



Թափոնների կառավարումը Հայաստանում **Waste Governance in Armenia**

Կայուն զարգացման նպատակների փորձագետների փոխանակման հայ-շվեդական ծրագրի շրջանակներում
In the frames of the Swedish Armenian SDG Expert Exchange Programme

A REPORT ON WASTE GOVERNANCE IN ARMENIA

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LIST OF ACRONYMS

ACRONYM	Full form
ARMSTAT	Statistical Committee of the Republic of Armenia
AUA	American University of Armenia
BAT	Best Available Techniques
BEMP	Best Environmental Management Practice
CDW	Construction and demolition waste
CEPA	Comprehensive and Enhanced Partnership Agreement
CEWEP	Confederation of European Waste-to-Energy Plants
CPC	Cleaner Production Concept
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EEU	Eurasian Economic Union
EMIC	Environmental Monitoring and Information Center
EMS	Environmental Management System
ENPI	European Neighborhood and Partnership Instrument
EPMIB	Environmental Protection and Mining Inspection Body
EPR	Extended Producer Responsibility
ESM	Environmentally Sound Management
EU	European Union
GDP	Gross Domestic Product
HDPE	High-density polyethylene
HLIB	Health and labor Inspection body of the Republic of Armenia
IMC	Inter-municipal cooperation
ISWM	Integrated Solid Waste Management
JRC	Joint Research Centre
LCA	Life-cycle assessment
LSGB	local self-governmental body
MH	Ministry of Health
ME	Ministry of Environment
MRF	Materials recovery facility
MSW	Municipal Solid Waste
MTAI	Ministry of Territorial Administration and Infrastructure
NCDPC	National Center for Disease Control and Prevention
NGO	Non-governmental organization
OECD	Organization for Economic Co-operation and Development
PAYT	Pay-as-you-throw
PCB	Polychlorinated biphenyl
PET	Polyethylene terephthalate
POP	Persistent organic pollutant
PP	Polypropylene

PPP	Public-private partnership
PRO	Producer Responsibility Organization
RA	Republic of Armenia
RCV	Refuse Collection Vehicle
RECP	Resource Efficient and Cleaner Production
SCOW	Selective collection of organic waste
SCS	Separate collection site
SDG	Sustainable Development Goal
SEIS	Shared Environment Information System
SME	Small and medium-sized enterprises
SNCO	State non-commercial organization
SW	Solid Waste
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNIDO	United Nations Industrial Development Organization
UPOP	Unintentional persistent organic pollutant

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Project website

<https://ace.aua.am/waste/wga>

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Governmental stakeholders

The project aimed at providing independent expert advice to Armenian government decision makers, using Armenian and Swedish experts, for development of national solid waste governance policy, strategy, and action map based on the principles of the Circular Economy and integrated waste management. The team wants to thank all governmental stakeholders for their openness and collaboration, in particular, the RA Prime Minister Office, Interagency Working Group Coordinating Country's Waste Management Activities, Ministry of Territorial Administration and Infrastructure, Ministry of Environment, Ministry of Health, Ministry of Emergency Situations, and Statistical Committee of Armenia.

CSO and private sector stakeholders

We thank also all civil society and private sector representatives actively engaged in the study starting from the kick-off workshop.

EXECUTIVE SUMMARY

This report presents the results of the Swedish-funded study on waste governance in Armenia having an overall aim to help the country move towards an improved and more sustainable governance of the sector and to support the transition to a more circular economy. The study has also assessed Armenia's legislative and institutional gaps with respect to compliance with the EU Comprehensive and Enhanced Partnership Agreement (CEPA) signed between the European Union and the Republic of Armenia in 2017.

The study includes an assessment of the current situation as well as analysis of gaps and recommendations based on a multi-stakeholder consultative process. The study covers 8 streams of solid wastes, namely municipal, agricultural, hazardous medical waste, hazardous, construction and demolishing waste, industrial, electrical, electronic, and automobile waste. The project has not addressed the management of radioactive and mining waste in Armenia.

The assessment of the current situation and gaps in the sector has been conducted using the Guidelines for National Waste Management Strategies (UNEP 2013). Key components of the situation analysis include a review of legislation, institutional framework, policies, strategies, programs, financial mechanisms, available infrastructure, waste management culture, and more.

The study identifies 48 gaps and suggests 44 recommendations structured in 4 directions: legislative and regulatory framework, institutional framework, financial mechanisms, and infrastructure and technologies.

The report includes also an extensive Appendix on International Best Practices in waste governance, where various proven policies and technologies are summarized. This section may be helpful for both policy makers and local authorities in developing policies and programs as well as implementing waste management.

As a next step, we recommend initiating a policy and strategy dialog process on solid waste governance in Armenia taking into account the findings of this study as well as other solid-waste related efforts in Armenia. A policy and strategy dialog process should engage wide set of stakeholders including key ministries, municipalities, donor community, IFI's, civil society organizations, and others as may be deemed appropriate.

1 INTRODUCTION

Globally countries are faced with the challenge of ever increasing quantities of solid waste. To address this challenge, both adequate national waste governance policies as well as capacity to implement these policies is needed. Without these, it would be difficult, if not impossible, to address the negative impacts. Without these, also, it would be difficult, if not impossible, to harvest the multiple benefits that proper solid waste management can provide.

As summarized in Figure 1, proper waste governance has multiple benefits, including economic, public-health, social and environmental. The economy can benefit from job creation, positive impact on tourism, technological innovation, resource efficiency, energy generation, nutrient recovery (such as phosphorous and nitrogen), conservation of raw materials, cost-effectiveness waste management, and better land use. The public-health benefits include reduced health risks and better disease control, and reduced health risks through reducing soil, water, and air pollution.

Environmental benefits such as reduced greenhouse gas emissions, reduced hazardous waste pollution, reduced water and soil contamination, better soil management, and conservation of raw materials. Eventually, an integrated waste management implies more civic participation and contribution to urban development, more satisfaction with the service provided, and better reputation of the country or city.



Figure 1 - The benefits of proper waste governance

Armenia stands at the precipice of major reforms in waste governance. To help the country make progress, access to information and evaluation of global practices and innovations will be critical to the country. It will, especially, help it devise ways to derive many of the benefits outlined above.

To shape the discourse, in this study we offer discussion and recommendations on key policy concepts including the waste hierarchy, circular economy, integrated waste management, and others. Adoption of approaches that integrate these advanced concepts will help the country set itself on the right path.

Waste governance reforms are also on the Armenian government's reform agenda in relation to its aim to achieve EU-approximation within the framework of the EU-Armenia Comprehensive and Enhanced Partnership Agreement (CEPA) and to contribute to Armenia's commitment to the Sustainable Development Goals (SDGs). In both of these strategic commitments, proper resource and waste governance is a high priority.

Adopting new approaches, however, often come with their own challenges. The challenges are many but include developing policies that are cross-sectoral, requiring multiple government agencies to cooperate on an ongoing basis. Another challenge is identifying realistic and practical programs and investments for local communities where there is often a lack experience and know-how on modern waste management practices. Many of the gaps and recommendations identified in this report address such challenges.

1.1 Waste Hierarchy as a guiding principle

Introduced into European waste policy since 1975,¹ the priority of waste management options evolved into what is known today as Waste Hierarchy defined in the EU Waste Framework Directive 2008/98/EC [xxxi]. More and more governments currently adopt Waste Hierarchy as a fundamental guiding principle to develop or improve their national waste governance policies.

Waste Hierarchy sets a priority order for steps to minimize and manage waste, and is usually presented as a diagram (see Figure 2). The inverted pyramid suggests that the most preferred policy step is to prevent the generation of waste. The next preferred step is to reduce and minimize waste generation through reuse, repair and other preparation for reuse. Material recovery is the next preferred action, followed by the downstream steps of other recovery options such as producing nutrient and energy from waste. If energy is recovered from processes such as combustion and pyrolysis, or from landfill, it also belongs at this level of the hierarchy. The final and least preferable option is the disposal of waste in case prevention, reuse or recovery was not possible. The disposal implies either storing in properly engineered and managed landfills (after a proper treatment if necessary) or incineration without energy recovery.²

Waste Hierarchy sets up a conceptual framework that is deeply aligned with the principles of Circular Economy. Rethinking of product and service design with an aim to decrease the material use and waste in production, extend the product durability, and increase the material recovery for end-of-life products are recommended by both approaches.

¹ EU Waste Framework Directive 1975/442/EEC

² For more details see section A1.1 Waste Hierarchy.

The adoption of the Waste Hierarchy and integrating it to various national policies and strategies should become a priority direction for the Armenian Government as suggested in the subsequent sections and chapters.

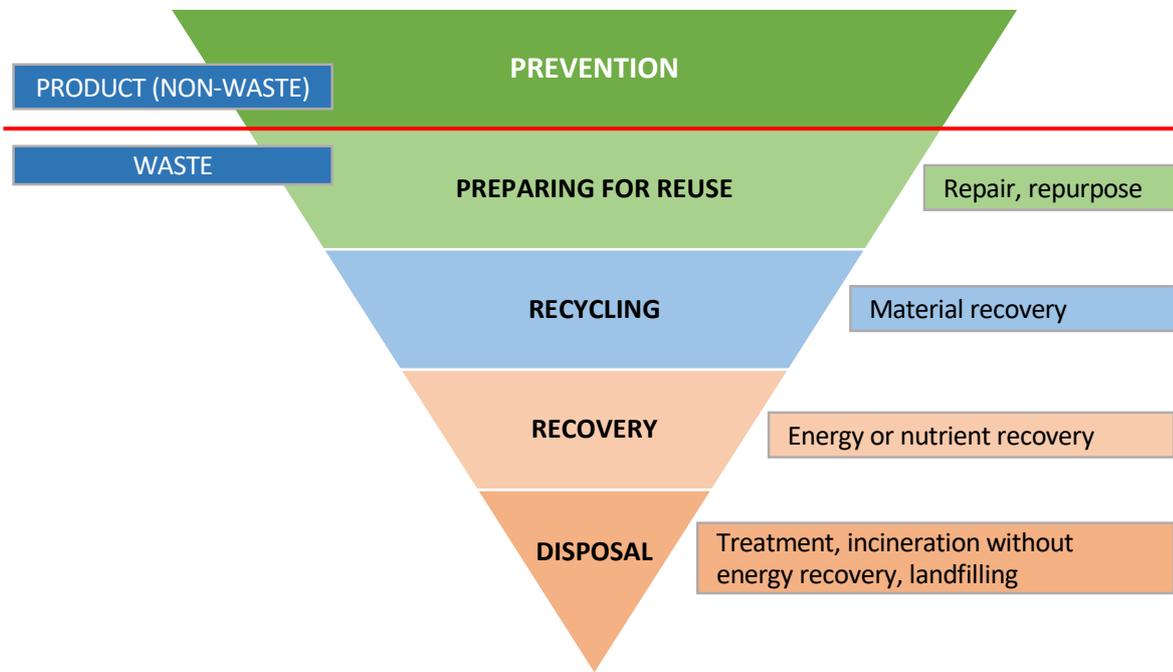


Figure 2 - Waste Hierarchy

1.2 Project objectives

This study has an overall aim to help the country move towards an improved and more sustainable governance of the sector and to support the transition to a more circular economy. The study has specifically assessed Armenia's legislative and institutional gaps to comply with the EU Comprehensive and Enhanced Partnership Agreement (CEPA). The improvement of solid waste governance in Armenia must be done with the following principles at its core:

1. Protection and preservation of human health
2. Environmental protection, conservation and improvement
3. Reasonable and effective use of natural resources
4. Adoption of principles of circular economy
5. Application of the hierarchy of waste (Directive 2008/98/EC)
6. Increase in energy efficiency
7. Reduction of Armenia's dependence on imported resources

Notably, the individual components of the Waste Hierarchy, namely prevention, reduction, and recovery of waste have since been present in Armenia's legislation and strategies, however, they haven't been adequately prioritized. Waste Hierarchy should become an umbrella concept and fundamental principle when developing waste governance policies.

Poor implementation of 'polluters pay' principle leads to low level of responsibility among the citizens and organizations, incomplete cost recovery, including costs associated with the negative impacts of waste. It is critical to establish full cost recovery mechanisms in accordance with the polluter pays principle and extended producer responsibility principle.

Diverting waste from landfills is of primary significance with regards to the conservation of the environment and protection of human health, as well as in terms of properly treating hazardous wastes and recycling economically valuable wastes in accordance with the Waste Hierarchy approach. Given the number and conditions of uncontrolled dumpsites in the country it is critical to address this issue on a national program level.

The utmost environmental, economic and social benefits resulting from the reduction of waste dumped in landfills will first of all be possible when recoverable waste, including biodegradable waste, plastic, metal, glass and paper waste is separated at source.

Sorted collection is also critical for the separation and elimination of hazardous waste. Hazardous waste contained in urban waste is still put in various landfills in the country (i.e. waste generated in households, construction, industry or different services). Sorted collection will also make it possible to effectively manage the initial (manual, etc.) processing and elimination of waste subject to placement in landfills.

A significant portion of the waste generated in an urban area is biodegradable waste. Placing biodegradable waste in landfills leads to major negative consequences, including greenhouse gas emissions, pollution of underground and surface water, soil and air. Considering the fact that dumpsites in Armenia are operated with no control and management systems for leachate and gases, the benefits of diverting biodegradable waste from landfills is even more apparent.

In order to increase waste recovery rates in the country, it will be necessary to assess the existing capacities and needs as well as the real potential for material, energy and nutrient recovery from solid waste in the country. Many recycling companies in Armenia report input material deficiency and need for economic and financial incentives to improve their operations. It will be necessary to ensure financial incentives for the waste recovery and treatment facilities at the same time strengthening environmental control upon their operations.

It is necessary to raise capacities on local level for sustainable solid waste management, including waste management and landfill operation and management planning. It is important to engage both local authorities and communities in the planning process.

In order to ensure availability and reliability of data, it is necessary to develop and introduce a consistent system of reporting that will include all phases of waste management – prevention, reduction, generation, separation, collection, recycling, placement in landfill or disposal. To achieve the targets that have been set and accelerate the transition to a circular economy, the exchange of information and best practices as well as comprehensive coordination among the country's different economic sectors should be developed.

In order to ensure the high quality, reliability and compatibility of data, it is necessary to improve the joint system of statistics and national statistical methodologies, as well as introduce a data evaluation system. The collection of reliable data on waste management is essential in relation to both the development and implementation of policies, as well as adequate planning of infrastructure.

There is a need to establish a system for regular review of solid waste quantity and composition in Armenia, including a regulatory basis, financial mechanisms and a national standard for methodology, which will ensure reliability and compatibility of data with EU standards.

Taking into account the abovementioned points, we suggest several priority directions for the further policy and strategy dialog process:

- Adoption of Waste Hierarchy
- Promoting EPR and Polluter Pays principle as full cost recovery tools
- Developing National Landfill Program
- Developing Local Waste Management plans
- Promoting sorted waste collection
- Developing Economic Instruments
- Improving Hazardous Waste Handling/Disposal Infrastructure
- Improving Legislative Framework
- Improving Institutional Framework
- Tapping into the energy and nutrient potential of bio-waste
- Engaging in solid waste policy dialog process

2 ANALYSIS OF THE EXISTING SITUATION

CHAPTER CONTENTS

- 2.1 Country profile
- 2.2 Information and data
- 2.3 National programs, strategies, and concept papers
- 2.4 Legislation and regulations
- 2.5 Institutional framework
- 2.6 Financial mechanisms
- 2.7 Infrastructure
- 2.8 Waste management practices in Armenia
- 2.9 Current level of awareness

The present analysis has used the questionnaire under Chapter 4.1 of the *Guidelines for National Waste Management Strategies* (UNEP 2013). The current situation has been analyzed for 8 streams of solid wastes – municipal, agricultural, hazardous medical waste, hazardous, construction and demolishing waste, industrial, electrical, electronic, and automobile waste. The project has not analyzed the management of radioactive and mining waste in Armenia. The analysis comprises 9 sections, each of which, in addition to overview, in special cases also addresses the various streams of waste.

2.1 Country profile

SECTION CONTENTS

- 2.1.1 Geographic profile
- 2.1.2 Economic profile
- 2.1.3 Cultural profile
- 2.1.4 Public health profile
- 2.1.5 Environmental profile
- 2.1.6 Waste management profile
- 2.1.7 Key national priorities

This section discusses the main factors characterizing Armenia that need to be considered on the national level while working on the development of a strategy for sustainable waste governance.

2.1.1 Geographic profile

Armenia has an area of 29,473 square kilometers. Average altitude from sea level is 1,800 meters (76.5% of the country's territory is between 1,000 and 2,500 meters above sea level). 71.6% of the territory are agricultural lands. Armenia does not have a lot of forests, with only 10.4% of its area covered by forests. The average temperature in January is as low as -2.3 Celsius and +16.3°C in June. Level of precipitation is 652.33 millimeters.

As of January 1st, 2018, the number of Armenia's permanent population is 2,972,732. Ethnic composition includes Armenians (98.1%), Yazidis, Russians, Assyrians, Ukrainians, Kurds, Greeks, Jews, Georgians, and other ethnicities (according to the 2011 official census). Major religion is Christianity (Armenian Apostolic Church), to which most of the population adheres to.

Armenia is situated in a high-risk zone for natural disasters and is subject to the influence of various hazards. Of the many natural hazards known in the world, about 110 can be met in Armenia. This is due to the complex relief of the country that includes steep mountain ranges, plateaus, and extremely fragmented elevation areas. The lowest point from sea level is 350 meters, while the highest peak is at 4,096 meters. Thus, the difference in altitudes in the small area of the country is about 3,500 meters, and this is what sets a high level of natural hazards.

Armenia is located in one of the more seismically active zones in the world. Therefore, there are significant risks related to geophysical hazards. One-third of the country's territory are landslide prone areas, which are the mountain bases and mountainous areas where 15% of Armenia's population lives.

In terms of natural hazards, 100% of the country's area is subject to strong earthquakes, 3% is subject to landslides (more than 3,000 landslide areas, 300 of which are in 6 communities), 30% is subject to floods and mudflows, 0.5% is subject to rockfall and collapses, 12% - subject to ground frost, 15% - subject to drought, and 17% - subject to the impacts of hail (see Table 1).

Natural hazard	Risk Area (%, as part of the total country area)
Strong earthquakes	100%
Floods and mudflows	30%
Hail	17%
Drought	15%
Ground frost	12%
Landslides (more than 3,000 landslide areas, 300 of which are in 6 communities)	3%
Rockfall and collapses	0.5%

Table 1 - The size of the areas having risks of natural hazards

Source: Armstat, Armenia's geographic profile. Available in Armenian at <https://www.armstat.am/file/doc/99472363.pdf>

The level of urbanization in the country is high, with 64% of the population living in cities, and 36% in rural areas. The mountainous terrain as well as diverse climate conditions have a negative impact on waste collection activities. These create difficulties related to the accessibility of certain communities in the country, which becomes more complicated in winter. Mudflows are also common and can become the cause of the spread of solid wastes into the environment. The distance and sparse populations of some communities make the management of solid waste rather costly and thus it is not even done [ii]. On the other hand, this may trigger local level management options such as composting and biogas production from organic waste.

