

Waste Management Situation and Perspectives in Bosnia and Herzegovina

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1.	Status quo in the sector	135
1.1.	Institutional set-up in waste management.....	135
1.2.	Legislation.....	137
1.3.	Waste quantities and composition.....	137
1.4.	Financing.....	139
1.5.	Available technologies and existing plants	139
2.	Milestones of development in the waste management sector.....	140
3.	Drivers for the installation of waste treatment facilities	142
4.	Current projects, plans and outlook.....	143
5.	Sources.....	144

1. Status quo in the sector

1.1. Institutional set-up in waste management

In accordance with the General Peace Agreement for Bosnia and Herzegovina (BiH), signed in Dayton on November 21, 1995, BiH consists of two entities: Federation of BiH (FBiH), Republika Srpska (RS). On the basis of an arbitral award passed on March 5th, 1999, the Brcko District (BD) of BiH was formed as third separate administrative unit under exclusive sovereignty of the state.

Development and implementation of the waste management policy in Bosnia and Herzegovina is at the entity level and level of Brcko District (BD). Responsible institutions are:

- Ministry of Environment and Tourism of the Federation of BiH (FBiH),
- Ministry of Physical Planning and Civil Engineering and Ecology of Republic of Srpska,
- Department for Physical Planning and Proprietary Affairs of the Government of Brcko District.

The overall institutional set-up in the field of waste management is shown on Figure 1. The responsibilities of different institutions are shown in Table 1.

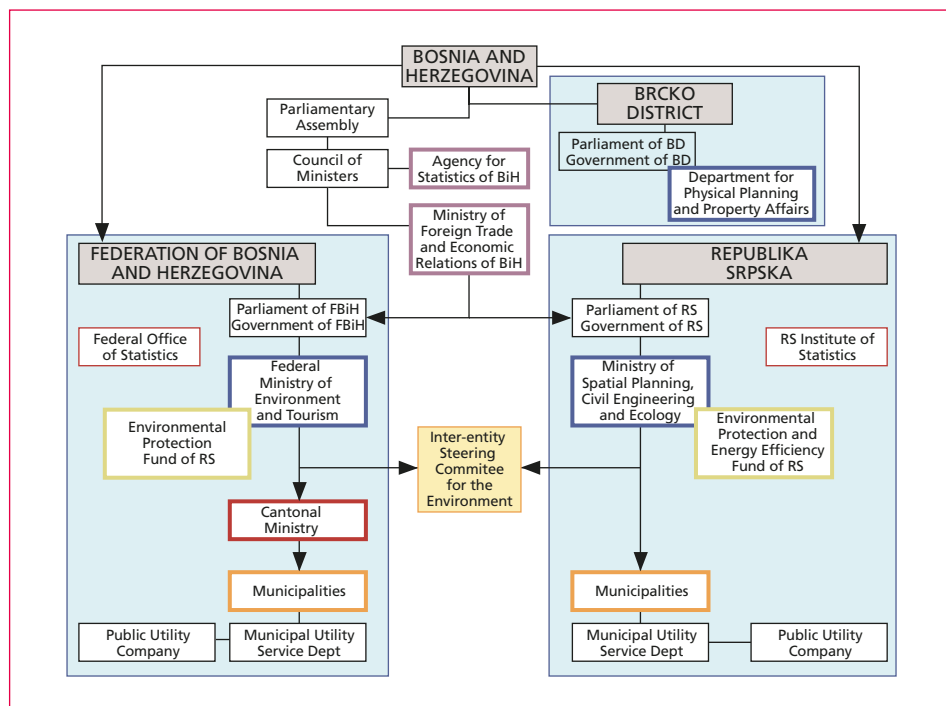


Figure 1: Institutional set-up in waste management

Table 1: Summary of roles and responsibilities related to waste management

Responsibility	State	Entity (FB&H and RS) and BD	Cantonal ¹	Municipal
Establishing policies	✓	✓		
Coordination of activities and harmonization of plans of entities' bodies	✓			
Development of waste management laws and regulations		✓	✓	n/a ²
Development of waste management strategies and plans		✓	✓	✓
Issuing environmental permits for relevant plants and facilities (threshold dependent)		✓	✓	
Inspection of permitted installations (threshold dependent)		✓	✓	
Organizing and conducting of statistical research	✓ ³	✓	✓ ⁴	
Tracking transboundary movements of waste		✓		
Determining sites and locations for waste management facilities (planning)			✓	✓
Operating / procuring waste management services			✓ ²	✓
Collection of fees			✓ ²	✓

