situation in the country.

More specifically, by taking into account the WFD, the targets for Kosovo, are proposed to be set with an **extension of four (4) years**, thus for the year 2024, in order to allow for the necessary infrastructure to be constructed and operate. Even so, the new set of targets demands huge efforts and funds, in order to be achieved. The Government of Kosovo has to decide whether it wants to endeavour such an ambitious plan or to redefine even lower targets. In any case, the GoK should not propose individual projects for the reason that in this way it would lose the general targeting of the country regarding waste management, which is to pass from landfilling to recycling and to waste treatment.

The **implementation plan (2015 – 2024)** may be divided into 3 periods:

- **1st period (2015-2016):** maturation of all the priority projects will take place and the raising of public awareness will commence. The Waste Prevention strategy should be developed and certain municipalities should start implementing prevention plans.



- **2nd period (2016-2017):** construction of priority infrastructure projects. Also the main collection and transfer equipment, i.e. collection vehicles and bins, should be acquired. Investments in recycling, treatment and disposal is considered to occur in 2016 and 2017. Public awareness raising campaigns shall continue.
- **3rd period (2018-2024):** operation of the infrastructure projects, closure and rehabilitation of the illegal dumpsites. Update / revision of the Master Plan. Implementation of supplementary investments in order to address the new waste generated quantities (if needed), transportation and treatment equipment, implementation of any required additional investments.

The next Table summarises the necessary actions, which should be made during the 3 periods of the implementation plan (2015 – 2024), for which a clear view of the measures to be implemented is established.



Table 31: Action plan for the period 2015 – 2024

Description of activity	Duration	Current status	Organization responsible	Costs (€, no VAT)	Source of funds	Comments
1st phase: Period 2015 – 2016						
Maturation of priority project 1	December 2015	Master Plan for priority projects	MESP/EU Office Kosovo	-		
Maturation of priority project 2	December 2015	Master Plan for priority projects	MESP/EU Office Kosovo	-		
Maturation of priority project 3	December 2015	Master Plan for priority projects	MESP/EU Office Kosovo	-		
Maturation of the priority projects	December 2016	-	MESP	3,500,000	DONORS / Kosovo Budget	Prefeasibility studies for 2 landfills (Dragash & Gjiljan) are drafted by the World Bank
Strategy on Waste Prevention	December 2016	-	MESP	80,000	Kosovo Budget	
Certain municipalities start waste prevention activities	2016-2017	-	MESP/Municipalities	-	DONORS / Kosovo Budget	The budget depends on the plan
Public awareness raising campaign	Periodically	-	MESP/Municipalities	600,000	DONORS / Kosovo Budget	Promote safe disposal and prevention
2st phase: Period 2016 – 2017						
Construction of WM infrastructure priority project 1 (Ferizaj)	December 2017	-	MESP/EU Office Kosovo	5,250,000	EU FUNDS / DONORS / Kosovo Budget	Upgrade of Transfer Station, and Construction of Material Recovery Facility and Civic Amenity Site
Construction of WM infrastructure priority project 2 (Prizren)	December 2017	-	MESP/EU Office Kosovo	5,300,000	EU FUNDS / DONORS / Kosovo Budget	Construction of Material Recovery Facility and Composting Plant
Construction of WM infrastructure priority project 3 (Peja)	December 2017	-	MESP/EU Office Kosovo	3,500,000	EU FUNDS / DONORS / Kosovo Budget	Construction of Material Recovery Facility



Description of activity	Duration	Current status	Organization responsible	Costs (€, no VAT)	Source of funds	Comments
Acquisition of main equipment for collection (vehicles and bins)		-	MESP/Municipalities	40,767,000	EU FUNDS / DONORS / Kosovo Budget	These are indicative costs. Real costs depend on existing equipment
Public awareness raising campaign	Periodically	-	MESP/Municipalities	500,000	DONORS / Kosovo Budget	Promote safe disposal, recycling and prevention
3rd Phase: 2018 – 2024						
Construction of waste management infrastructures		-	MESP	55,461,496	EU FUNDS / DONORS / Kosovo Budget	Indicative cost
Rehabilitation of dumpsites		N/A	MESP/Municipalities		EU FUNDS / DONORS / Kosovo Budget	The closure of the dumpsites is closely connected to the starting of operation of the new WM infrastructure
Revision of Master plan			MESP	100,000	Kosovo Budget	
Public awareness raising campaign	Periodically	N/A	MESP/Municipalities	400,000	EU FUNDS / DONORS / Kosovo Budget	Promoting an information, awareness-raising and motivation system for the public and all relevant stakeholders