2.1.2 Economic profile

Armenia is a member of the Customs Union of the Eurasian Economic Union (EEU) since January 2015, while in November 2017 the country signed the Comprehensive and Enhanced Partnership Agreement (CEPA) with the European Union. The dominant sectors in the country's economy are the mining (3.1% of GDP), construction, industry, services (including retail, information and communication, financial, tourism), and

agriculture. Armenia's main economic partners are EU, Russia and former Soviet Republics, China, Iran, USA, Georgia, and Turkey. Armenia receives considerable foreign aid from the European Union and the United States, while money transfers by individuals also play an important role in the country's economy. Table 2 and Table 3 present Armenia's main economic statistics as of April, 2019, while Table 4 shows the breakdown of the country's GDP in 2018.

Indicator	1990	2000	2010	2018
Population, total (millions)	3.54	3.07	2.88	2.95
Population growth (annual %)	0	-0.6	-0.4	0.2
Life expectancy at birth, total (years)	68	71	73	75
Surface area (sq. km) (thousands)	29.7	29.7	29.7	29.7
Population density (people per sq. km of land area)	124.3	107.8	101.1	103.7
Poverty headcount ratio at national poverty lines (% of population)	..	..	35.8	25.7
Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)	..	19.3	1.9	1.4
GNI, Atlas method (current US\$) (billions)	1.06	2.03	9.99	12.48
GNI per capita, Atlas method (current US\$)	310	660	3,470	4,230
GNI, PPP (current international \$) (billions)	8.28	7.34	19.83	30.87
GNI per capita, PPP (current international \$)	2,340	2,390	6,890	10,460

Table 2 - Main demographic and economic indicators for the Republic of Armenia, World Bank 2019

Source: <https://www.worldbank.org/en/country/armenia/overview#3>

Indicator	1990	2000	2010	2018
GDP (current US\$) (billions)	2.26	1.91	9.26	12.43
GDP growth (annual %)	-11.7	5.9	2.2	5.2
Inflation, GDP deflator (annual %)	79.4	-1.4	7.8	2.6
Agriculture, forestry, and fishing, value added (% of GDP)	..	..	18	14
Industry (including construction), value added (% of GDP)	..	..	28	25
Exports of goods and services (% of GDP)	35	23	21	38
Imports of goods and services (% of GDP)	46	51	45	53
Gross capital formation (% of GDP)	47	18	26	22
Revenue, excluding grants (% of GDP)	..	..	22.6	22.5
Net lending (+) / net borrowing (-) (% of GDP)	..	..	-5	-4.1

Table 3 - GDP of the Republic of Armenia, World Bank 2019

Source: <https://www.worldbank.org/en/country/armenia/overview#3>

Domestic product (gross, at market prices)	Share (%)
Net taxes on products	10.6
FISIM (Financial intermediation services indirectly measured)	-1.9
Agriculture, hunting, forestry, and fishing	13.7
Industry, including energy	17.5
Construction	6.8
Trade and service activities	53.3

Table 4 - The breakdown of Armenia's GDP by large sectors as of year 2018, Armstat

Source: https://www.armstat.am/file/article/sv_01_19a_112.pdf

2.1.3 Cultural profile

On holidays, in particular, Easter, Vardavar, and New Year among other holidays, the volumes of waste produced in communities increase tremendously.

Many rural communities still adhere to the traditional wisdom of “water will flush everything away,” which leads to lots of household and agricultural waste being dumped into rivers and brooks (see Pictures 1,2,3 and 4).³

Drying manure and using it as fuel is a common tradition in rural areas. Such use of organic waste does solve certain issues with heating and cooking. However, it also decreases the chances for using manure as organic fertilizer.

Another widely applied practice in rural areas vegetation and crop residues in the fields, which is supposed to suppress all the weeds. However, this leaves a very negative impact on the fertile layer of the soil.

Canning of organic waste, including manure, vegetation and food residues, composting of recyclables generated in the production of wine and distillation of oils is still relatively new and not yet a developed practice within rural communities. Some types of these wastes are mainly subjected to partial processing and reuse, some vegetation residue is used as fodder, some of the manure is used as fuel and some of it, although not entirely, is also utilized as fertilizer.

Similarly to many former Soviet republics, older generations in Armenia remember the practice of material recovery and product reuse that they experienced during the Soviet times. Beverage glass bottles and other glass containers, print newspapers and journals, as well as waste metal objects, would generally be accepted for recycling in return for a certain standard reimbursement. The same applies to the multiple-use fabric and net shopping bags that have been quickly replaced by single-use plastic bags in mid-1990s. The country can efficiently recover such sustainable practices through well-designed and coordinated public awareness and capacity building projects.

³ Photo credit: EcoAghb NGO



Picture 1 - River and forest littering



Picture 2 – River and forest littering



Picture 3 - Cleaning the Gyumri River



Picture 4 - Water canal in Ararat

2.1.4 Public health profile

The poor management of solid waste in Armenia creates major health risks for communities, which mainly has to do with the factors presented in Table 5.

#	Factor	Risk
1	There are more than 300 landfills and dumping grounds in the country, ⁴ where the waste is usually not covered and is constantly burned while at the same time being accessible to animals and people.	Air pollution (emission of methane, dioxins and other toxic gases) Spread of disease and infections through animals
2	Not a single landfill has a system of collecting leachate	Groundwater pollution Soil pollution Spread of disease and infections
3	Unsorted waste (household and industrial) containing hazardous wastes is placed in all landfills and dumping grounds through methods that are not controlled.	Groundwater pollution Soil pollution
4	Garbage bins used for waste collection in communities are mainly open and have no lids	Spread of disease and infections through animals and insects Air pollution
5	Direct reuse of useful objects extracted from garbage bins for household waste or landfills without proper disinfection (intact plastic and glass bottles, boxes, books, etc.)	Spread of disease and infections through various objects
6	Burning of agricultural waste (including plastic containers of fertilizers)	Air pollution (emission of methane, dioxins, and other toxic gases)

Table 5 - Factors leading to health risks

Source: Data collected from various sources by the authors of this report

These factors first of all pose a threat to the residents of adjacent communities but also to the lives and health of the entire population of the country. The unsustainable management of agricultural waste also brings forth a number of environmental and health problems, including the following:

- Agricultural chemicals washed away by rainwater and snow-melt waters enter water basins and cause pollution leading to health issues;
- Pesticides wrongfully repackaged in juice and water bottles are sold in the market without control. These wastes that are mistakenly consumed by children can be fatal.

⁴ Data by the Ministry of Territorial Administration and Infrastructure, October 2019

2.1.5 Environmental profile

In order to make solid waste management more sustainable, a number of environmental factors should be considered, such as the placement of landfills, junkyards for pesticides and waste recycling facilities in the vicinity of sensitive habitats like a water basin or specially protected natural areas.

Each one of the specially protected areas addresses the fundamental issue of waste within the frameworks of its charter. Particularly, the Charter of the Sevan National Park foresees an exclusion of municipal, industrial, and chemical wastes within the recreation zone of the park, while in the economic zone of the protected area it is prohibited to conduct treatment, processing, recycling, liquidation, and burial of municipal solid waste (921-Ն).

Specially protected natural areas form 13% of Armenia's territory.⁵ According to the № 321-A Decree of the Minister of Urban Development, landfills in the country may only be placed outside of the sanitary protection zones of reserves, resort houses and other such facilities. According to the regulation, the landfills can be placed in areas with enough natural protection to exclude groundwater pollution, in creeks, and outside of the sanitary protection zones of water sources, surface waters, natural reserves, resort houses and other such facilities. The boundaries of the sanitary zone are supposed to be at least 30 meters away from the water intake point. However, this may vary for the cases of protected (30m) and unprotected (50m) groundwater use.

There should be no groundwater and soil pollution sources within the sanitary strip of water canals. Water canals shall not be constructed through areas of landfills (Decree №803 of the Minister of Health). The RA Code of Administrative Offences foresees liability for dumping waste in water systems, including irrigation canals as well as for disposing of waste outside of chutes, waste collection rooms, garbage bins and trash cans located within the areas of sanitary protection zones.

Agricultural waste

The increasing development of agriculture significantly changes the biological circulation of materials, which, in turn, leads to changes with surface water and deep groundwater causing eutrophication and pollution of the water basin with toxic materials. The washing away of food elements (N, P, K, S, Ca, Mg, etc.) from agricultural waste, particularly manure and manure wastewater, by surface runoffs leads to the deterioration of lands by biological materials and prevents the normal cycles of agricultural eco systems. This phenomenon can be seen near the coastal areas of Lake Sevan as well as those of other reservoirs resulting in serious ecological tension. Wastewater from the sewage systems of coastal restaurants and hotels are also diverted in the rivers and Lake Sevan creating the same hazards.

Manure and the manure wastewater from barns built right next to gorges flow directly into those gorges and rivers. A very visible example of this can be found in the village of Oshakan. See Picture 5 - Farm at Oshakan dumping its waste directly in the gorge.

⁵ For more details visit the Story map of Armenia's natural monuments and specially protected areas available on the web site of the AUA Acopian Center for the Environment: <https://ace.aua.am/gis-and-remote-sensing/maps/natural-monuments/>



Picture 5 - Farm at Oshakan dumping its waste directly in the gorge⁶

Agricultural activities also generate non-organic waste, including plastic containers of pesticides and sacks of fertilizers, which can often be found in fields and become causes of contamination.

2.1.6 Waste management profile

In Armenia, like everywhere else, there are many issues related to waste generated by human activity. These issues refer to the quantity of waste and its reduction, collection, recycling, and elimination of waste. The volumes of solid waste generated in the country have to do with the number of the population, the level of economic development, the climate and lifestyle of people.

Overall, the level of awareness about the reduction of waste, sorting, recycling culture and practices is very low among the Armenian public. In addition to that, the quality of municipal solid waste management services is very low and that leads to social, environmental and sanitation problems in general. The existing national strategy and its action plan is implemented poorly and slowly, which mainly has to do with the lack of financial and administrative resources. All the works done so far have been superficial and have not engaged all public groups and have never been implemented all across the country.

According to data provided by the Statistical Committee of Armenia, the highest level of annual municipal waste per capita in Armenia was recorded at 271 kg between 2013 and 2014, which is 57% lower than the average of 28 EU member states – 478 kg per capita⁷ (see Figure 3). In 2017, 493.9 thousand tonnes of solid household waste was transported into municipal landfills.⁸

⁶ Photo credit: Lusine Nalbandyan

⁷ Source: <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20190123-1>

⁸ Environment and natural resources in RA for 2017. Armstat. Available at https://www.armstat.am/file/article/eco_book_2017_13.pdf

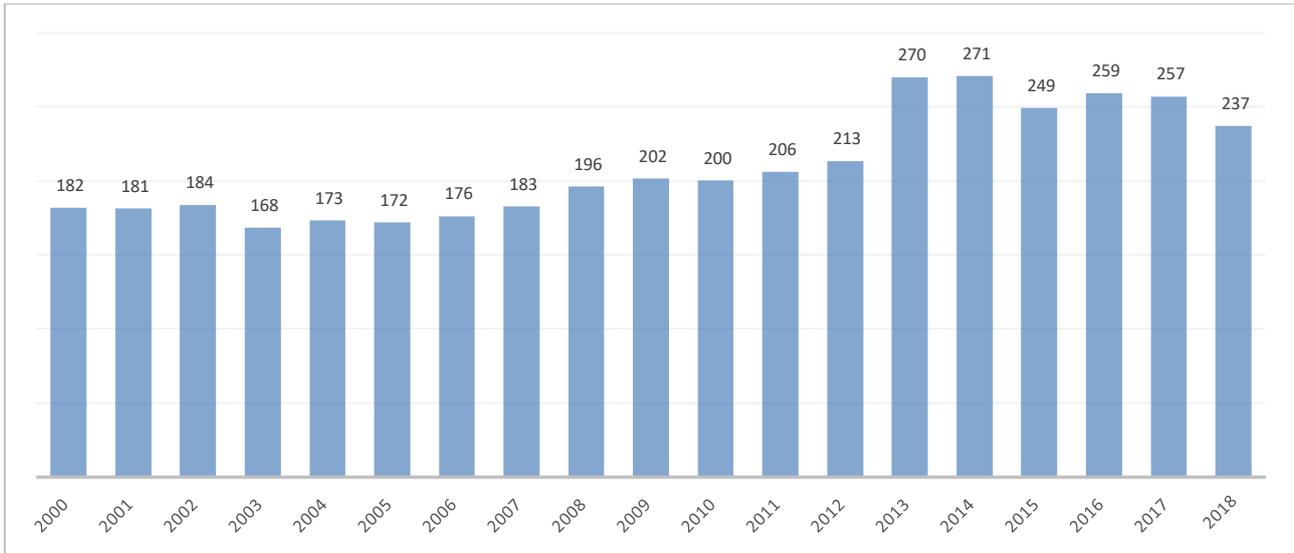


Figure 3 - Municipal solid waste generation per capita by years (kg/year per capita)
 Source: ArmStatBank. Available at <https://armstatbank.am/>

Figure 4 shows the flow of hazardous wastes in Armenia by generation, use, treatment and disposal, placement in disposal sites, transferring to other organizations, and use/utilization. The figure suggests that while the placement in landfills is quite stable over the years the amounts of waste transmitted to other organizations varies drastically. It is yet unknown what happens to the waste transmitted to other organizations. The category ‘used’ (referred in figures 2 and 3) includes the amounts of hazardous waste domestically reused in the waste producer organization.

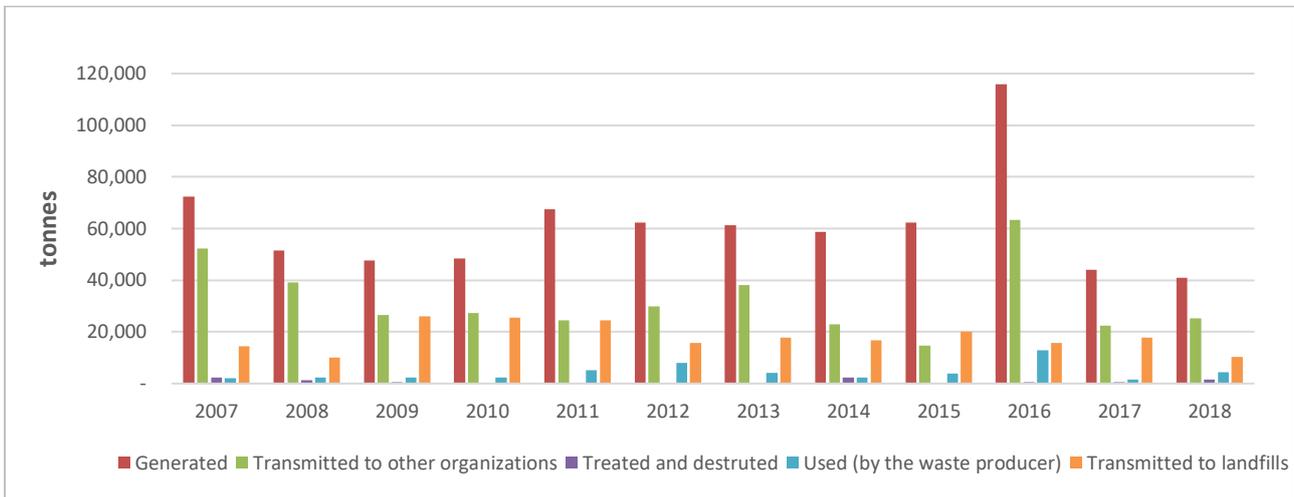


Figure 4 - The flow of hazardous waste (excluding municipal) by years (tonnes)
 Source: ArmStatBank, 2018. Available at <https://armstatbank.am/>

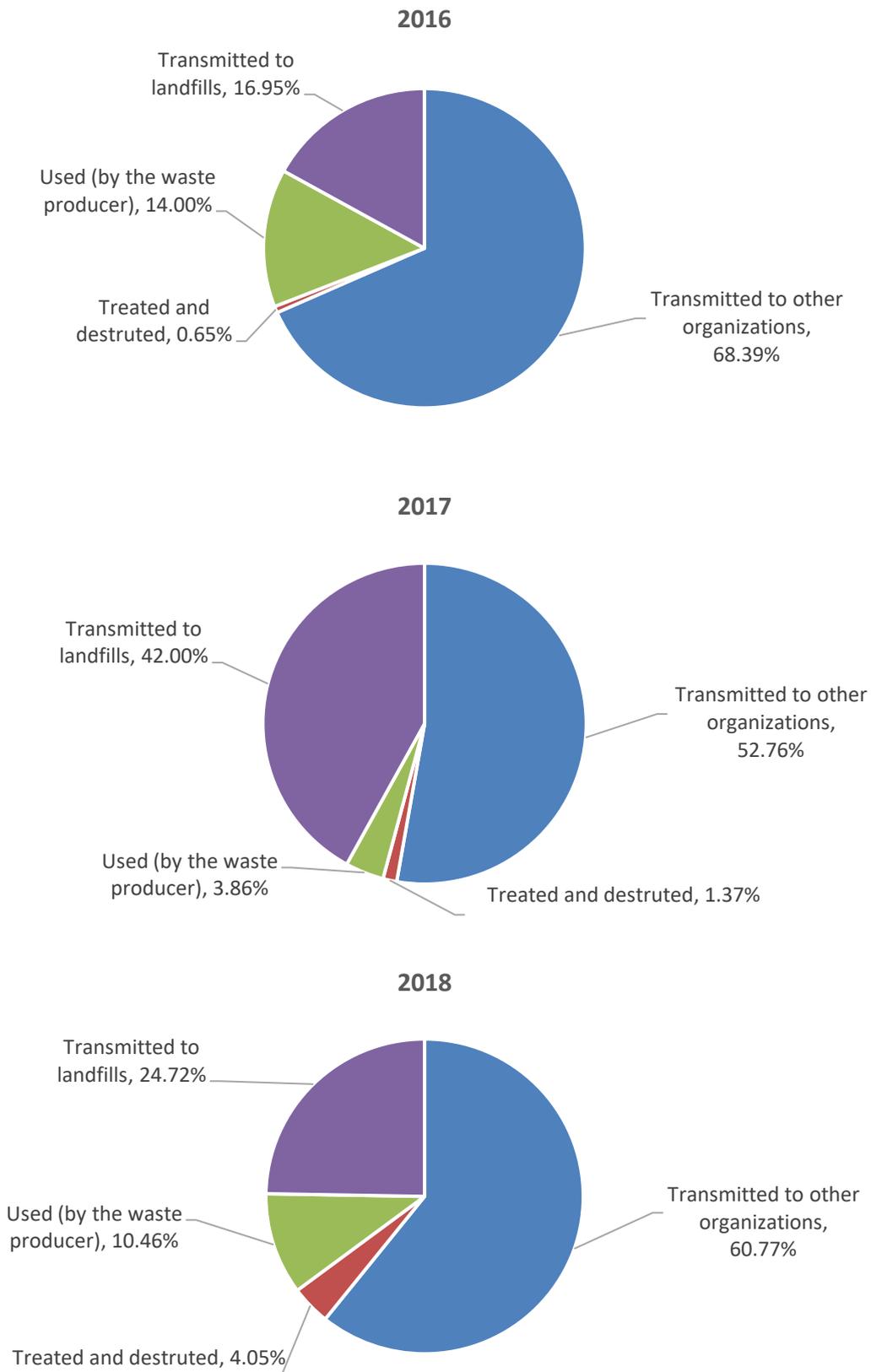


Figure 5 -The flows of waste in years 2016-2018

Source: ArmStatBank, 2018. Available at <https://armstatbank.am/>

2.1.7 Key national priorities

Main directions for the strategy of solid waste management depend heavily on the needs of the country as well as on the key policy priorities. Waste governance is the integral part of many key national priorities and strategies that relate not only environment but also sectors such as tourism and energy, agriculture, and industry.