1. Only FB&H is divided up into cantons/regions.
 2. Operation of services at Cantonal level only occurs in Sarajevo Canton.
 3. The Agency for Statistics is a national agency that covers the whole of B&H.
 4. In FB&H the Institute for Statistics is organized as follows: statistical surveys are conducted by the cantonal departments and offices located in the headquarters of all ten cantons, which collect, control and submit data to the research departments in Sarajevo.

1.2. Legislation

Solid waste management regulation in BiH consists of:

- Law on Waste Management in the RS (Official Gazette (O.G.) RS 113/13 and 106/15),
- Law on Waste Management in the FBiH (O.G. FBiH 33/03, 72/09),
- Law on Waste Management in BD (O.G. BD 72/09, 25/04, 1/05, 19/07, 2/08 and 9/09),
- set of entity bylaws that regulate different aspects including waste categories with lists, permitting for small-scale activities on waste management, extended producers responsibility (EPR), transboundary movement of waste, and so forth.

While the laws on waste management are the legal basis for waste management in the country, strategies and plans provide guidelines for the future development and investments in the field of waste management. The main strategic and planning documents in BiH are:

- Environmental Protection Strategy of FBiH for the period 2008 to 2018 which addresses waste management in its integral part, the Waste Management Strategy of FBiH and Federal Waste Management Plan 2012 to 2017 (FBIH)
- Solid Waste Management Strategy 2017 to 2026 (RS)
- Environmental Protection Strategy of BD for the period 2016 to 2026 which addresses waste management in its integral part

In FBiH cantons develop their own strategic documents on waste management as part of their legal obligations arising from the Law on Waste Management. Municipalities are also obliged to develop Municipal Waste Management Plans.

According to the RENA report on monitoring transposition and implementation of the EU environmental acquis for period May 2011 to March 2012, the transposition score of the Waste Framework Directive in FBiH is 31 percent. According to the same, the level of transposition of the Waste Framework Directive in RS was at very early stage, approximately 19.5 percent. However, in 2013 Republika Srpska adopted new Law on Waste Management, therefore, the level of transposition is somewhat advanced compared to the last available progress report. Amendments to the RS law on waste management introduce provisions on packaging and packaging waste management. Alignment with EU legislation on sewage sludge, batteries, packaging, polychlorinated biphenyls (PCB) / persistent organic pollutants (PCT) and end-of-life vehicles is at a very early stage. Further efforts are needed on alignment with EU acquis provisions on landfill directive and on closing or rehabilitating non-compliant landfills. Legislation on the shipment of waste is harmonised with the Basel Convention. BiH needs to adopt waste management strategy at state level.

1.3. Waste quantities and composition

Data collection on MSW is not well structured in the country, due to the highly complex government structure and interconnected levels that gather data. Law on Waste Management of RS defines that the competent authority for waste management data

collection and waste data register is the Fund for Environmental Protection and Energy Efficiency of RS. The rulebook on the methodology for waste data collection and waste data register was adopted in 2015 (Official Gazette of RS no. 71/15). The FBiH and BD laws on waste management do not regulate data collection and registering issues. The Fund for Environmental Protection of FBiH performs, unofficially, the collection of data on waste in FBiH. They will officially be granted this role by new amendments to the Law on Waste Management of FBiH in 2017.

Both Funds are collecting data from Cantons (in FBiH only), municipalities, public and private communal enterprises and landfill sites. This includes data on waste generation and types of waste. This data is used to understand the situation concerning waste management in both entities. For statistical purposes, entity agencies for statistics collect data on solid waste collected and disposed in BiH. This data is conveyed to the national Agency for Statistics of BiH, which compiles data and reports to Eurostat.