The country's strategic development framework "Armenia Transformation Strategy 2050" presented by RA Government in July 2019 sets Strategic Mega-Goals,⁹ some of which have direct links to waste governance. The selected Mega-Goals are:

- 9. PRODUCTIVE AND RESPONSIBLE FARMING
- 15. RENEWABLE AND ACCESSIBLE ENERGY
- 16. ATTRACTIVE FOR BUSINESS ARMENIA
- 17. CLEAN AND GREEN ARMENIA

In 2015 Armenia started a participatory process of nationalization and implementation of Sustainable Development Goals (SDGs),¹⁰ some of which directly or indirectly involve waste governance aspects. The selected SDGs are:

- SDG 7: Ensure access to affordable, reliable, sustainable, and modern energy for all
- SDG 12: Ensure sustainable consumption and production patterns
- SDG 13: Take urgent action to combat climate change and its impacts.

Waste governance aspects are reflected also in key national strategies and international agreements such as Republic of Armenia Government 2019 Program, Republic of Armenia Territorial Development Strategy for 2016-2025 [ii], Republic of Armenia Solid Waste Management Development Strategy for 2017-2036 [iii], Cleaner Production Concept [vi], Comprehensive and Enhanced Partnership Agreement (CEPA) [ix] signed between RA and EU, which are discussed in the section 2.3 *National programs, strategies, and concept papers*.

Below is the outline of the key national priorities reflected in different programs and strategy papers to be addressed when developing solid waste management strategy and policies.

1. A policy targeting the reduction and elimination of the negative and hazardous impact of solid wastes on human health, for which a number of measures have been foreseen in different strategy documents such as 2019 RA Government Program [i] and Republic of Armenia Territorial Development Strategy for 2016-2025 [ii].
2. Development and implementation of a policy encouraging green economy and sustainable development goals.

⁹ More details on the discussion are available at <https://www.gov.am/en/news/item/9554/>

¹⁰ For more details on SDG implementation process, please see the 2018 report "SDG Implementation Voluntary National Review (VNR) Armenia", available at https://sustainabledevelopment.un.org/content/documents/19586Armenia_VNR_2018.pdf

3. Implementation of a policy aiming to ensure the application of modern methods for saving water resources as well as increasing their management efficiency, while preventing overuse of water resources.
4. Implementation of a policy for the protection of biodiversity and ensuring biosecurity. [i]
5. Policy for the development of tourism as well as other subsectors with great tourism-related potential. [i]
6. A policy for increasing the population's level of employment, which can be greatly impacted by solid waste management, including the modernization of technologies for the elimination, collection, transport, placement, recycling, and treatment of waste that will lead to the creation of a number of jobs. This is also important in the context of poverty reduction in the country.
7. Development of a system ensuring energy security and promotion of alternative energy resources, including the use of biomass, which is of decisive significance for ensuring the energy independence of the country.
8. Increasing the efficiency of land use, and development of organic agriculture. The sustainable development of these two sectors provides adequate management of organic waste generated in agriculture and a return to agricultural ecosystems (through composting).

Government Program Action Plan of 2019 outlines main direction in country's waste governance emphasizing its importance in sectors such as industry, agriculture, healthcare, and construction. To ensure cross-sectoral approach to waste governance it is necessary that not only the strategies and policies that directly relate to waste governance but also the policies such as Energy Security Strategy and Tourism Development Strategy include waste governance aspects. Energy sector may benefit from waste-to-energy solutions such as biogas, bio-fuel, refuse-derived fuel production, incineration, and pyrolysis among other options.

2.2 Information and data

SECTION CONTENTS

- 2.2.1 RA Statistical Committee
- 2.2.2 Data found in strategies and research reports
- 2.2.3 Studies on quantity and composition of waste

The sustainable development of solid waste greatly depends on the availability and accuracy of information and data. Statistical data received based on studies serves as a baseline for the development of the contents of the strategy and for determining the next steps, whereas inaccuracies and insufficient data and information significantly hamper the development of a system of sustainable waste management.

The information on the generation and subsequent use of solid wastes is collected and reported sporadically, the main reason for which is the lack of finances and technological capacities. The transparency and consistency of methods applied in studies and monitoring is another problem.

2.2.1 RA Statistical Committee

The mission of the Statistical Committee of the Republic of Armenia (ARMSTAT) is to develop, produce, and disseminate the official statistics for public use. Its main functions are to:

- Implement the development, production, and dissemination of official statistics according to the statistical programs;
- Conduct sample surveys according to the methods, sampling and conduction order defined by the State Council;
- Conduct comprehensive censuses by the order defined by law;
- Collect statistical data (including from administrative registers) through statistical documents defined by the State Council;
- Maintain statistical, including business registers and statistical databases;
- Collect necessary statistical data from citizens on their living conditions, socio-demographic status, households, etc.;
- Implement Statistical Information Collection Program each year at the expense of the means provided by the state budget of the Republic of Armenia by the order defined by law;
- Conclude cooperation agreements, memorandums of understanding, adopts joint orders with the bodies implementing official statistics of other states, international organizations, state and local self-government bodies in accordance with the procedure defined by law and other legislation;
- Define a systematic dissemination policy for other producers of official statistics according to the procedure defined by the State Council for the transparent application in the national statistical system, as well as a general terminology for dissemination of official statistics;
- Coordinate all activities related to the development, production, and dissemination of official statistics in the national statistical system, except for the RA Central Bank; and
- Examine cases of administrative offenses by the order defined by law.

The ARMSTAT provides the following data on solid waste in the country:

1. Generation of waste according to indicators and years;
2. Generation of waste according to the types of activities, categories of hazards, and years;
3. The amounts of waste transported to landfills;
4. Flow of hazardous waste (excluding household waste) according to indicators and years;

5. Environmental taxes and payments for nature use (e.g. landfill tax);
6. Expenditure for capital repair of fixed assets (e.g. recycling plants, etc.)

Drawbacks

The data on waste reported by the committee is often unreliable because of data acquisition sources and methodology. For instance, the amounts of waste transported to landfills is reported by the municipalities to ARMSTAT. These amounts are calculated based not on weight measured via weighbridges but based on volumes of waste trucks. The diverse fleet of refuse collection vehicles – compacting and non-compacting – as well as varying density of waste allow for only rough estimates for the reported volumes of transported waste that are later converted to weight with certain factor.

Also, the institutional setting for data acquisition and processing is often sophisticated and allows for many inaccuracies to occur. Figure 6 represents the current institutional setting for acquisition, processing, and reporting data on solid waste. The data on waste is acquired from different sources by 4 entities and there is no coherence in its processing, analyzing, distributing, and publishing. The distribution and exchange of the collected data among the agencies is disorganized and complicated due to lack of clear protocols and tools for data exchange, which makes waste governance and decision making on all levels inefficient. Additionally, the reporting format varies from paper-based forms to MS Excel spreadsheets files. It is strongly recommended that all waste-related data is collected and processed through one comprehensive centralized waste reporting on-line (web-based) tool for tracking and reporting waste data ensuring that public authorities make waste management information available to the public. This requirement should extend to private businesses and contractors handling waste.

The European Union statistical office Eurostat in 2016 has developed a Guidance on Municipal Waste Data Collection ^[xvii] with an aim to provide guidance on the scope and coverage of municipal waste for the purpose of the annual data collection on municipal waste generation and treatment.¹¹

There are also inconsistencies in representation of waste by classes of hazard. Table 6 shows the amounts of waste reported by the RA Statistical Committee in 2019 on total waste generation in the country by classes of hazard. Notably, the figures in five rows from the 1st to 5th classes do not sum-up to the corresponding amounts indicated in the row Total. The figures in Total row are larger. The difference in these figures corresponds to the municipal waste amounts again reported by Armstat presented in Table 7.

¹¹ The report is available at <https://ec.europa.eu/eurostat/documents/342366/351811/Guidance+on+municipal+waste+reporting/0710f1a4-6b68-4d48-ac4c-75901bc0644b>

Class of hazard	2013	2014	2015	2016	2017	2018
I class (1000 t/year)	-	-	-	0.03	0.01	-
II class (1000 t/year)	0.09	0.02	0.04	0.02	0.03	-
III class (1000 t/year)	41.10	37.53	35.23	95.35	2.09	4.30
IV class (1000 t/year)	19.34	21.17	27.00	20.37	41.80	36.70
V class, non-hazardous (1000 t/year)	49,262.55	46,453.21	47,276.24	55,045.63	59,578.53	67,105.20
Total (1000 t/year)	49,840.77	47,029.63	47,831.31	55,661.13	60,116.40	67,616.10

Table 6 - Total waste generation by hazardous classes and years (1000 t/year)

Source: ArmStatBank. Available at <https://armstatbank.am/>

Class of hazard	2013	2014	2015	2016	2017	2018
I class (1000 t/year)	-	-	-	-	-	-
II class (1000 t/year)	-	-	-	-	-	-
III class (1000 t/year)	-	-	-	-	-	-
IV class (1000 t/year)	-	-	-	-	-	-
V class, non-hazardous (1000 t/year)	-	-	-	-	-	-
Municipal services total (1000 t/year)	517.69	517.70	492.80	499.73	493.92	469.90

Table 7 - Municipal waste generation by hazardous classes and years (1000 t/year)

Source: ArmStatBank. Available at <https://armstatbank.am/>

According to the List of wastes classified by hazardousness (N 430-Ն) the unsorted municipal household and commercial wastes have the 4th class of hazard. Since the municipal solid waste in the entire country has always been collected unsorted up until the year 2019, it should have been accounted and reported as having 4th class of hazard, while Table 6 shows that it is not classified, which conflicts with the mentioned N 342-Ն decree (Oct 26, 2006) of the Minister of Environment.

The Law on Waste (ՀՕ-159) sets out the Cadaster of waste that includes the “Registry of the objects of generation, recycling and recovery of waste” and the “Registry of waste disposal sites”, which do not include the waste collection and transportation entities. Thus waste operators in the country do not report data on collected and landfilled waste. This information based on rough volume estimations is reported by municipalities to the RA Statistical Committee. This cadaster and register of wastes should include both hazardous and non-hazardous wastes, however, de facto only the information on hazardous wastes is included.

WASTE DATA REPORTING STRUCTURE IN ARMENIA

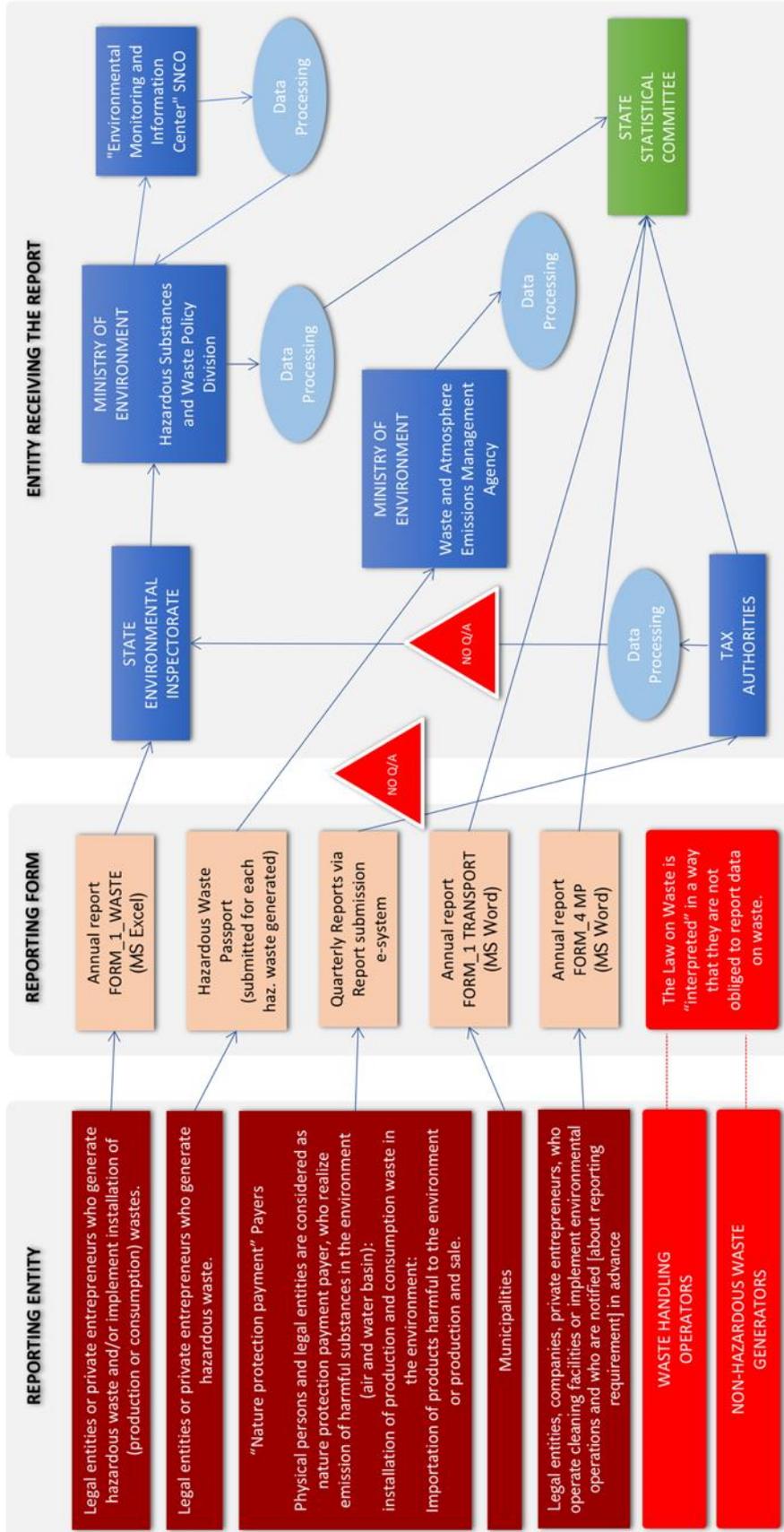


Figure 6 - Waste data reporting structure in Armenia
 Source: Information from various sources assembled by the authors of this report

2.2.2 Data found in strategies and research reports

The comprehensive list of waste management related research papers and reports is available at the AUA Acopian Center for the Environment Waste Resource Library.¹²

Strategies and plans developed by the Ministry of Territorial Administration and Infrastructure are also viewed among information available in relation to the sector. The situation of waste management in Armenian provinces and in Yerevan with respect to the number of population and communities, as well as the expenses for waste collection, waste collection rates, amounts of fees gathered for waste collection for every year are available on the official web pages of all provincial authorities (governors' offices).

Some organizations have initiated mapping of dumpsites in the country. Particularly:

1. Since 2017, the RA Ministry of Territorial Administration and Development, Ministry of Health and Transproject CJSC have been collecting data and created an online map of landfills, which was accessible until April of 2019 through this link: <http://map.transproject.am>
2. "Hetq" online media conducted a research of waste collection in the province of Tavush in 2015 and created a map of 23 landfills. The study can be found here: <https://hetq.am/hy/article/62141>
3. Asian Development Bank has financed mapping of landfills in Syunik region.
4. In 2019, the RA Ministry of Territorial Administration and Development together with the AUA Acopian Center for the Environment implemented a pilot project for the development of a map and a database on the generation and collection of waste in Armenia. The maps and the outcomes of the project are available here: <https://whm-ace.aua.am/>

Drawbacks

Information is of crucial importance for the development of a policy for sustainable management of waste, and a tremendous amount of important data is still missing. Particularly, there is no information on the quantity and composition of waste generated in all communities of the country and currently existing in landfills.

Regular inventories and monitoring of landfills are not conducted and there are no control mechanisms, as a result of which it is impossible to prevent the random emergence of landfills. The norms for generated waste that are in place since the Soviet times, through which the volumes of waste generated in the country are supposed to be assessed, are no longer relevant and do not reflect an accurate picture. There is also no official information on the volumes of recycled solid waste in the country.

In 2010 the Republic of Armenia has engaged in developing ENPI Shared Environment Information System (SEIS), a project implemented by the European Environment Agency in collaboration with Eurostat, DG Environment, and the EU's Joint Research Centre (JRC). The project aims to promote the protection of the environment in the countries of the ENPI area by extending the principles of the Shared Environmental Information System (SEIS) to the EU neighboring countries, and developing the capacities of the relevant authorities responsible for environmental data management and reporting. The SEIS is an EU initiative to modernize and simplify the collection, exchange, and use of the data and information required for designing

¹² The Waste Resource Library is available at <https://wrl-ace.aua.am/research-and-policy-papers/>

and implementing environmental policy. It is recommended that the SEIS is extended to include also information on solid waste in Armenia.

RA Government Decree № 500-N approved the management procedure of the register of facilities for the generation, treatment, and recycling of waste. The main objective of the register is to collect, analyze, process and store data on the generation, treatment, and recycling of waste.

2002 Decree № 112-N of the RA Minister of Nature Protection on approving the N1-Waste (annual) format of the administrative statistical report “on the generation, use and disposal of waste” as well as the order of filling out the said form.¹³

2.2.3 Studies on quantity and composition of waste

Availability of data on quantity and composition of generated waste is critical to successful waste governance in the country. This availability, however, implies regularity, consistency, and accuracy. It is best practice to perform waste quantity and composition study once 3 years, 3-4 tests during different seasons, using the same methodology. This is a costly operation that requires both financial, technical, and human capacity, as well as lots of cooperativeness and support on the side of municipalities.