According to data presented by Agency for statistics of BiH waste generation rate in the country is 0.89 kg/cap/day. In 2015 total amount of municipal waste generated was equal to 1,248,718 t. Waste generation rates, as presented in strategic documents of two entities and BD, are given in Table 2, while waste generation rates in some cantons in FBiH are given in Table 3.

Source	Average MSW generation per capita kg/cap/day
Agency for Statistics BiH	0.89
Federal Waste Management Plan (2012-2017)	0.87
Solid Waste Management Strategy RS (2017-2026)	0.76
Environmental Protection Strategy of BD (2016-2026)	1

Table 2:

Waste generation rate in FBiH

Sources:

Agency for statistics BiH (2016) First release – Environment: Public Transportation and Disposal of Municipal Waste http://www.bhas.ba/saopstenja/2016/KOM_2015_001_01_BA.pdf

Federal Waste Management Plan 2012-2017

Source	MSW generation per capita kg/day Average for the Canton
Zenica – Doboј Canton ¹	0.63
Sarajevo Canton ²	1.26*
Bosnia Podrinje Canton ³	0.55
Tuzla Canton ⁴	0.89
Central Bosnia Canton ⁵	0.71
Una Sana Canton ⁶	0.81
Weighted average	0.88

Table 3:

Waste generation rates in Cantons in FBiH

* Predominantly urban canton

¹ Analysis of experience in the production and use of RDF in Southeast Europe, REZ, 2016

² Waste Management Plan for Sarajevo Canton 2015 - 2020

³ Waste Management Plan for Bosnia Podrinje Canton 2013 - 2018

⁴ Waste Management Plan for Tuzla Canton 2015 - 2020

⁵ Waste Management Plan for Central Bosnia Canton 2015 - 2025

⁶ Waste Management Plan for Una Sana Canton 2014 - 2019

To assess current MSW composition, existing information from various studies was compared [1-4]. In some cantons and municipalities (Una Sana Canton, Tešanj and Cazin, Bijeljina, Prijedor Municipalities) waste composition are a result of real measurements. In general, it can be concluded that organic waste is the dominant fraction and varies from 25 percent (cantonal average) up to 50 percent (municipal average). Here it is to be noted that organic waste may decrease with increase in urbanisation. If Canton Sarajevo is represented as highly urbanised area then we can conclude that organic waste in urban areas can go as low as 15 percent. The dry recyclables (plastic, glass, paper, metals, Al. cans, PET) accounts for 24 to 38 percent of the total waste. The percentage is lower in rural municipalities and higher in the urban cantons, especially Sarajevo Canton.

1.4. Financing

The main revenues for collection, transport and disposal of waste from households are from tariffs. Various calculation methodologies are used and consequently the tariff varies between the municipalities. Tariffs for households might be based on square meters usable surface, fixed amount per person per household, fixed amount per household, number of waste removals, etc. The weighted average tariff/year for the served inhabitants is BAM 102/household/year assuming a family size of 3.09 persons (Census 2013) and a waste generation rate of 0.8 kg/cap/day. The average spendable income of the households in 2013 was approximately BAM 1,672/month. It can be concluded that the average tariff for waste management was 0.5 percent of the spendable income, while international norms indicate 1 to 1.5 percent, as is the case in most EU Member States.

The commercial/institutional sector can also be charged per container and the tariff per 1,100-litre container is in general BAM 35/container, which would correspond with approximately BAM 190/tonne (assuming 185 kg/m³ and 90 percent filling) as compared to BAM 113/tonne for households. In addition, tariffs are applicable per large containers mainly for the industrial sector. The tariff for a 5 m³ container varies between BAM 70-111 depending on the distance corresponding with BAM 76-120/tonne assuming 185 kg/m³. The tariff for a 7 m³ container is around BAM 111-117 corresponding with BAM 86-90/tonne. In addition, custom-made contracts are concluded with the industries depending on the type of waste, quantity, distance, etc.