Since the year 2000, eight projects implemented in Armenia involved solid waste quantity and composition analysis either as part of the project or as its main purpose. All of the analyses have been carried out using different methodologies, in different parts of the country, and in different seasons, so that the results are not compatible with each other.

The latest analysis has been carried out in summer 2019 by the AUA Acopian Center for the Environment in partnership with the Government of Armenia in the frames of the Waste Quantity and Composition Study (WQCS).¹⁴ The MSW tests has been executed in 6 locations (the cities of Yerevan, Ararat, Kapan, Hrazdan, Vanadzor, and Gyumri) to acquire a representative sample for the entire country. To execute the tests a methodology used in EU (specifically Sweden) has been used and adapted to the Armenian context (see Table 8).

¹³ The Armenian version of the Decree is available at <https://www.arlis.am/DocumentView.aspx?docid=18980>

¹⁴ For more details on the study visit <https://wqcs-ace.aua.am>

#	Report title	Authors	Study year	Regions included in the study
1	Environmental Performance Review Armenia [xxii]	UN	2000	Hrazdan and Yerevan cities
2	Municipal Solid Waste Management in Armenia: Current Trends and Steps Forward [xxiii]	Georgi Arzumanyan	2004	Yerevan city
3	Composition of Solid Waste in the Berd Municipal Dump in Tavush Marz, Armenia [xxiv]	Patricia Butler	2007	Town of Berd (Tavush Marz)
4	Advisory Study on the Municipal Solid Waste Management in Yerevan [xxv]	FICHTNER	2008	Yerevan city
5	Recycling of Household Waste in Armenia: Personnel training, data collection including waste analyses, recommendations for waste management actions [xxvi]	Bundesumweltministerium	2010	Towns of Vanadzor, Sevan, Ejmiatsin, Talin, village of Mkhchyan
6	Kotayk Solid Waste Management - Environmental and Social Due Diligence [xxvii]	COWI A/S	2010	Hrazdan City Centre, Kotchor village, Ahpurak village
7	Qualitative Analysis of Municipal Solid Waste in Armenia, Croatia, Cyprus, F.Y.R.O.M. and Ukraine – Methodology and Results [xxviii]	Enviroplan S.A	2015	Yerevan city
8	Waste Diversion Concept Note (Yerevan Solid Waste Assignment) [xxix]	Enviroplan S.A	2016	Yerevan city
9	Waste Quantity and Composition Study [xxx]	LL Bolagen	2019	Entire country

Table 8 - Studies that included waste composition analysis in RA¹⁵

Source: Information from various sources assembled by the authors of this report

To ensure a consistency and comparability of the future quantity and composition analyses conducted in the country it is recommended to adopt a uniform technical guidance on waste quantity and composition analysis. (For more details see the chapter *Policy Recommendations, section 4.2.1 A. Monitoring, data, and information*).

¹⁵ Reports for most of these studies are available online. To assess the links see the REFERENCES or visit the Waste Resource Library of the AUA Acopian Center for the Environment available at <https://wrl-ace.aua.am/research-and-policy-papers/>

2.3 National programs, strategies, and concept papers

SECTION CONTENT

2.3.1 2019 RA Government Program

2.3.2 2017-2036 Municipal Solid Waste Management System Development Strategy

2.3.3 Sustainable Agricultural Development Strategy for 2010-2020

2.3.4 Cleaner Production Concept

2.3.5 Extended producer responsibility (EPR)

2.3.6 CEPA

The development and coordination of the implementation of the national policy on waste governance all across Armenia are done by the government of the Republic of Armenia. Municipal waste handling (management)¹⁶ as well as sanitary cleaning on the local level are done by territorial authorities and local self-governing bodies. A common mechanism and a universal framework of regulations are foreseen for all provinces (Marzes) and communities of Armenia. Each community practically decides for itself how to organize waste collection and disposal in areas within its administrative territory. However, weak requirements and standards on local solid waste management planning together with poor capacities lead to unsustainable and low quality waste management or, like in case of many communities, no waste collection service provided.

Many strategy concepts and papers adopted by the national government have never been fully implemented due to poor administrative capacities, lack of resources and political will to promote and follow up the accepted approaches and achieve the set goals (e.g. the below discussed Cleaner Production Concept). Due to the same reasons, several strategies and roadmaps developed with the support of international consultants and organizations remained on the paper. One of such instances is the 2013 Strategy Report, Road-map and Long-term Investment Project in Solid Waste Management in Armenia developed by the Asian Development Bank.¹⁷ Some of the approaches and solutions suggested in the report informed the 2017-2036 Municipal Solid Waste Management System Development Strategy developed by the MTAI. The later, however, focused mainly on improving the waste collection, transportation, and disposal capacities in the country, while setting quite weak targets for waste sorting and recovery (by 2016 users will sort up to 20% of the generated waste).

Overall, many efforts have been focused on the municipal solid waste leaving other waste streams such as agricultural, industrial, C/D, chemical, automotive, WEEE, as well as specific critical wastes such as batteries and oils among others out. Additionally, there is no separate strategy or program developed to address the issue of the country's dumpsites on a national level. This issue is discussed in details in section titled "Dumpsites and Landfills".

The goals and actions set out in the current 2019 RA Government Program and the CEPA broadly address some of the abovementioned issues, however there should be a more comprehensive strategic approach to all solid waste streams based on the principles of waste hierarchy and circular economy, where polluters are

¹⁶ Here we refer to the following definition in the RA Law on Waste. *Waste handling (management)* – activities aimed at the collection, transportation, disposal, storage, treatment, processing recycling, removal, neutralizing and burial of wastes.

¹⁷ The report in Armenian is available to download at <http://www.mtad.am/files/docs/1496.pdf>

financially responsible and legally liable for the impact they cause. In the below sections we discuss some of the mentioned programs and strategy papers.

2.3.1 2019 RA Government Program

The program (N65-Մ) released in February 2019 outlines the main directions for the country's environmental management, particularly focusing on environmentally sound management of chemicals and wastes (including mining waste). To ensure convenient and ecologically safe living conditions for citizens and to reduce the negative (hazardous) impacts of the municipal solid waste on the environment and public health, the program sets out the following:

- an institutional framework to establish waste management system compliant to international standards
- waste management cost recovery through improved waste handling fee collection and better contracting and legal framework in the sector
- implementation of waste disposal and recycling programs in collaboration with international institutions

Based on the program (N65-Մ) the RA Government further developed an action plan (N650-Լ) released in May 2019. Table 9 shows the summary of the actions supporting the main directions on solid waste governance set in the program.

#	Action and outcome	Due date
95.1	Develop draft legislation on chemicals	June 2020
95.4	Develop conceptual approaches to waste management (directed to prevention and recycling of industrial, agricultural, medical, and C/D waste streams).	Aug 2019
97.1	Introduce an electronic system for permits and licenses issued by the Ministry of the Environment to ensure accessibility and reduce the time of issuing the permits.	Nov 2020
97.3	Modernize the monitoring networks for the environmental components (air, water, soil, biodiversity) and the waste disposal sites.	Nov 2022
97.5	Develop shared environment information system that will include thematic libraries.	Sep 2023
99.1	Reduce the use of single-use plastic bags through economic mechanisms.	June 2019
102.1	Develop proposal for changes in the legislation on ecological education to ensure implementation of effective ecological training on different levels of education.	Dec 2020
102.2	Develop informal ecological education through public awareness raising mechanisms.	2022-2023
226.2	Increase the rates of waste handling service fee collection in communities.	Sep 2020
226.3	Develop waste management strategy (that will ensure collection, safe disposal, or recycling of solid waste in all communities).	Aug 2019

Table 9 - Summary of the actions supporting the main directions on solid waste governance set in the program (N-65 Մ)

Drawbacks

The program and the action plan do not explicitly promote the use of economic incentives to promote waste hierarchy implementation and environmentally sound waste management and sustainable resource management. Furthermore, there's no mention of circular economy.

2.3.2 2017-2036 Municipal Solid Waste Management System Development Strategy

Objectives and expected outcomes

1. The primary objective of the strategy [iii] is to create an integrated system of management of municipal solid waste by EU standards for all of Armenia, which will provide technically, financially, and environmentally cost-efficient services to the general population and enterprises (henceforth - users).

The national MSWM system will include comprise regional MSWM sub-systems meeting the same criteria and principles. The integrated nature of the system will ensure compatibility of waste management technologies (collection, transportation, storage, disposal and later also recycling) and the management system that will function based on a sustainable financial, institutional, and legal framework.

2. Outcomes of strategy implementation:

- 1) All of Armenia will have a SMWM system in line with the requirements of the Council of Europe Directive 2008/98/EC of November 19, 2008 and CE Directive 94/62/EC of December 20, 1994 (henceforth jointly referred to as EU standards), which will include the operation of landfills and waste collection.
- 2) SMWM system will comprise a limited number of regional sub-systems (operation of no more than 10 regional landfills in line with EU standards as well as implementation of waste collection in communities of the sub-system) and will cover 100% of Armenia's territory.
- 3) At least 95% of the waste generated in Armenia will be collected.
- 4) Users will sort up to 20% of the waste generated by them.
- 5) In parallel with the introduction of the new system, all existing landfills in Armenia will be terminated (if their modernization is deemed infeasible).
- 6) The economy of scale will ensure the lowest possible fee rate. The implementation of the strategy will not require increase in the service fees for waste collection defined by law.
- 7) The economy of scale will lead to increase of the attractiveness of the system for the private sector along the whole value chain (from collection to recycling)
- 8) The impact on public health and environment will decrease drastically. The landscapes cleansed up from litter will increase the touristic attraction.

Drawbacks

While this strategy outlines important directions like providing all communities up to date solid waste collection and sanitary cleaning services, there is too little focus on raising capacities for sorted collection and recycling in the country. The target set for 2036 requires waste producers to sort up to 20% of the waste generated, which is a very low number for a period of nearly 20 years, compared to, for instance, the average targets set by EU Commission for the member states.¹⁸ Additionally, the strategy does not address the issue of biological wastes.

¹⁸ More details on EU targets can be found in *Towards a circular economy: A zero waste program for Europe* available at <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52014DC0398>

2.3.3 Sustainable Agricultural Development Strategy for 2010-2020

The strategy [vii] stipulates the primary directions for the state policy targeting agriculture and rural development for 2010-2020. The document identifies the main directions of agricultural policy and the measures required for its implementation. The strategy also defines the priorities of the agricultural sector as well as the preferred specialization and rational distribution conditioned by market factors, which can serve as more targeted milestones for state governing authorities and local self-governing bodies, the donor community, investors, and business entities.

The strategy is communicated to the RA Government Sustainable Development Program and ensures the continuity of the enhancement of agricultural reforms in the country, while also targeting the reduction of rural poverty and migration.

Drawbacks

The document in no way addresses the issue of agricultural waste management, whereas the implementation of the 11th sub-goals of the strategy implies sustainable management of agricultural wastes, namely, conservation of the environment and natural landscapes, development of agro-tourism and organic agriculture.

2.3.4 Cleaner Production Concept

RA Government Protocol Decision № 49 adopted in 2011 makes a reference to the Cleaner Production Concept [vi] as one of the governing legal frameworks of the RA 2014-2025 Strategic Program of Prospective Development, which shall facilitate the following:

- Safe management of waste
- Introduction of an ecologically clean production
- Complex solution to the issue of environmental pollution

Cleaner production implies more efficient use of raw materials and energy, exclusion of toxic and hazardous materials, as well as prevention of production waste generation and pollution at the source. The philosophy of cleaner production targets the reduction of negative impacts of production and services on the environment during their entire life-cycle starting from the acquisition of raw materials and ending with use and final elimination.

The concept foresees the following:

1. Principles for the organization of environmentally clean and low-waste technologies;
2. Requirements for zero-waste production procedures and technologies;
3. Requirements for raw materials and energy resources in the organization of a low-waste or zero-waste production;
4. Requirements for finished goods
5. Measures aiming to ensure clean production
6. Main benefits expected from the introduction of the principles of cleaner production by the industrial organization.

Cleaner Production Concept framework aims at reducing the negative impacts from production and services during their entire life-cycle – from material extraction to consumption and disposal – that would include:

- 1) Reduction of prime costs for material, water, and energy recovery
- 2) Prevention of waste
- 3) Avoidance or reduction of hazardous materials and processes
- 4) Improvement of environmental indicators
- 5) Improvement of productivity
- 6) Reduction of waste management costs
- 7) Reduction of negative impacts on the environment
- 8) Reduction of unit cost, that would increase the competitiveness in global market
- 9) Improvement of working conditions
- 10) Development of production based on wastes generated by other industries and human activities

2.3.5 Extended producer responsibility (EPR)

On April 12, 2018, the RA Government adopted a Protocol Decision on Approving the Strategy and 2018-2021 Action Plan for the Introduction of the Extended Producer (Importer) Responsibility Systems [viii]. At its core, the EPR has a governing strategy, according to which the producer or the importer, in the initial stage of production (import) of the given item, foresees measures preventing (or neutralizing the negative impacts) the environmental impacts arising in the final stage of that product's (good's) use and bears administrative and financial liability for the elimination of said negative impacts. The objectives of the EPR system are:

1. Prevention of waste generation
2. Reduction of quantities at source of generation
3. Recycling as secondary raw materials
4. Recycling as secondary energy resource
5. Burial in landfills (as the least preferable method for waste management)

The main long-term goal for the introduction of the EPR system is the promotion of production that meets environmental requirements, which will help to prevent environmental pollution and reduce the use of natural resources in all production cycles as well as reduce costs of waste recycling.

The strategy is expected to be implemented in two main phases, and the overall system was planned to be introduced by the end of 2021 in the following order:

- A. Development of the corresponding legal framework (2018-2021)
- B. Introduction and development of the EPR system, including:
 - Developing and introducing a packaging marking system
 - Developing and implementing public awareness campaigns on waste separating and sorted collection
 - Implementing financial studies to assess the expenses by companies and consumers, as well as other studies

Table 10 presents the four measures comprising the action plan defined in the strategy's Annex 2.

Action/ Measure	Designated authorities	Implementation Timeframe
1. Develop a draft on changes and amendments in the RA Law on Waste	RA Ministry of Environment RA Ministry of Economy	Dec 2018
2. Develop a draft on changes and amendments in the RA Tax Code	RA Ministry of Environment RA Ministry of Economy RA Ministry of Finances RA State Revenue Committee	Dec 2019
3. Develop a draft list of non-consumable products (including packaging) subject to recovery	RA Ministry of Environment RA Ministry of Economy RA State Revenue Committee RA Ministry of Energy (from 2019 a part of the RA Ministry of Territorial Administration and Infrastructure)	Dec 2020
4. Develop a draft on changes and amendments in the RA Law on Waste Collection and Sanitary Cleaning	RA Ministry of Territorial Administration and Infrastructure RA Ministry of Environment	Nov 2021

Table 10 - Action plan for the introduction of the EPR systems in Armenia, 2018-2021

According to the RA Ministry of Environment,¹⁹ given that

- Armenia currently lacks treatment, recycling, recovery, and disposal, as well as sorted collection and transportation capacities necessary to introduce the EPR systems;
- Armenia has an obligation to establish full cost recovery mechanism in accordance with the polluter pays principle and extended producer responsibility principle according to the Comprehensive and Enhanced Partnership Agreement (CEPA) signed between EU and RA of Armenia on 24 November 2017;

the action plan measures have been deemed untimely and inexpedient (which is fortified by 08.01.2019 N 02/24.10/8 Prime Minister's decree) and thus will be implemented within the action plan and timeframe required by the CEPA (see Table 11).

¹⁹ AUA Acopian Center for the Environment has sent an inquiry on status of the EPR adoption process on October 4, 2019.

The assumption that Armenia currently lacks capacities for treatment, recycling, recovery, and disposal, as well as sorted collection and transportation necessary to introduce the EPR systems is not fully substantiated. There are more than forty companies involved in solid waste recovery and treatment in the country (see APPENDIX C – List of waste recovery and treatment facilities in Armenia). Some of the capacities these companies are discussed in detail in sections 2.7 *Infrastructure* and 2.8 *Waste management practices in Armenia*.

However, there remains a need for additional analysis of waste handling, recovery, and treatment capacities in the country. Therefore, EPR adoption would require assessing these capacities for the specific types of wastes selected according to the draft list of non-consumable products, including packaging, subject to recovery (see Action 3 in EPR action plan).

2.3.6 CEPA

The Comprehensive and Enhanced Partnership Agreement (CEPA) was signed between EU and RA of Armenia on 24 November 2017. Table 11 presents the summary of the Agreement's selected provisions relevant to the solid waste management taken from the Annexes and Protocols to the EU-Armenia Comprehensive and Enhanced Partnership Agreement.²⁰

Area/Domain	Directive	Provisions of the Directive that shall apply	Timeframe*
Access to environmental information	Directive 2003/4/EC of the European Parliament and of the Council of 28 January 2003 on public access to environmental information and repealing Council Directive 90/313/EEC	<p>Adoption of national legislation and designation of competent authority/ies</p> <p>Setting up of practical arrangements under which environmental information is made available to the public and the applicable exceptions (Articles 3 and 4)</p> <p>Ensuring that public authorities make environmental information available to the public (Article 3(1))</p> <p>Establishment of procedures to review of decisions not to supply environmental information or to supply only partial information (Article 6)</p> <p>Establishment of a system for disseminating environmental information to the public (Article 7)</p>	2 years
Public participation	Directive 2003/35/EC of the European Parliament and of the Council of 26	<p>Adoption of national legislation and designation of competent authority/ies</p> <p>Establishment of a mechanism for providing the public with information (Articles 2(2)(a) and 2(2)(d))</p>	2 years

²⁰ The Annex Timeframe for implementing the action applies as of date of the entry into force of the CEPA, 24 November 2017 is available at https://eur-lex.europa.eu/resource.html?uri=cellar:60b9829d-a1f1-11e7-a56f-01aa75ed71a1.0015.02/DOC_2&format=PDF

* Timeframe for implementing the action applies as of date of the entry into force of the CEPA, 24 November 2017.

	May 2003 providing for public participation in respect of the drawing up of certain plans and programs relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC	<p>Establishment of a mechanism for public consultation (Articles 2(2)(b) and 2(3))</p> <p>Establishment of a mechanism for public comments and opinions to be taken into account in the decision-making process (Article 2(2)(c))</p> <p>Guaranteeing effective, timely and not prohibitively expensive access to justice at administrative and judicial level in these procedures for the public (including NGOs) (Article 3(7) and Article 4(4), environmental impact assessment and integrated pollution prevention and control)</p>	
Environmental liability	Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, as amended	Adoption of national legislation and designation of competent authorities	5 years
		Establishment of rules and procedures aimed at preventing and remedying of damage to the environment (water, land, protected species, and natural habitats) based on the polluter-pays principle (Articles 5,6 and 7, Annex II)	8 years
		Establishment of strict liability for dangerous occupational activities (Article 3(1) and Annex III)	7 years
		Establishment of obligations for operators to take the necessary prevention and remediation measures including liability for costs (Articles 5, 6, 7, 8, 9 and 10)	7 years
		Establishment of mechanisms for affected persons, including environmental NGOs, to request action by competent authorities in the case of environmental damage, including independent review (Articles 12 and 13)	5 years
Waste management	Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives	Adoption of national legislation and designation of competent authority/ies	4 years
		Preparation of waste management plans in line with the five-step waste hierarchy and of waste prevention programs (Chapter V)	
		Establishment of full cost recovery mechanism in accordance with the polluter pays principle and extended producer responsibility principle (Article 14)	6 years
		Establishment of a permitting system for establishments/undertakings carrying out disposal or recovery operations, with specific obligations for the management of hazardous wastes (Chapter IV)	4 years
Establishment of a register of waste collection and transport establishments and undertakings (Chapter IV)			
Landfills	Council Directive 1999/31/EC of 26	Adoption of national legislation and designation of competent authority/ies	3 years

April 1999 on the landfill of waste , as amended	Classification of landfill sites (Article 4) Preparation of a national strategy reducing the amount of biodegradable municipal waste going to landfill (Article 5) Establishment of an application and permit system and of waste acceptance procedures (Articles 5 to 7, 11, 12 and 14) Establishment of control and monitoring procedures in the operation phase of landfills and of closure and after-care procedures for landfills to be disaffected (Articles 12 and 13)	
	Establishment of conditioning plans for existing landfill sites (Article 14)	6 years
	Establishment of a costing mechanism (Article 10)	3 years
	Ensuring the relevant waste is subject to treatment before landfilling (Article 6)	6 years

Table 11 - Summary of the CEPA selected provisions relevant to the solid waste management

What follows is several highlights from Armenia’s CEPA commitments on waste governance that we present as targets to be met according to the set timeline:

- By 2020 to have established a system for disseminating environmental information to the public
- By 2021 to have prepared national strategy reducing the amount of biodegradable municipal waste going to landfill
- By 2021 to have established control and monitoring procedures in the operation phase of landfills and of closure and after-care procedures for landfills to be disaffected
- By 2021 to have established application and permit system and of waste acceptance procedures (at landfills)
- By 2022 to have prepared waste management plans in line with the five-step waste hierarchy and of waste prevention programs
- By 2023 to have established register of waste collection and transport establishments and undertakings
- By 2024 to have established full cost recovery mechanism in accordance with the polluter pays principle and extended producer responsibility principle
- By 2024 to have established conditioning plans for existing landfill sites
- By 2024 to have established a system ensuring the relevant waste is subject to treatment before landfilling
- By 2025 to have established obligations for operators to take the necessary prevention and remediation measures including liability for costs
- By 2025 to have established strict liability for dangerous occupational activities.

2.4 Legislation and regulations

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- 2.4.1 RA Constitution and ratified international waste-related treaties
- 2.4.2 RA Law on Waste (ՀՕ159-Ն)
- 2.4.3 RA Law on Waste Collection and Sanitary Cleaning (ՀՕ-237-Ն)
- 2.4.4 RA Law on Environmental Impact Assessment and Expert Examination (ՀՕ-110-Ն)
- 2.4.5 RA Tax Code (ՀՕ-165-Ն)
- 2.4.6 RA Law on Licensing (ՀՕ-193)
- 2.4.7 RA Law on Local Self-Government (ՀՕ-337)
- 2.4.8 RA Law on Environmental Control (ՀՕ-82-Ն)
- 2.4.9 RA sub-legislative acts
- 2.4.10 Legislation related to hazardous wastes
- 2.4.11 Legislation related to waste oils and lubricants
- 2.4.12 Legislation related to packaging waste
- 2.4.13 Rights and responsibilities of main actors
- 2.4.14 Definition and types of waste
- 2.4.15 Documents stemming from EEU membership
- 2.4.16 Key policy and legislation drawbacks

The Armenian waste legislation involves more than fifty laws²¹ and sub-legislative acts related to waste management. Armenia has signed more than 10 international treaties and agreements directly related to waste. Figure 7 below illustrates overall structure of the RA legal framework. The present section addresses overall scope of the domestic legislation involving only the key legislation. We discuss the competences and authorities of the key government bodies in the next section *2.5 Institutional framework*.

Simplifying and modernizing the waste legislation has been a priority objective for the EU since 2008. Harmonization of legislation regarding interaction of different legislation and harmonizing the implementation of legislation on European level has been identified as priority objectives of the activities not least because harmonization includes the potential to simplify legislation.

²¹ The up to date list of legislative acts related to waste management in Armenia is available at the Waste Resource Library of the AUA Acopian Center for the Environment (<https://wrl-ace.aua.am/legislation>)

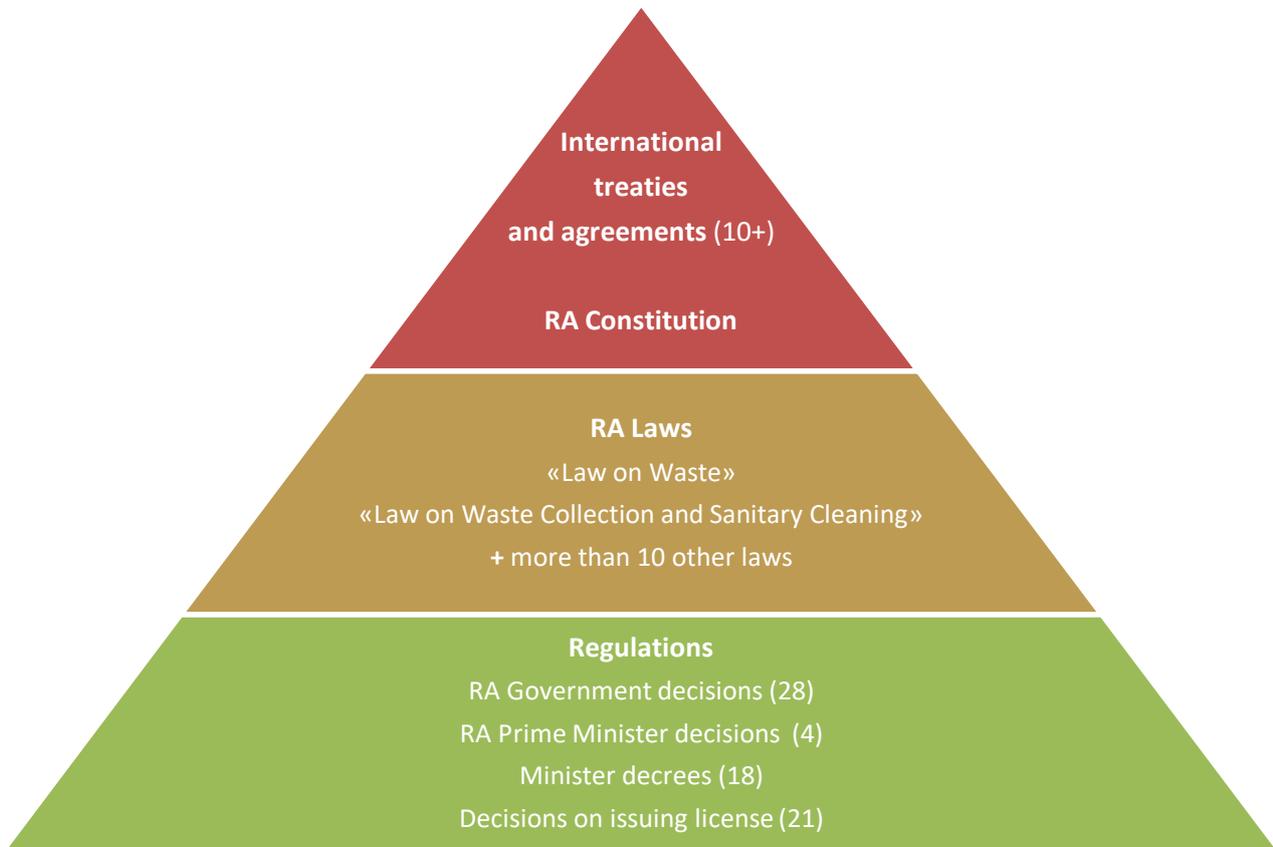


Figure 7 - The structure of the RA legal framework

Source: Data collected from various sources by the authors of this report

2.4.1 RA Constitution and ratified international waste-related treaties

The RA Constitution states the terms for use of natural resources defined in articles 10 and 12.

Article 10. Guaranteeing Ownership

1. All forms of ownership shall be recognized and equally protected in the Republic of Armenia.
2. The subsoil and water resources shall fall under the exclusive ownership of the State.

Article 12. Preservation of the Environment and Sustainable Development

1. The State shall promote the preservation, improvement and restoration of the environment, the reasonable utilization of natural resources, guided by the principle of sustainable development and taking into account the responsibility before future generations.
2. Everyone shall be obliged to take care of the preservation of the environment.

The constitution does not provide any clauses that would secure the right to live in a healthy and sustainable environment both for current and future generations.

Armenia is a party to 11 international agreements directly related to waste management (see Table 12) and to 6 inter-state agreements that concern environmental issues (see Table 13).

#	Agreement	Date of ratification
1	Convention on Long-Range Transboundary Air Pollution	1997
2	UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	1998
3	The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1999
4	Helsinki Convention on the Transboundary Effects of Industrial Accidents	1997
5	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2004
6	Stockholm Convention on Persistent Organic Pollutants	2004
7	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2013
8	Minamata Convention on Mercury	2017
9	Agreement on the cooperation of CIS member states with respect to the use of electronic and electrotechnical equipment wastes	2018
10	Decision of the Eurasian Economic Commission on defining the rates of import duties of the Eurasian Economic Union's common economic tariff for wastes and scraps of precious metals.	2015

Table 12 - Armenia's membership to international agreements related to waste management

Source: Data collected from various sources by the authors of this report

#	Agreement	Date of ratification
1	Bilateral Agreement between Armenia and Georgia on Cooperation in the Sectors of Environment and Natural Resources Protection	1997
2	Memorandum of Understanding Between the Ministry Environment of the Republic of Armenia and Iran Environmental Agency on Cooperation in the Sector of Environment	2001
3	Agreement Between the Ministry of Environment of the Republic of Armenia and the Ministry of Environment of the Republic of Tajikistan on Cooperation in the Sector of Environment	2003
4	Agreement Between the Ministry of Environment of the Republic of Armenia and the Ministry of Environment of the Arabic Republic of Syrian on Cooperation in the Sector of Environment	2009
5	Agreement Between the Ministry of Environment of the Republic of Armenia and the Ministry of Environment of the Republic of Latvia on Cooperation in the Sector of Environment	2009
6	Memorandum of Understanding Between the Ministry Environment of the Republic of Armenia and the Ministry of Environment of the Republic of Lebanon on Cooperation in the Sector of Environment	2011

Table 13 - Armenia's membership to inter-state agreements related to the environment

Source: Data collected from various sources by the authors of this report

2.4.2 RA Law on Waste (ՀՕ159-Ն)

In the area of waste management, the Republic of Armenia Law on Waste defines the competences of the Government of Armenia, the state authorities in the sectors of nature protection, health, territorial administration, as well as those of the local self-government (RA Law on Waste, articles 7, 8, 9, 10 and 11 respectively).

The Law on Waste regulates the collection, transport, storage, treatment, disposal, and reduction of volumes of wastes, as well as the legal and economic frameworks for preventing the negative effects of wastes on public health and the environment. The law defines the state policy in waste management, as well as the procedures for the standardization, accounting, and profiling of waste. More than 40 sub-legislative acts have been adopted to ensure the enforcement of the Law on Waste.

Drawbacks

The Law on Waste is missing the notion and definition of Waste Hierarchy (WH). While containing and promoting all components of Waste Hierarchy the law yet does not explicitly set the priority order which is central to the WH approach. Specifically, the notions such as upcycling and downcycling, Bio-waste, Waste holder, Dealer, Broker, Separate collection, Circular economy, as well as definitions on types of recyclables are not introduced in the Law.

To meet the requirements of the Comprehensive and Enhanced Partnership Agreement (CEPA) on "Preparation of waste management plans in line with the five-step waste hierarchy and of waste prevention programs" it will be necessary to include the notion of Waste Hierarchy in the law.

The law promotes zero-waste, less-waste, and resource efficient technologies but does not focus on promotion of zero-waste and less-waste consumption. No promotion of waste sorting as a precondition for the most efficient material recovery.

While the Article 23 of the Law on Waste promotes incentives for organizations introducing technologies contributing to reduction of waste generation, there is still no legal act issued to define the procedure of applying for receiving the benefits.

The mentioned Article 23 involves some conceptual uncertainties when defining the entities eligible for the benefits. Thus, saying “organizations introducing technologies contributing to reduction of waste generation, which recover, collect, store, and build facilities...” the article involves confusion between waste reduction practice and different treatment practices.

Additionally, the Article 23 does not specify the types of benefits, e.g. tax benefit, import taxation, feed-in tariff, etc.

2.4.3 RA Law on Waste Collection and Sanitary Cleaning (ՀՕ-237-Ն)

The Law defines the competences of the RA Government as well as those of the relevant state authority in the field of waste collection and sanitary cleaning. The law also defines the main principles of waste collection and sanitary cleaning, rights and responsibilities of the problems, and defines the rates for waste collection. In the list of concepts in the law, a very important role and significance is given to the concept of “waste.”

Drawbacks

The law defines the liability terms for improper waste collection that lies only on the operator who will pay 50,000 AMD penalty for each case of improper implementation, while the community council (head or other designated person or entity) is responsible to control the proper implementation of the waste collection by the operator.

2.4.4 RA Law on Environmental Impact Assessment and Expert Examination (ՀՕ-110-Ն)

The law states that the founding documents related to the areas of handling of wastes are subject to assessment and expert examination, which focus on the composition of wastes, levels of hazard, the volume, use, treatment, transport, liquidation, storage, packaging, burial, storage, and maintenance of waste. It defines three categories of assessment and expert examination – A, B, and C.

In waste management sector, the following activities are subject to assessment and expert examination of Category A:

- Collection, storage, use, processing, treatment, disposal, liquidation, placement, and burial of hazardous wastes;
- Installation of landfills or municipal waste recycling facilities to service communities with 15,000 or more residents or to receive at least 10 tons of waste per day, and/or treatment of municipal waste.

The unsorted municipal solid waste from residential households and household spaces of organizations is defined as having 4th class of hazard according to the List of wastes classified by hazardousness (RA Government decision N 430-Ն). However, neither the waste collection operators nor the dumpsite operators at the communities do not pass EIA or Expert Examination required by law.

2.4.5 RA Tax Code (ՀՕ-165-Ն)

The Article 162 of the law defines the environmental taxpayers:

1. ...
7. In specifically designated areas (waste allocation sites, landfills, waste deposits, refuse dumps, complexes, constructions, industrial sites, tailing storage facilities, industrial waste dumps, overburden rock sites):
 - (1) payers of environmental tax for placing or storing subsoil management wastes shall be deemed to be those generating such wastes;
 - (2) payers of environmental tax for storing industrial and/or consumption wastes shall be deemed to be those generating such wastes;
 - (3) payers of environmental tax for placing industrial and/or consumption wastes shall be deemed to be those generating or placing such wastes, except for the cases referred to in point 4 of this part;
 - (4) payers of environmental tax for placing household wastes generated by natural persons as a result of carrying out garbage disposal in accordance with the Law of the Republic of Armenia “On garbage disposal and sanitary purification” shall be deemed to be the operators performing garbage disposal and sanitary purification activities, in accordance with the same Law.

The law’s Article 170 defines the rates of environmental tax for placing and storing mining wastes, industrial wastes and/or consumption wastes in specially designated areas (waste allocation sites, landfills, waste deposits, refuse dumps, complexes and/or constructions) discussed in section 2.11.2 *Landfill taxes*.

2.4.6 RA Law on Licensing (ՀՕ-193)

The law defines the types of activities subject to licensing and regulates the relations connected to issuing permits. In the environmental protection sector (article 13) the law sets licensing requirements to recycling, treatment, storage, transportation, and placement of hazardous wastes. The licensing procedure is regulated by the Norms on issuing a license for hazardous waste handling operations (N 121-Ն).

As in case of the EIA or Expert Examination, licensing is required for the unsorted municipal solid waste from residential households and household spaces of organizations defined as having 4th class of hazard according to the List of wastes classified by hazardousness (RA Government decision N 430-Ն). However, neither the municipal waste collection operators nor the dumpsite operators at the communities do not pass licensing procedure required by law.

2.4.7 RA Law on Local Self-Government (ՀՕ-337)

The law defines the competences of the Local Self-Government bodies (LSGB) in relation to the organization of waste collection and sanitary cleaning as well as the definition of waste handling fees. The competences and responsibilities of the LSGBs are discussed in details in the section 2.5.8 *Local self-government bodies*.

2.4.8 RA Law on Environmental Control (ՀՕ-82-Ն)

Article 22 of the law defines the main directions of the environmental control, several from which related to the waste management are presented below:

1) Atmospheric air protection

...e) enforcing the requirements on limits of storing or burning of wastes (in the settlements) that come from industry or household, and that are source of air pollution through dust, harmful gazes and odorous substances;

2) Water resource use and protection

...e) enforcing the requirements on siting the landfills, dumpsites, burial sites, and other facilities for waste that have indirect harmful impact on water resources;

3) Soil protection

a) applying measures to protect soil from landslides caused by water and wind, from floods, swamping, salination, pollution with industrial and household waste, chemicals, and other impacts on soil;

4)...

5)...

6) Hazardous substances and industrial and household wastes

a) enforcing the requirements on handling hazardous substances and industrial and household (excluding radioactive) wastes, meaning their generation, collection, transportation, storing, treatment, recovery, disposal, and placing in the environment;

b) enforcing the requirements on exporting hazardous substances and wastes from the Republic of Armenia and their transboundary shipment through the Republic of Armenia.

2.4.9 RA sub-legislative acts

The RA Government Decree № 1161-N of October 4, 2007 defines the mandatory norms for the maintenance of common equity ownership in apartment buildings, including:

1. Disposal of consumption (household) waste at least once every three days, and in case of temperatures of +50°C and above – every day;
2. Disinsection (extermination of insects) and deratization (extermination of rodents) in common areas, chutes and waste collecting rooms at least once every three months;
3. Sanitary cleaning of common areas at least once every two days.