The municipality or the Canton (in case of Sarajevo) might subsidize directly the waste collection company by taking over payments wholly or partly for operations of landfills, sorting lines, gate fee at regional landfills, etc. In addition, the Federal Environmental Fund can make available grants for investments while the EPR system can provide payments for containers and/or public awareness raising activities to increase separation of packaging waste in case the municipality has a contract with the EPR scheme. The EU IPA funds, funds of the World Bank (WB) and SIDA were used in the past ten years for financing infrastructure development in the solid waste sector.

1.5. Available technologies and existing plants

The Waste Management Strategy (based on the EU PHARE Study from 2000) recommends the implementation of regional landfills serving a certain geographical area. Currently, Bosnia and Herzegovina has six active regional sanitary landfills that serve

36 municipalities (out of 141 + BD) and two under construction that will serve six more: *Smiljevići Sarajevo*; *Ramići Banja Luka*; *Brijesnica Bijeljina*; *Moščanica Zenica*; *Uborak Mostar*; *Crni vrh Zvornik*; *Koričine Livno* (still under construction); and *Kurevo, Prijedor* (still under construction);

Up to now, only a part of the landfill regionalization plan has been implemented. New regional landfills (new site or upgrading of existing municipal landfill) are needed while existing ones might need an upgrade (expansion of disposal area and investment in leachate treatment plants). Detailed feasibility studies will be carried out for future investments.

It is estimated that 93 non-compliant municipal landfills are found in the country. There is only one landfill for inert waste located in the Municipality of Neum. The number of illegal dumpsites is high. Current estimates indicate the existence of 340 illegal dumpsites in FBiH and 250 in RS. However, the Federal Waste Management Plan 2012 to 2017 and Draft Waste Management Strategy in RS 2016 to 2025 estimate that there are as many as 1,200 illegal dumpsites.

There are 5 sorting/separation lines installed in BiH (Mostar, Konjic, Sarajevo, Tuzla, Dobo) for sorting of pre-separated dry recyclables each having a capacity of 5 to 8 t/h and for separation of mixed waste (Mostar) with a capacity of 15 t/h.

No other options for waste (pre)treatment are available in the country.

2. Milestones of development in the waste management sector

The reform in the solid waste sector started with development of National Solid Waste Management Strategy in 2000 through EU Phare programme. Although the Strategy was never adopted by the entities and state institutions, it set the foundation of regionalisation concept in BiH. This concept became part of waste management laws in both entities and BD. Therefore, all activities in the sector in the past period were directed toward implementation of regional disposal concept.

The most important milestones from 2000 to 2013 in the sector were as follows:

As a result of the WB First Solid Waste Management Project six regional landfills were established with almost half of the country's population benefiting and nearly 50 percent of solid waste being disposed in a sanitary landfill or in another environmentally sound manner. A total of 145 wild dumpsites were cleaned and closed, greatly reducing environmental and health hazards. This represents more than a 10 percent reduction of wild dumpsites. Sarajevo and Banja Luka established recycling arrangements with private recycling factories for paper, plastic, metal, and tires. The collection rate in the project region has increased from 40 to 70 percent. Seven multi-municipal waste management districts were established through the cooperation of multiple municipalities.

The results of the WB Second Solid Waste Management Project are summarised in the following table.

Table 4: The most important milestones in the waste management sector from 2000 to 2013