In order to prevent the negative effects of wastes on human health and the environment, the Decree № 25-N of the RA Minister of Health, adopted on 22.12.2009, defines sanitary rules N2.1.7.002-09 and hygienic requirements for the sanitary maintenance of community areas, collection, storage, transport, processing, treatment, recycling, liquidation, and burial of consumption wastes, as well as for the occupational safety of the staff dealing with consumption wastes.

The Decree defines the norms for the collection, storage, and disposal of waste in buildings with chutes, the types and sizes of containers for temporary storage of waste and their placement in different areas.

Moreover, the containers must have lids and only two-thirds of the container should be filled with waste.

The Decree also defines the norms for the transport of consumption wastes, as well as the disinfection norms for containers, garbage trucks and waste collection rooms.

However, the above-mentioned norms are not always adhered to. The RA Code of Administrative Offenses was amended in May of 2018, and harsher punishments and liability were foreseen for dumping waste in areas and sites not designated for waste collection and sanitary cleaning. The penalties have been differentiated according to the amount and type of waste (article 43.1).

List of production (including mining) and consumption wastes generated in RA (N 342-Ն)

Enforced in 2006, the N 342-Ն RA Government decision suggests the list of wastes generated in the country. The wastes are listed with 13-digit code, the name, and the source. See Picture 6 – The first page of the List of production (including mining) and consumption wastes generated in RA.

Էջ 1		
Հավելված ՀՀ բնապահպանության նախարարի 2006 թվականի հոկտեմբերի 26-ի N 342-Ն հրահանգի		
ՑԱՆԿ ՀԱՅԱՍՏԱՆԻ ՀԱՆՐԱՊԵՏՈՒԹՅԱՆ ՏԱՐԱԾՔՈՒՄ ԳՈՅԱՑՈՂ ԱՐՏԱԴՐՈՒԹՅԱՆ ԵՎ ՍՊԱՈՍԱՆ ԹԱՓՈՆՆԵՐԻ		
Ծածկագիր	Թափոնների անվանումը	Ծագումը
1000000000000	ԲՆԱԿԱՆ ԾԱԳՈՒՄ ՈՒՆԵՑՈՂ ՕՐԳԱՆԱԿԱՆ ԹԱՓՈՆՆԵՐ /ԲՈՒՄԱԿԱՆ ԵՎ ԿԵՂԱՆԱԿԱՆ/	
1100000000000	Սննդամթերքի և համային հատկանիշներ ունեցող մթերքների արտադրության թափոններ	
11100000 00 00 0	Սննդամթերքի արտադրության թափոններ	

Picture 6 – The first page of the List of production (including mining) and consumption wastes generated in RA.
 Source: <https://www.arlis.am/DocumentView.aspx?docid=100155>

2.4.10 Legislation related to hazardous wastes

The treatment, neutralization, storage, transport, and placement of hazardous wastes require licensing according to the Law on Waste and the Law on Licensing. The licenses issued currently may contain inserts on the corresponding types of activities. The licensing procedure is regulated by the Norms on issuing a license for hazardous waste handling operations (N 121-Ն).

Drawbacks

Although the licensing process includes a complicated procedure, it should be noted that the license is issued with not expiry dates and there is no requirement to renew the license. The license can be suspended or terminated, however, in practice there have been no cases of suspending or terminating of licenses in the past decade.

List of wastes classified by hazardousness (N 430-Ն)

According to Decree № 430-N of the Minister of Nature Protection adopted in 2006, wastes in Armenia are classified according to their level of hazard: class 1, 2, 3, 4 and 5. The most hazardous wastes belong to category 1, while category 5 implies non-hazardous waste.

The List of wastes classified by hazardousness is compatible with the corresponding lists of the Basel Convention and those of the OECD. In addition, Armenia has adopted the list of banned wastes for import and classifies waste according to 4 different levels of hazardous wastes and as non-hazardous wastes. For the purpose of an inventory, a corresponding sub-legislative act was adopted, according to which all organizations that generate waste must submit annual reports on the quantity of the waste, amount of waste sent to landfills, as well as the payments made according to the different risk levels of the wastes.

As of November 2019, this List of wastes classified by hazardousness included 845 entries. Table 13 summarizes the list in terms of number of entries corresponding to a specific waste and its class of hazard. Thus, 27 entries are wastes of most hazardous 1st class, 56 are of 2nd, 300 are of 3rd, and 462 are of 4th class of hazard that includes unsorted municipal solid waste from residential households (entry 91100100 01 00 4) and household spaces of organizations (entry 91200400 01 00 4).

Class of hazard	Number of entries
1 st class of hazard (most hazardous)	27
2 nd class of hazard	56
3 rd class of hazard	300
4 th class of hazard (least hazardous)	462
Total	845

Table 14 - Number of entries by class of hazard in the List of wastes classified by hazardousness (N 430-Ն)

Source: <https://www.arlis.am/DocumentView.aspx?DocID=35639>

Hazardous waste passport

Decree № 19-N of the Minister of Nature Protection, adopted in 2006, defines the model form of the waste passport. Moreover, the entity generating waste must declare the following: “I have concluded through research that the given waste contains only the above-mentioned toxic components in the given percentages, due to which I have classified this waste as a waste of Category __. I confirm that the information provided by me is accurate and true.”

Medical hazardous waste

The medical waste handling is regulated by Decree № 03-N of the Minister of Health adopted on March 4, 2008 on approving sanitary rules and norms N 2.1.3-3 on “the hygienic and anti-epidemic requirements for the handling of medical waste.” These sanitary rules and norms define the sanitary and anti-epidemic requirements for the use (prevention of generation, collection, temporary storage, neutralization, liquidation, transport, and burial) of hazardous medical wastes (with the exception of radioactive medical waste) generated by medical facilities, other organizations, and sole proprietors.

Notably, the requirements for the neutralization of medical wastes are different depending on their volumes. The overall weight of hazardous medical wastes generated within 30 days determines whether or not an organization is a major generator of waste (more than 50 kg monthly) or a small one (fewer than 50 kg). If the health organization can reduce its quantity of hazardous medical wastes to 50 kg per month through accurate separation and sorting of waste and reduction of the overall volume of wastes, then it can be reclassified as a health organization generating a small amount of waste.

№ 05-N Decree (February 1, 2013) of the RA Minister of Health on Approving the procedure for keeping records of medical wastes in pharmacies and pharmaceutical kiosks.²²

According to this procedure, medical wastes generated at pharmacies and pharmaceutical kiosks are the following products, which are no longer good for use:

- 1) Medications
- 2) Medical substances
- 3) Products of medical significance

Those products are registered as medical wastes after they are classified as defective, if:

- 1) They are past their expiry date;
- 2) There is a violation in the packaging, labeling, the contents are not complete, there are signs of deterioration of the medication (form, color, transparency, and changes of other features);
- 3) If there is information or it has been identified through a lab examination conducted in an order defined by RA legislation that the quality of the medication, medical substance or product of medical significance is not compatible with the requirements of RA legislation;
- 4) Medications produced in Armenia have been recalled in a manner defined by RA legislation.

Internal monitoring shall be done in organizations for the inventory of medical wastes.

At least one week prior to the expiry dates of medications, and immediately after a medication has been identified as faulty, the person with the relevant responsibility shall inform the director of the organization

²² The decree is available in Armenian at <https://www.arlis.am/DocumentView.aspx?docID=84564>

on the matter in written form. Within a two-day period, the director of the organization shall organize the proper disposal of expired medications and those no longer good for use by a commission set up a legal act defined within the framework of competences of the director. The commission shall comprise three employees of the given legal entity or sole proprietor. The commission shall prepare an act for disposal of medications, medical substances, products of medical significance in pharmacies or pharmaceutical kiosks. Immediately after the proper disposal of medications and the generation of a disposal act, the individual with the relevant authority shall carry out an inventory of medical wastes. Following the inventory of medical wastes and prior to their liquidation in a manner defined by RA Law, the individual with the relevant authority shall medical wastes in temporary storage sacks or containers.

A “Manual on the design and operation of landfills,” developed based on European directives and reviews of international best practices, was approved by the 29.12.2009 Decree № 321-A of the RA Minister of Urban Development.

Drawbacks

Despite the norms and regulations related the handling hazardous waste are relatively well-developed there is still no single ESM (Environmentally Sound Management) facility for hazardous wastes (e.g. mercury containing lamps or thermometers, batteries, etc.) in the entire republic. There has been no decree or legal act enforcing design and construction of such a facility. As of September 2019, there has been no decree or legal act requiring design and construction of an ESM facility that would receive wastes with 1st class of hazard for at least storing.

In effect, particular types of hazardous waste, such as Alkaline, Carbon Zinc, and Lithium household batteries currently end up in dumpsites through municipal mixed waste stream, while they can be diverted from landfills through simple low-cost separate collection systems and storing facilities introduced and run by municipalities. When organized properly, the collection and transportation of waste batteries is a low-risk operation, while the environmental and health risks and impacts of their uncontrolled dumping through mixed waste are considerably high. Many European municipalities use special containers spread over the city to collect used household batteries in accordance to EU norms defined in the directive on batteries.²³ (To learn more about waste batteries management best practices see Appendix A section *A4.8 Waste household batteries*).

One of the reasons such systems are not implemented in Armenia is that the waste batteries are classified as having 4th class of hazard and thus their transportation and storage require permits according to the Law on Licensing (ՀՕ-193). Additionally, an environmental tax will apply for storing the household batteries.

2.4.11 Legislation related to waste oils and lubricants

RA Government decision № 546 of 2015 on Approving the technical regulations for lubricants, oils and special liquids.²⁴

²³ Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC (Text with EEA relevance) available at <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32006L0066>

²⁴ The decision is available in Armenian at <https://www.arlis.am/DocumentView.aspx?DocID=97859>

In order to prevent risks to human life and health, property, environment, flora, and fauna and/or health care, as well as activities misleading consumers, and in order to save resources, the present technical regulation defines requirements for lubricants, oils and special liquids (henceforth products), used lubricants, oils and special liquids, as well as products obtained following the recycling of used products.

Products are allowed to be imported and circulated in the market, if their compatibility with the requirements of the technical regulation has been approved.

For the purpose of the application of the present technical regulation, lubricants, oils and special liquids are identified in accordance with documents, which may be the technical documents, and/or the quality profiles, and/or testing acts, and/or supply agreements, and/or specifications, and/or labels, and/or brief characteristics or other documents characterizing the product.

This regulation prohibits the waste oils and lubricants to be:

- a) disposed into water reservoirs, on soil and into sewage system
- b) transferred and disposed in dumpsites dedicated for industrial and household wastes
- c) mixed with gasoline, gas, oil, and diesel fuels for creation of a fuel to be used as a source of energy (except for entities authorized by competent governmental bodies)
- d) mixed with products containing halogen organic compounds
- e) used as non-stick liquids to fill in construction components

2.4.12 Legislation related to packaging waste

RA Government Decision № 1544-N on Approving the Technical Regulation for Packaging Waste²⁵

1. ...

2. ...the present technical regulation defines the measures related to preventing the generation of packaging waste, the distance of reuse and recycling of wastes, the use of multiple-use packaging, treatment of waste and application of new methods, reduction of the volumes of final recycling of wastes.

3. The present technical regulation does not cover consumer packages of medical equipment, pharmaceutical products, pesticides and agricultural chemicals, chemical substances (reagents), products containing radioactive materials and elements, packages of hygienic products for oral cavities.

2.4.13 Rights and responsibilities of main actors

Provision of waste collection services

The rights and responsibilities of entities providing waste collection services are regulated on contractual basis in accordance with existing norms in the country. While norms should be revisited and evaluated in terms of sustainability aspects, there is also a need for local authorities to raise capacity in sustainable public procurement, contract management, and sustainable environmental management.

²⁵ The decision is available in Armenian at <https://www.arlis.am/DocumentView.aspx?DocID=28433>

Payment of waste collection fees

The principal rights of persons paying waste collection fees are as follows:

1. Independently assess the amount of the fee subject to payment and check its compatibility with calculations.
2. Get familiar with the rate subject to payment as well as calculations, receive information on payments made by them.
3. In a legally defined manner appeal actions related to the registration of persons subject to paying waste collection fees, calculations of waste collection fees, as well as activities related to the collection of said fees.
4. Require compensation of waste collection expenses from the community, operator or company in cases of inadequate implementation of responsibilities of the party liable for waste disposal.

The responsibilities of persons paying waste collection fees:

1. Payment of the waste collection fee in a legally defined timely manner and rates
2. In cases of major generation of waste, order the disposal of said waste in relevant containers
3. Store the waste and dispose of it in designated areas.

2.4.14 Definition and types of waste

According to the RA Law on Waste, in Armenia there are *production*²⁶ wastes (including mining waste) and *consumption wastes* which are characterized as residues generated during production (including mining) or consumption of raw materials, substances, outcomes, remains of other goods or food, as well as products that have lost their initial consumption attributes. Notably, this definition differs from the one provided in Article 3 of the EU Waste Framework Directive,²⁷ where ‘waste’ means any substance or object which the holder discards or intends or is required to discard.

The same RA Law on Waste mentions the term “*household solid waste*,” which is described as types of consumption waste that are generated in residential areas as a result of consumption by natural persons, as well as products that have lost their consumption features during their use in residential areas by natural persons aiming to meet their individual and domestic needs. Household solid wastes include wastes generated by the activities of legal persons and sole proprietors and in their composition are similar to wastes generated in residential areas as a result of consumption by natural persons. This category “*household solid waste*” is quite comparable to the *municipal solid waste* as described in, for instance, EU List of Waste²⁸ and many national legislations across EU. Using the term ‘household’ (instead of ‘municipal’) for wastes generated out of domestic environments may make confusions, especially, in relation with the term household waste defined in another fundamental law in RA legislation, namely the RA Law on Waste Collection and Sanitary Cleaning Services (ՀՕ-237-Ն, 08.23.2011).

²⁶ In this report the terms *production waste* and *industrial waste* are used interchangeably. Both versions are commonly used in different translations of RA legislation.

²⁷ DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on waste and repealing certain Directives is available to view at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098>

²⁸ The list of waste referred to in article 7 of Directive 2008/98/EC is available at <https://eur-lex.europa.eu/eli/dec/2000/532/2015-06-01>

In the later the term “waste” is defined as comprising of Household waste, Non-household waste, and Bulky waste explained as follows:

1. Household waste – wastes generated by human consumption and/or activities.
2. Non-household waste:
 - production waste – industrial and production waste and/or consumption wastes generated by legal entities and sole proprietors;
 - construction waste – wastes generated during urban development activities, repairs, reconstruction, and demolishing of buildings
3. Bulky waste – production or consumption waste generated by human activities or those of legal entities or sole proprietors, which, taking into account their physical features (including size, volume and weight) are impossible to collect, store or transport to designated areas for municipal waste through regular technical means.

In this categorization the Household waste and Non-household waste categories are mutually exclusive, while the Bulky waste overlaps with both of them, which also makes confusion.

The N 342-Ն decree (Oct 26, 2006) of the Minister of the Environment defines the list of production (including mining) and consumption wastes produced in the Republic of Armenia, while the same year N 430-Ն decree defines the list of hazardous wastes according to the level of hazard. As it has already been mentioned, the level of hazard serves as the basis for the classification of wastes in Armenia. Wastes are classified into 5 categories. First 4 categories of wastes are considered hazardous wastes, while the 5th category is considered to be non-hazardous waste.

Drawbacks

The mentioned framework laws miss a number of important definitions included in the 2008/98/EC Directive on waste and repealing certain Directives 2008. These terms and their definitions are the following:

- ‘waste hierarchy’ (priority order in waste prevention and management: prevention, preparing for re-use, recycling, other recovery, e.g. energy recovery, and finally disposal)
- ‘bio-waste’ (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food processing plants);
- ‘waste holder’ (the waste producer or the natural or legal person who is in possession of the waste);
- ‘dealer’ (any undertaking which acts in the role of principal to purchase and subsequently sell waste, including such dealers who do not take physical possession of the waste);
- ‘broker’ (any undertaking arranging the recovery or disposal of waste on behalf of others, including such brokers who do not take physical possession of the waste);
- ‘separate collection’ (the collection where a waste stream is kept separately by type and nature so as to facilitate a specific treatment);
- ‘re-use’ (any operation by which products or components that are not waste are used again for the same purpose for which they were conceived);
- ‘preparing for re-use’ (checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing);

2.4.15 Documents stemming from EEU membership

The Agreement on the Order of Implementation of Customs Operations Related to Clearance and Movement of Personal Items by Physical Entities through the Customs of the Customs Union entered into force in 2015.²⁹

This agreement defines the procedure of customs operations related to the movement and clearance of personal items of physical entities, including automobiles, through the customs system of the Customs Union.

In the list of banned imports and exports to and from the territory of the Customs Union, the following products are listed among other things:

- Hazardous wastes that are prohibited to import, and/or for which transfer limitations are applied during import and/or export (1.3.)
- Quantity limits are applied during the importing and/or exporting of ferrous and non-ferrous metals and scraps included in the list (2.1.)
- Raw precious metals, scraps and wastes of precious metals, minerals of precious stones and raw materials, as well as ores containing precious metals, the exports of which are not restricted by the Customs Union (2.2.).

In June of 2017, the Agreement on the Transboundary Movement of Hazardous Wastes through the Customs of the Eurasian Economic Union entered into force.³⁰

This agreement is in line with the principles of international obligations foreseen by the Basel Convention, which effects legal entities or physical entities registered as sole proprietors implementing transboundary movement of wastes while conducting trade between member states.

According to the agreement, transboundary movement of wastes can be done based on a conclusion (written permission), which is issued by the authorized body on a form approved by the Eurasian Economic Commission. The conclusion (written permission) is issued to the applicant in an order and timeframe defined by the legislation of member states.

2.4.16 Key policy and legislation drawbacks

Missing promotion of waste hierarchy in the country's policy and legislation

Overall, the RA legislative framework and policies miss the notion and definition of Waste Hierarchy and other important definitions. There are missing provisions promoting green procurement and Waste Hierarchy approach in the Procurement as well as licensing legislation and regulations.

There is a lack of national policies that advance programs promoting Waste Hierarchy approach and specifically waste prevention both on national and local level. There are no effective mechanisms for economic incentives to promote Waste Hierarchy compliant initiatives. (See more details in section 3.1 *Legislative and strategy gaps*).