	Bosnia and Herzegovina		
	FBIH	RS	BD
Development of policies and strategies			
National solid Waste Management strategy	2000		
Law on Waste Management	2003	2002; 2013	2009
Bylaws	2005, 2006 and 2008	2015	/
Solid Waste Management Strategy	2008	2017	2016
Solid Waste Management Plan	2012	/	/
Development of National Approximation Strategy (AP) for Sector of Environment including DSIP for the EU Landfill Directive (ENVIS project)		2015	
Adoption of the AP	2017		
Institutional measures			
Establishment of Fund for Environmental Protection	2006	2011	/
System measures			
Introduction of EPR system	2011	2015	/
Development of studies on rehabilitation and closure of non-compliant municipal landfill	2011	/	/
Infrastructure development			
WB Solid Waste Management Project in BiH	2002 to 2009 The Solid Waste Management Project objectives of the additional financing would remain the same as for the original project. The main objectives of the original project are to: (a) cost effectively improve solid waste services in participating priority areas; (b) increase administrative and technical capacity for solid waste management at the local and Entity level; (c) improve cost recovery in the sector and encourage private sector involvement; and (d) correct environmental problems and reduce health hazards caused by inadequate waste collection and disposal systems. Specifically, the additional funding would be sought for the following: (a) technical assistance/engineering services; and (b) investments to rehabilitate regional landfills and clean up of wild dumpsites.		
WB Second Solid Waste Management Project	2009 to 2017 project objectives included improving availability, quality, environmental soundness, and financial viability of solid waste management services in participating utilities/regions. There are three components to the project. Component A: waste management. This component invests in rehabilitating existing disposal sites, closing wild dumps, improving collection infrastructure, supporting equipment purchases, and to a limited extent, converting existing small dump sites to transfer stations. Component B: capacity building. This component provides technical assistance and engineering services to participating regions and will finance institutional strengthening and capacity-building activities benefiting the entity-level institutions involved in solid waste management. Component C: project management and operating cost.		
SIDA Municipal Solid Waste Management Project in BiH	2010 to 2014 The goal of the programme was to improve the quality and availability of solid waste services in the targeted municipalities, and thereby contribute to the integrated solid waste management in BiH. The support consisted of capacity building at the state, entity and municipal level, and investments mainly at the municipal level which were complemented by municipal contributions. The programme also provided support for implementation of the awareness campaign conducted by two entity ministries of environment and coordinated by the state Ministry for Foreign Trade and Economic Relations.		

SIDA Municipal Solid Waste Management Project in BiH has contributed to systematic improvement of the quality and availability of solid waste services in 44 municipalities and 4 regional landfills in BiH. Purchase of trucks and solid waste containers and bins were done for 44 municipalities. The project also helped to develop 44 Municipal Waste Management Plans.

Table 5: Results of the WB Second Solid Waste Management Project

Indicator	Baseline	Current	Target
Increased number of established inter-municipal solid waste districts	6 inter-municipal districts established	RS: 4; FBiH: 9	13 inter-municipal districts established
Increased number of rehabilitated sanitary landfills become operational	4 regional sanitary landfills operational	7 regional sanitary landfills operational (RS: 3; FBiH: 4)	8 regional sanitary landfills operational
Implementation of regular monitoring for leachate and dump site surface coverage at operational landfills	Regular monitoring at 2 operational landfills	RS: 7; FBiH: 6	Regular monitoring at 9 operational landfills
% of regional solid waste utilities complying with national environmental standards	25 % of utilities comply with standards	RS: 100 %; FBiH: will be reported after the submission of the environmental compliance reports	60 % of regional solid waste utilities comply with national environmental standards
Number of utilities with sorting, recycling, and/or gas capturing facilities	2 utilities with recycling and/or gas capturing	RS: 3; FBiH: 5	6 utilities with recycling and/or gas capturing
Implementation of cost recovery plans in solid waste management utilities recovery plans	Limited number of utilities cover operational costs	RS: 3; FBiH: 3	7 utilities implement cost
Increased share of collected solid waste disposed in regional sanitary landfills	72 % of collected waste is not disposed in sanitary landfills	FBiH: 45 % disposed in sanitary landfill; RS: will be updated	40 % of collected waste is not disposed in sanitary landfills
Increased support to regional sanitary-land fills as evidenced by percentage of local population agreeing to the location of landfill sites	5 landfills selected with consulted population agreeing to site location	All selected landfill sites supported by more than 60 % of the population.	9 landfill sites supported by more than 60 % of the consulted population
Improve regular environmental monitoring as evidenced by increased number of solid waste utilities monitored for their compliance with national standards	25 % of operational utilities monitored (4 utilities)	RS: 100 % of regional landfills; FBiH: 100 % of regional landfills and all closed dumps	90 % of operating utilities monitored
Intensified policy debate on hazardous waste management strategy as indicated by increased media coverage	No public debate on hazardous waste	RS: National SWM Strategy consultations (Strategy includes hazardous waste); FBiH: not achieved	Conduct a public consultation and at least one report/article on final draft of hazardous waste management strategy in daily newspaper or TV/Radio

3. Drivers for the installation of waste treatment facilities

As previously explained, the main treatment option available in the country is landfilling of waste. The existing strategies and plans are forcing regional waste disposal concept. They are main drivers for installation of new regional landfills financed by the two WB projects. In general, for a small country like Bosnia and Herzegovina other options such as e.g. incineration are not recommended in strategic documents.