²⁹ The agreement is available in Armenian at <https://www.arlis.am/DocumentView.aspx?docid=95220>

³⁰ The agreement is available in Armenian at <https://www.arlis.am/DocumentView.aspx?DocID=124799>

Separation of waste is not promoted by RA laws

While the Law on Waste sets out the competences for a community mayor of “supporting the introduction of a system of sorted waste in the community”, there are no explicit requirements or promotion of sorted collection as a precondition for an efficient material recovery in any regulation. Neither there is a requirement to develop waste management plans that would include source separation requirement. Additionally, the Preparation of a national strategy reducing the amount of biodegradable municipal waste going to landfill is part of CEPA requirements

Lack of local (community or province) level waste management strategies

There are only few cases where the community has developed a solid waste management strategy or plan. These are cases when an international or local organization implements a project where such a plan is necessary. Normally, the waste management is included in the yearly general programs and action plans of the communities, however, they address only collection and disposal issues with no focus on prevention, sorting, and recovery aspects. The preparation of waste management plans in line with the five-step waste hierarchy and of waste prevention programs is part of CEPA requirements.

Missing regulations on individual waste streams

The RA legal framework includes regulations on waste oils and lubricants, construction and demolition waste, medical waste, hazardous chemicals.

In its 2019 program the RA Government commits to develop conceptual approaches to waste management, directed to prevention and recycling of industrial, agricultural, medical, and C/D waste streams. However, there are no separate regulations or expressed wish to develop conceptual approaches for such solid waste streams as WEEE, end-of life vehicles, waste batteries, animal by-products and derived products, biodegradable wastes.

Missing adequate technical guidelines on landfills

One of the preconditions of environmentally sound solid waste management is the proper and controlled design, operation, maintenance, closure, and after-care of landfills that require good technical guidelines and norms set by the regulations. There are reportedly around 330 dumpsites in the Republic of Armenia the majority of which are subject to closure that would require a technical guidance that is missing. Additionally, part of the CEPA requirements are the establishment of control and monitoring procedures in the operation phase of landfills and of closure and after-care procedures for landfills to be disaffected as well as the establishment of conditioning plans for existing landfill sites.

Lack of a uniform technical guidance on waste quantity and composition analysis

Availability of data on quantity and composition of generated waste is critical to successful waste governance in the country. This availability, however, implies regularity, consistency, and accuracy. Since the year 2000, eight projects implemented in Armenia involved solid waste quantity and composition analysis either as part of the project or as its main purpose. All of the analyses have been carried out using different methodologies, in different parts of the country, and in different seasons, so that the results are not compatible with each other.

Missing laws or regulations on ESM facilities for hazardous wastes

Despite the norms and regulations related the handling hazardous waste are relatively well-developed there is still no single ESM (Environmentally Sound Management) facility for hazardous wastes (e.g. mercury

containing lamps or thermometers, batteries, etc.) in the entire republic. There has been no decree or legal act enforcing design and construction of such a facility. As of September 2019, there has been no decree or legal act requiring design and construction of an ESM facility that would receive wastes with 1st class of hazard for at least storing.

Limited responsibility and liability of waste producer

Generally, according to RA legal framework the generator (e.g. original producer) of waste is not responsible for the waste after handing it over to a waste handling company, so that if the collected waste is handled improperly (illegal dumping or other disposal) by the collecting entity, the generator has no liability but only the handling company has. As a result, having no liability for the end-of-life treatment the generators may select the handling companies basing on the cost of service only rather than the reputation or other records.

The regulations do not specify in which cases the original waste producer is to retain responsibility for the whole treatment chain or in which cases the responsibility of the producer and the holder can be shared or delegated among the actors of the management chain. This issue is closely tied to the issue of ownership of waste on every stage of the management chain which is quite uncertain in RA legal framework.

This gap echoes the CEPA requirements to establish rules and procedures aimed at preventing and remedying of damage to the environment (water, land, protected species, and natural habitats) based on the polluter-pays principle as well as to establish strict liability for dangerous occupational activities.

More details on identified gaps are discussed in section 3.3 *Financial mechanisms gaps* and the corresponding policy recommendations are presented in section 4.3 *Recommendations on financial mechanisms*.

2.5 Institutional framework

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- 2.5.1 RA Government
- 2.5.2 RA Ministry of Territorial Administration and Infrastructure
- 2.5.3 RA Ministry of the Environment
- 2.5.4 RA Ministry of Health
- 2.5.5 RA Ministry of Emergency Situations
- 2.5.6 RA Urban Development Committee
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- 2.5.9 Environmental Protection and Mining Inspection Body of the RA (EPMIB)
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- 2.5.11 Environmental Monitoring and Information Center, SNCO
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- 2.5.13 Privately-owned test labs
- 2.5.14 Statistical Committee of the RA
- 2.5.15 Key institutional drawbacks

This section discusses Armenia's waste governance institutional framework presenting the main actors involved in the sector with their competences and functions including state governing authorities, territorial administration authorities, and local self-governmental bodies. The policy development of the sector is led by the RA Government, while the Ministry of Territorial Administration and Infrastructure, the Ministry of Environment, and the Ministry of Health, as well as the regional level territorial administration authorities participate in waste related policy development. The mentioned three ministries develop national programs and plans and ensure their implementation. The territorial administration authorities and the local self-governmental bodies (LSGBs) carry out the implementation of the policies and national programs and plans on regional and local level. The LSGBs are responsible for provision of municipal waste collection and disposal and sanitary cleaning services in communities. In case of emergencies where hazardous substances are involved (leakage of chemicals, large amounts of poisonous or infectious substances) it is the responsibility of the Ministry of Emergency Situations to oversee and ensure the proper handling of hazardous wastes. Otherwise the hazardous waste (including medical, C/D, industrial, lead batteries, mercury, poultry manure, etc.) is handled by licensed entities. Figure 8 represents the waste governance institutional framework currently existing in the country.

WASTE GOVERNANCE INSTITUTIONAL FRAMEWORK IN ARMENIA

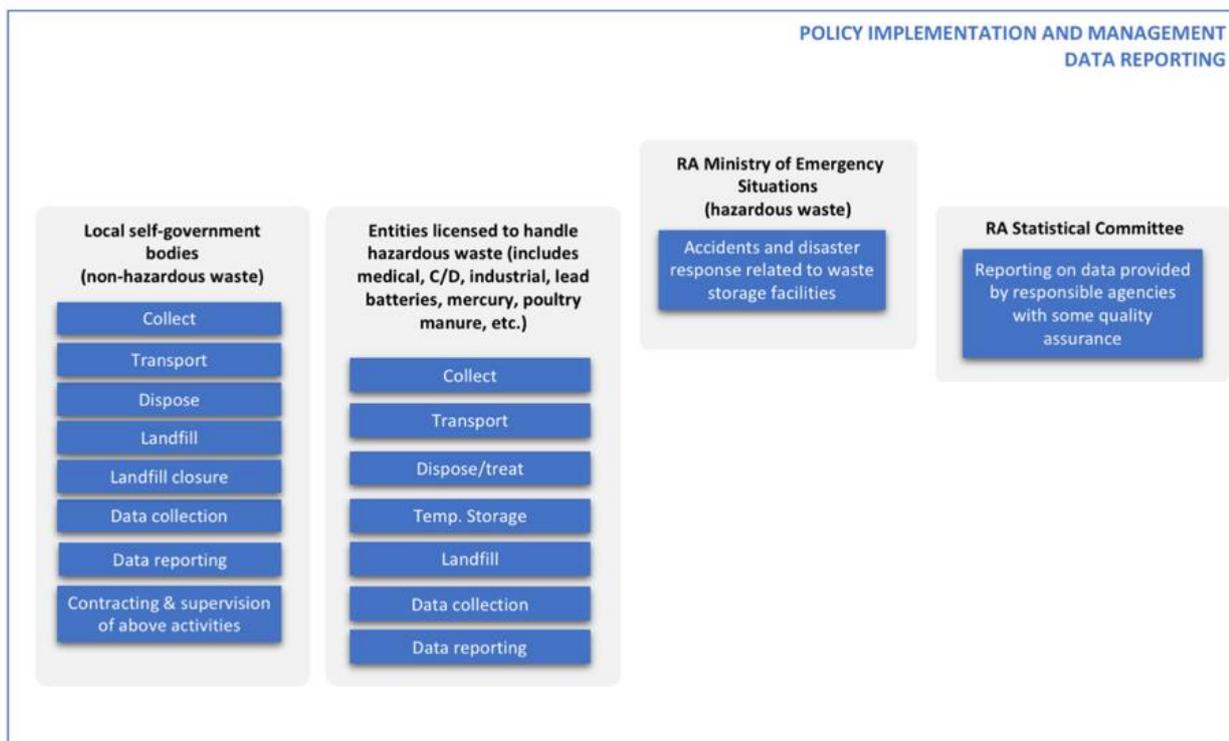
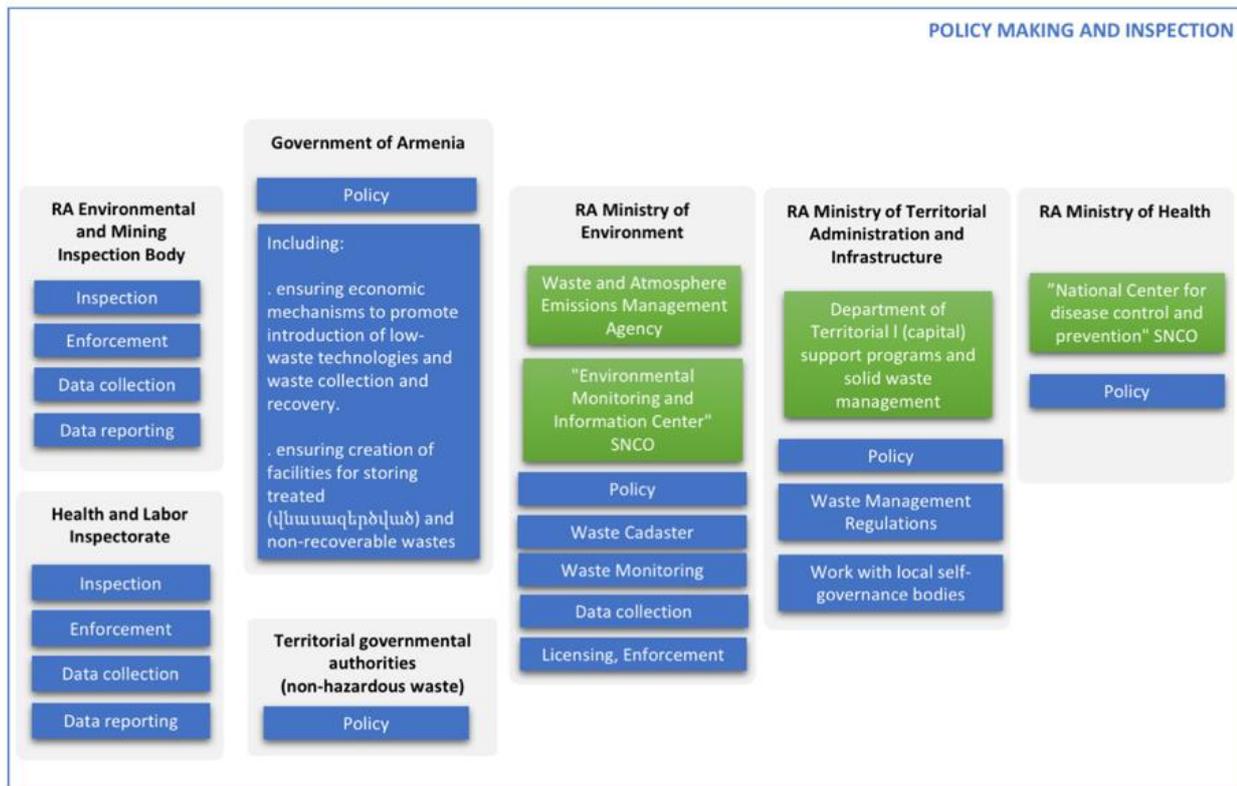


Figure 8 - Waste governance current institutional framework in Armenia
 Source: Data collected from various sources by the authors of this report

2.5.1 RA Government

According to the RA Law on Waste, the competences of the RA Government in the area of handling of identified wastes are the following:

- a) Development of the state policy for the sector and ensuring its implementation;
- b) Coordination of the activities of state governing authorities in the sector;
- c) Ensuring economic incentives for the introduction of less wasteful technologies, collection of waste and recycling of waste;
- d) Providing a procedure for the inventory, generation, disposal (liquidation, neutralization, removal) and recycling of waste;
- e) Providing a procedure for the licensing of treatment, neutralization, storage, transportation, and disposal of hazardous wastes;
- f) Development of a list of banned and hazardous wastes;
- g) Providing the procedure for transboundary movement and removal of wastes;
- h) Ensuring the development of facilities for the storage of neutralized and non-recyclable waste.
- i) Ensuring international cooperation in the area of waste management.

According to the RA Law on Waste Collection and Sanitary Cleaning, the competences of the RA Government in the sector of waste collection and sanitary cleaning are the following:

1. The development of a state policy and coordination in the sector of waste collection and sanitary cleaning;
2. Coordination of state governing authorities in the sector of waste collection and sanitary cleaning;
3. Introduction of modern technologies for waste disposal, collection, sorting, transportation, storage, and mechanisms of safe removal.

2018 Decree 1310-A of the RA Prime Minister established a Working Group for the coordination of activities in the sector of household (municipal) solid waste management, disposal, and treatment of waste in the Republic of Armenia. The 22 members of this working group represent different government agencies.

2.5.2 RA Ministry of Territorial Administration and Infrastructure

According to the RA Law on Waste Collection and Sanitary Cleaning, the competences of the state governing authority in the sector of waste collection and sanitary cleaning are as follows:

1. Participation in the development of the state policy for the sector of waste collection and sanitary cleaning;
2. Development of targeted regional plans in the sector of waste collection and sanitary cleaning;
3. Development and coordination of programs aiming to improve waste collection services;
4. Development of draft legislation regulating the sector of waste collection and sanitary cleaning;
5. Coordination of the elimination (liquidation) of unsupervised and unlicensed landfills;
6. Engaging in international cooperation in the sector of solid waste management.

According to the Charter of the RA Ministry of Territorial Administration and Infrastructure, the following functions have been defined in relation to the sector of waste management:

1. Ensuring the introduction of a waste collection system in accordance with international norms;
2. Development of an efficient, coordinated, and common policy of waste collection and sanitary cleaning in the marzes (provinces) of Armenia;

3. Development of proposals for effective mechanisms of waste collection and sanitary cleaning, operation of landfills, and improvement of the contractual field in Armenian communities;
4. Implementation of activities towards the introduction of a system of solid wastes' treatment;
5. Implementation of activities towards the adaptability of Armenian communities as well as reducing the impacts of climate change.

2.5.3 RA Ministry of the Environment

The RA Law on Waste defines the competences of the environmental state governing authority in the sector of waste management:

- a) Taking part in the development of a state policy in the sector of waste management;
- b) Development of targeted programs in the sector of waste management;
- c) State inventory of wastes;
- d) Approving the limits of waste quantities to be disposed by legal entities and sole proprietors;
- e) Development of the list of hazardous and prohibited wastes;
- f) Development of a list of wastes according to the categories of risks;
- g) Presenting recommendations related to the issuance of permissions for the transboundary movement of hazardous wastes;
- h) Providing consent on the sites of facilities for waste disposal;
- i) Approving the waste profiles (passports) developed by entities generating waste;
- j) Establishment of a database on the volumes of waste generation;
- k) Implementation of an environmental impact assessment of complex plans and design documents for the construction, reconstruction and operation of polygons, complex facilities, structures, and other designated areas used during the generation, treatment, recycling, placement, and disposal of wastes;
- l) Management of a state waste cadaster;
- m) Sharing information on less wasteful and zero-waste technologies with other government agencies;
- n) Development and management of a register for the generation, treatment and recycling facilities and disposal sites, as well as implementation of monitoring;
- o) Development of draft legislation regulating the waste management sector as well as adoption of normative acts within the frames of its authority;
- p) Signing agreements on international cooperation in the waste management sector and on issues related to transboundary movement of wastes;
- q) Sharing information with international organizations and foreign countries on waste management;
- r) Approving the register reports and update forms for facilities generating, treating, and recycling waste;
- s) Approving recording sheets and update forms of the register of waste disposal sites;
- t) Approving model waste passports;
- u) Approving model forms for the calculation of waste generation norms and quantity limits for their disposal;
- v) Approving the list of industrial waste (including mining waste) as well as consumption waste generated in Armenia.

The Charter of the RA Ministry of the Environment defines the following functions in the sector of waste management:

1. Carrying out monitoring of the environment, as well as waste disposal sites;
2. Development and implementation of the Armenian government policy related to sector of ecologically safe waste management and chemical materials;
3. Classification of industrial (including mining) and consumption wastes generated in Armenia and chemical substances used in the country according to their levels of risks;
4. Development and implementation of a policy targeting waste generation and the reduction of their negative impact, beneficial recycling of wastes from the environmental standpoint, development, and implementation of a policy for the hierarchy of waste usage.
5. State inventory of wastes, agreement of waste profiles (passports), development and management of registers for the state cadaster of wastes, waste generation, treatment and recycling facilities and disposal sites, approval of the waste quantity limits for placement.

2.5.4 RA Ministry of Health

The RA Law on Waste defines the following competences for the health care state governing authority in the area of waste management:

- a) Development of requirements for the safety of human health in normative and technical documents related to waste management; development and overseeing the implementation of the requirements of hygienic norms, sanitary and anti-epidemic rules aiming to exclude harmful and hazardous impact on human health during the process of waste generation, collection, transportation, storage, processing, recycling, removal, disinfection, and burial
- b) Development of priorities for measures aimed at the protection of human health from the negative impacts of wastes and submitting them to the RA Government;
- c) Consenting to the approval of locations for waste management facilities;
- d) Identifying sanitary and hygienic requirements for outputs produced from waste as well as issuing relevant hygienic conclusions;
- e) Taking part in the development of the lists of wastes according to the level of risks.

The Charter of the RA Ministry of Health defines the following functions in the area of waste management:

1. Development of public awareness and health care education programs and monitoring of its implementation;
2. Collection, analysis, and assessment of information on the health care system and the overall health situation of the population.

2.5.5 RA Ministry of Emergency Situations

The charter of the Ministry of Emergency Situations does not set any competences directly related to waste, unless it comes to their duties and responsibilities in emergency situations. In practice the ministry provides a lot of consultancy in cases such as broken mercury thermometers, waste lighting devices that contain phosphorus, and other similar cases.

2.5.6 RA Urban Development Committee

The Charter of the Urban Development Committee of the Republic of Armenia defines the following functions:

1. Separation of objects subject to special regulation, regulation of the sector of urban

2. development and ensuring conditions for the development of construction;
3. Development of regional development programs aiming to improve the ecological situation of towns, reducing the negative impacts of urbanization on the environment, as well as increasing the level of adaptability to climate change.