Very limited activities are implemented concerning waste separation at source while pre-treatment of mixed waste at sorting plants is available at five sorting plans.

In addition to separation of dry recyclables other treatment options to reduce the quantities to be landfilled are investigated such as production of Refuse Derived Fuel (RDF) for co-incineration in cement plants. Two cement plants in Bosnia are interested to buy RDF as an alternative fuel which was a driver for several municipalities to start thinking about RDF production. A feasibility study is under preparation for the construction of such plant at the regional landfill in Zenica, while Sarajevo and Mostar regional landfills are also interested to investigate these options.

4. Current projects, plans and outlook

Current plans and projects in the solid waste management sector are given in the table below.

Table 6: Current plants and projects in the solid waste management sector

	Bosnia and Herzegovina		
	FBIH	RS	BD
Development of policies and strategies			
Laws	Amendments to the Law on Waste management		
	New Law on Environmental Protection		
	New Law on Environmental Fund		
Strategies and plans	Solid Waste Management Strategy		
	Solid Waste Management Plan	Solid Waste Management Plan	Solid Waste Management Plan
Institutional measures			
Restructuring institutions	Reorganisation of Fund for Environmental Protection	/	/
System measures			
Municipal landfills	Development of studies on rehabilitation and closure of non-compliant municipal landfills	Development of studies on rehabilitation and closure of non-compliant municipal landfills	Development of studies on rehabilitation and closure of non-compliant municipal landfills in BD
Regional landfills	Finalisation of regional landfill in Livno	Finalisation of regional landfill in Prijedor and Zvornik	Finding solution for waste disposal in BD
	Upgrade of existing regional landfills in Zenica, Sarajevo and Mostar	Upgrade of existing regional landfill in Bijeljina	/
	Development of project documents for new regional landfills	Development of project documents for new regional landfills	/
Infrastructure development			
WB – SIDA project on Building Long-term Sustainability for Integrated Solid Waste Management	SIDA is funding the project together with the World Bank as implementer with professional and technological assistance for improved and modern Solid Waste Management practices in Bosnia and Herzegovina. The project will seek to strengthen the country's capacity to plan, manage and operate the Solid Waste Management in an economically and environmental sustainable development. The project components include preparation of two public outreach workshops; finalization of the review of the solid waste management system in BiH towards preparing a SWM sector assessment in BiH, recommendations and sector investment plan; the Extended Producer Responsibility in BiH; the extended capacity building program in BiH; the preparation of a communication campaign; and the identification of priority investments for further assessment (pre-feasibility assessments).		

The most important recent changes in the sector are related to the amendments to the Law on Waste Management in FBiH. New amendments define special categories of waste which are harmful to the environment and health of the population. The amendments were introduced to regulate the management of those waste categories because of their effect on the environment and the amounts generated. The special waste categories cover packaging waste, waste oil, batteries, old vehicles, tires, electronic and electrical waste, asbestos and PCB, waste generated in the production of titanium dioxide, medical, animal and construction industry waste. The regulations had to be introduced

for the management of those types of waste from the place they are generated, over the manner of their collection, transport, treatment and disposal. The amendments include the definition *product manufacturer and importer* of products which become waste and *system operator* companies for the recycling and use of special categories of waste. System operators can be set up only by companies which sell products which later fall into the special waste categories. Manufacturers and importers of those products are also accountable for the protection of the environment from the waste of their productions and the law regulates the fees for those waste categories which are paid to the Environmental Protection Fund of the FBiH, except for those categories for which system operators have been set up. The changes to the law on waste management include an information system on all types of waste, infrastructure and companies managing waste. That system is under the jurisdiction of the Environmental Protection Fund.

The government has high expectations from the WB SIDA project that is to bring proposals for the reform in the sector and preferably result in third WB Solid Waste Management project with investment component.

5. Sources

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