2.5.7 RA Territorial administration authorities (Marzes)

According to the RA Law on Waste, the competences of territorial administration authorities related to the sector of waste management are as follows:

- a) Taking part in the development of the state policy in the sector of waste management;
- b) Taking part in the development of state programs in the sector of waste management;
- c) Development and coordination of regional programs in the sector of waste management within the boundaries of an administrative division;
- d) Issuance of permits for waste disposal sites agreed with the relevant state authority;
- e) Preparation of sanitary cleaning schedules within the boundaries of an administrative division and overseeing waste collection;
- f) Prepare and update registers for waste generation, treatment, and recycling as well as disposal sites;
- g) Elimination (liquidation) of unsupervised and unauthorized landfills with the boundaries of an administrative division;
- h) Organizing public participation in the process of collection non-hazardous wastes with resource value within the boundaries of an administrative division.

2.5.8 Local self-government bodies

According to the Constitution of Armenia, the administrative and territorial divisions in the country are the marzes (provinces) and communities. The RA Law on Waste provides the following competences for a community mayor in relation to the sector of waste management:

- a) Supervising waste collection;
- b) Preparation of sanitary cleaning schedules of territories;
- c) Carrying out the elimination (liquidation) of unsupervised and unauthorized landfills;
- d) Organizing public participation in the collection process of non-hazardous wastes with resource value;
- e) Supporting the introduction of a system of sorted waste in the community.

Article 43 of the RA Law on Local Self-Governance stipulates the organization of waste collection and sanitary cleaning as the competence of the community mayor. The authorities of a community mayor and a council in relation to waste management and sanitary cleaning are foreseen by the RA Law on Waste Collection and Sanitary Cleaning Services.

Waste collection and sanitary cleaning activities are funded by the community budget, based on the decision of the community council, and implemented directly by community entities or by an operator selected in a procedure defined by the law on procurements.

The procedure for waste collection, including the minimum schedule for waste collection is approved by the council of the community upon the submission of the community mayor while adhering to requirements of

sanitary and hygienic rules and norms defined by RA legislation. Moreover, wastes must be collected before the containers are full (Law on Waste collection and sanitary cleaning).

According to the RA Government Decree № 1161-N of October 4, 2007 on defining the mandatory norms for the maintenance of common equity ownership in apartment buildings, the following measures and activities must be carried out for ensuring maintenance of common equity ownership in apartment buildings:

1. Removal of household wastes at least once every 3 days, and in cases of +50 °C and more – every day.
2. ...

It is worth noting that in the given situation self-governance of communities creates certain risks in terms of the poor implementation of waste collection responsibilities by some communities.

Waste collection in Armenia, as well as setting the fee for waste collection, approving the procedure for the implementation of waste collection are all issues within the realm of authorities of local self-governing bodies. Waste collection and sanitary cleaning services carried out within the boundaries of a community are paid by the community budget through a separate expenditure plan or an extrabudgetary account. By the decision of the community council, waste collection and sanitary cleaning services are paid for by the community budget and delivered directly by community-owned entities or operators selected through the procedure defined by the legislation on procurements for community needs. The permit for waste collection and transportation is issued to the operator by the community mayor with the conditions and procedure approved by the community council.^{31 32}

The fee for waste collection is a mandatory fee paid to the community budget or an extrabudgetary account. The rates for waste collection fees are defined by the community council. Armenian legislation provides a maximum fee rate of 400 AMD per month for one resident or according to the total area of a residential building or an apartment, setting maximum 25 AMD per square meter. Waste collection fees in the communities of Armenia range between 50 and 300 AMD per person. Waste collection in Armenian communities are done either by community-owned entities or by the private sector. Collection of SDW in Armenia is done only in 446 out of 501 communities. 55 rural communities do not have waste collection services. During the last one and a half years there has been considerable progress in terms of allocating funds in community budgets for waste collection. Community budgets make specific distinctions for waste collection and sanitary cleaning services as well as for incomes from collection of waste collection fees. Nevertheless, the waste collection sector is not currently self-sustainable. Therefore, waste collection in communities is partly done with the help of state subsidies.

Local self-governance drawbacks

Many communities experience issues with contract management in waste handling and sanitary cleaning. The challenges are even greater in case of PPP contract when design, build and operate tenders require

³¹ On sustainable public procurement please see <http://www.sustainable-procurement.org/sector-watch/?c=search>

³² On Circular Public Procurement in the Nordic Countries please see the following guideline <https://norden.diva-portal.org/smash/get/diva2:1092366/FULLTEXT01.pdf>

setting and monitoring a sophisticated set of KPIs for construction standards, investment amounts, delivered services, and taking adequate measures in case of failures.

The interviews with several municipalities revealed that the waste collection operators have low level of training and miss technical guidance on sustainable operation of waste management systems and infrastructure (bins, RCV, landfills, etc.) resulting in reduced lifespan of the systems and higher costs. Specifically, because of improper operation the lifecycle of the bins with wheels shortens as a result of wheel damage at the same time increasing inefficiency and service time for each collection point.

The Law on Licensing (ՀՕ-193) requires the entities that recycle, treat, store, transport, and place hazardous waste to have a permit issued by the RA Government along with undergoing an examination and certification. According to the Law on Waste (ՀՕ-159) and the List of wastes classified by hazardousness (N 430-Ն) the unsorted municipal household waste has the 4th class of hazard, which should require any household waste transporting and landfilling operator to receive a license for their operation. In reality, no single municipal waste collector in the country has a permit.

The RA Law on Environmental Impact Assessment and Expert Examination (ՀՕ-110-Ն) states that the following activities are subject to assessment and expert examination of Category A:

- Collection, storage, use, processing, treatment, disposal, liquidation, placement, and burial of hazardous wastes;
- Installation of landfills or municipal waste recycling facilities to service communities with 15,000 or more residents or to receive at least 10 tons of waste per day, and/or treatment of municipal waste.

While unsorted municipal solid waste from residential households and household spaces of organizations has the 4th class of hazard, neither the waste collection operators nor the dumpsite operators at the communities go through an EIA or Expert Examination process required by RA Law.

2.5.9 Environmental Protection and Mining Inspection Body of the Republic of Armenia (EPMIB)

The following competences are defined by the Charter of the Body Environmental Protection and Mining Inspection Body of the Republic of Armenia:

- 1) Atmospheric air protection:
 - f. maintenance of the requirements for storing or limiting the burning of industrial and municipal wastes serving as sources of pollution with harmful gases and foul-smelling odors;
- 2) Use and protection of water resources:
 - e. implementation of the requirements for the placement of waste burial sites having indirect negative impacts on water resources, as well as dunghills, cemeteries, and other facilities;
- 3) Land use and protection:
 - a. Maintenance of assigned limitations and norms as well as implementation of other environmental measures aiming to protect lands from surface runoffs and winds, floods, eutrophication, salinity, pollution from industrial and municipal wastes, chemical substances, landslides, soil degradation or other impacts deteriorating the soil;
- 4) Use and protection of flora and fauna:

- k. maintaining limits preventing the pollution of forests with industrial and municipal wastewaters, industrial emissions, chemical substances and wastes;
- 5) Hazardous materials, industrial and consumption wastes:
 - a. Maintenance of requirements for the export, import and transit movement of hazardous materials and wastes through the territory of the Republic of Armenia;
 - b. carrying out the normative requirements for the generation and placement of wastes;
 - c. meeting the requirements for the profiling of wastes and updating the register;
 - d. adhering to the rules for conducting state inventory of wastes.

2.5.10 Health and labor Inspection body of the Republic of Armenia (HLIB)

The charter of the Health and labor Inspection body of the Republic of Armenia (N 755-L, 11.06.2018) defines its main duties as follows:

- To manage risks in the areas of public sanitary and infection safety, medical services, distribution of pharmaceuticals and pharmaceutical activities, occupational health and safety;
- To oversee compliance to the requirements of the RA Laws and other legislation
- To implement preventive actions in the areas of public sanitary and infection safety, medical services, distribution of pharmaceuticals and pharmaceutical activities, occupational health and safety;

The HLIB charter does not define any duties, objectives or competences directly relating to waste, however, many of them, particularly those concerned with sanitary inspection and control, include waste related issues. The HLIB is responsible for monitoring the safe handling of healthcare hazardous waste in medical institutions through WHO IPCAF tool. However, there is a need to enhance the monitoring and control capacities of the HLIB as reported by the representatives of the National Center for Disease Control and Prevention.

2.5.11 Environmental Monitoring and Information Center SNCO

The charter of the Environmental Monitoring and Information Center (EMIC) state non-commercial organization (N 31-U, 02.01.2017) defines its main subject and objectives as follows:

- To contribute to high level of protection of the environment and natural resources (except for mineral reserves) through monitoring and through registering, analysis, provision, and storage of data on the environment and natural resources;
- To upload necessary data on the environment and natural resources to and maintain the shared environmental information library;
- To conduct studies to maintain the classification system of the objects of waste generation, recycling, recovery, and disposal sites, as well as to collect and analyze data on waste handling and treatment low- or zero-waste technologies;
- To create and maintain digital databases on specific components of the environment and natural resources information and to provide and receive this kind of information according to the RA legislation to and from the governmental bodies, NGOs, and the public.

The EMIC charter defines also the duties of the organization, some of which relate to waste:

- 1) ...

- 5) To conduct observations and studies of the use, qualitative and quantitative characteristics, composition, contamination by chemicals and radioactive materials and waste, as well as of the negative impacts on water resources;
- 6) To conduct observations and studies of the soil contamination and qualitative changes as well as of other negative impacts on soil;
- 7) To conduct observations and studies of the waste disposal sites and to present their negative impacts

2.5.12 National Center for Disease Control and Prevention SNCO

The Charter of the “National Center for disease control and prevention” SNCO defines the following functions in relation to the sector of waste management:

- 1) Overseeing the maintenance of the requirements of the RA Legislation on ensuring the sanitary and epidemic safety of the population by business entities (with the exception of the requirements of legislation related to food safety) as well as the implementation of preventive sanitary and epidemic measures;
- 2) Identification of the causes and conditions of communicable, professional, and non-communicable diseases and poisonings as well as overseeing the implementation of preventive sanitary and hygienic and sanitary and epidemic measures;
- 3) Implementation of instrumental measurements and sampling for conducting sanitary and hygienic and laboratory expert examinations within the frameworks of oversight;
- 4) Submitting recommendations to relevant authorities regarding the decisions to impose quarantines in order to ensure the sanitary safety of the population in Armenia;
- 5) In cases and procedures foreseen by law, issuing orders for carrying out disinfections, extermination of insects and rodents at sources conducive to the development and spread of communicable diseases, including parasitic diseases.

2.5.13 Privately-owned test labs

As of December 2019 there are 32 actually operating certified test laboratories in the country, most of which (more than 20) are privately-owned. According to the RA Law on Certification, starting from December 2012 the only entity eligible to certify test laboratories is the “National Certification Body” SNCO³³.

2.5.14 Statistical Committee of the RA

The RA Statistical Committee is discussed in details in section 2.2 *Information and data*.

2.5.15 Key institutional drawbacks

Fragmentation among the key government agencies responsible for waste governance

The consultations with the stakeholders representing the key government agencies involved in the country’s waste governance and management have revealed a certain level of fragmentation within the interagency institutional setting. The competencies and responsibilities defined by the framework laws on waste do not relate to specific waste streams but rather waste in general and often overlap for two or more agencies.

³³ For more details visit <http://www.armnab.am/>

Only in some instances the competencies and responsibilities are specified in terms of hazardousness of wastes. The fragmentation is noticeable when it comes to functions such as monitoring, data collection, or licensing, permitting, and enforcement.

Internationally, it is a common practice to have an Environment Protection Agency (EPA) or a similar body to carry on regulatory, enforcement, licensing, permitting, and data collection functions, while the policy development is distributed between the key ministries engaged with the waste governance, and the inspection and enforcement is the role of the state inspectorates. Such agencies usually relieve the burden from many minor ministerial divisions and state agencies overloaded with the duties and functions for which they lack resources and capacity. Forming such an agency should be considered as one of the solutions for the mentioned fragmentation issue.

Poor mechanisms for acquisition, processing, reporting, and disseminating environmental information

As discussed in the section 2.2 *Information and data*, the data on waste is acquired from different sources by four entities and there is no coherence in its processing, analyzing, distributing, among the key government agencies. The distribution and exchange of the collected data among the agencies are disorganized and complicated due to the lack of clear protocols and tools for data exchange, which makes waste governance and decision making on all levels inefficient.

Poor institutional setting for acquisition, processing, and reporting

The law sets out the Cadaster of waste to include the “Registry of the objects of generation, recycling and recovery of waste” and the “Registry of waste disposal sites.” It does not, however, include the waste collection and transportation entities, so that the MSW operators in the country do not report data on collected and landfilled waste to the Cadaster. Only municipalities report this information based on rough volume estimations to the RA Statistical Committee. While the Register of wastes should include both hazardous and non-hazardous wastes, de facto only the information on hazardous wastes is included.

Insufficient capacity for lab testing

The consultative meetings and interviews with the representatives of the State Environmental and Mining Inspectorate and the Environmental Monitoring and Information Center at the Ministry of the Environment revealed complaints about unclear access to the lab testing facilities available in the republic. The mentioned agencies often have to make use of the better testing facilities of the National Center for disease control and prevention SNCO. Additionally, there’s weak technical equipment at labs for analysis of waste and emissions, specifically POPs, e.g. new POPs, UPOPs.

Weak capacity for controlling illegal dumping

Uncontrolled dumping is one of the most significant issues in regard to almost all waste streams. Agricultural waste from farms is often dumped into gorges and rivers, municipal waste, car carcasses, industrial waste, and lots of C/D waste are dumped on roadsides. The reasons for this are mainly the insufficient capacity of the State Environmental and Mining Inspectorate as well as the poor technical capacity for control and detection of illegal dumping.

The monitoring and control are perhaps one of the weakest points in the country’s waste management sector. The reasons for it are the poor data collection mechanisms (including methodologies) to regularly acquire reliable figures on waste generation and other relevant indicators, poor infrastructure such as

weighbridges to keep record of landfilled waste or cameras and other equipment to control illegal dumping of waste. The abovementioned poor capacities at labs to analyze waste and emissions also make monitoring and control in waste management difficult.

Shortfalls with permits, licenses, and EIA for municipal waste collection

The unsorted municipal solid waste from residential households and household spaces of organizations is defined as having 4th class of hazard according to the List of wastes classified by hazardousness (RA Government decision N 430-Ն). Therefore its transportation (and any other handling operation) requires licensing, permitting, and passing EIA or Expert Examination procedures. Neither the waste collection operators nor the dumpsite operators at the communities do not pass through any of the mentioned procedures required by law.

Additionally, the majority of the dumpsites are owned by communities, yet many communities operate dumpsites owned by a private entity. At least 10% of the communities exploit dumpsites that have been formed spontaneously, not based on any decree or decision.

Weak institutional setting to deal with investors

As of October 2019, there is a lack of institutional capacity to deal with the investors. Many investors seek access to politicians and government in search of guarantees for their businesses. This creates institutional chaos and bad reputation for the country for foreign investors.

Lack of knowledge and capacity to recover value from recyclables

The low level of awareness, lack of knowledge chains, capacities, and mobilization among communities and local authorities result in a lost value for the recyclables (mainly plastics, glass, paper, and metals), which could generate funds for waste handling. Given the relatively high-level of in-country demand for recyclables (esp. plastics, glass, metals, and paper), communities can benefit from separated collection.

More details on identified gaps are discussed in section 3.3 *Financial mechanisms gaps* and the corresponding policy recommendations are presented in section 4.3 *Recommendations on financial mechanisms*.

2.6 Financial mechanisms

SECTION CONTENTS

2.6.1 Waste collection fee

2.6.2 Landfill tax

2.6.3 Waste-related expenditure overview

2.6.4 Key financial drawbacks related to financial mechanisms

The funding of the country's solid waste management sector can be viewed according to the following areas (see Table 14):

- Waste collection and disposal services
- Infrastructure investments in treatment capacities Opportunities for reuse
- Research and studies
- Elimination of environmental impact
- Prevention and reduction (responsible consumption)

Area of SWM	Funding sources
Waste collection and disposal services	Waste collection fee paid by the waste generator, state subsidies, PPP
Infrastructure investments in treatment capacities	Businesses, international organizations
Research and studies	NGO's, international organizations, universities, scientific and research institutions
Elimination of environmental impact	Environmental taxes, international banks, financial and other organizations
Prevention and reduction (responsible consumption)	NGO's, international organizations

Table 15 - The funding sources of solid waste management areas

Overall, the economic potential of sustainable waste management in Armenia is underestimated. Viewing waste as a resource has not been a priority in the country's policy concepts. This refers to both organic wastes with their nutrient and energy recovery potential, as well as non-organic wastes with their potential for reuse and material recovery.

The 'polluter pays' principle implementation is very weak in the country especially when it comes to full cost recovery. The residential and commercial sectors are very resistant to pay the costs of environmentally sound management of waste, so that treatment and disposal costs are externalized. The poor infrastructures for recovery operations also results in value loss. As discussed in the following section *2.6.1 Waste collection fee* the costs for MSW management are recovered only partially through the waste collection fees supplemented by the subsidies from municipal budgets. The environmental taxes, e.g. landfill taxes

discussed in section 2.6.2 *Landfill tax*, are directed to the general state budget. The best practice shows that possible instruments to implement the ‘polluter pays’ principle are very diverse and may include, among others, the following tools discussed in *Financing and Incentive Schemes for Municipal Waste Management: Case Studies*:³⁴

- VARIABLE CHARGING (i.e. pay-as-you-throw) schemes
 - Pay per bag scheme (Belgium)
 - Weight-based charging schemes (Denmark)
 - Weight- and volume- based systems at apartment (Germany)
 - Tagged bag schemes (Italy)
 - Pay-per-bag schemes (Italy)
 - Combined volume and weight-based scheme (Luxembourg)
 - Weight-based scheme (Sweden)
- PRODUCER RESPONSIBILITY SCHEMES
 - Schemes for battery collection
 - Systems to deal with unsolicited mail (France and Brussels)
 - Paper and fiber covenant (Netherlands)
- SCHEMES WITH JOINT WASTE MANAGEMENT / SOCIAL OBJECTIVES
 - White- and brown goods collection (Belgium)
 - Community re-paint schemes (UK)
- SCHEMES DESIGNED TO INCENTIVISE MUNICIPALITIES
 - Residual waste levy in Wallonia (Belgium)
 - Local public service agreements (UK)
- SCHEMES DESIGNED TO INCENTIVISE POSITIVE BEHAVIOUR BY HOUSEHOLDS
 - Schemes using aluminum can reverse-vending machines (Greece)
 - Schemes to promote home composting (Sweden)
- OTHER SCHEMES like benchmarking competition between companies

Additionally, the low level of awareness, lack of knowledge chains and capacities among communities and local authorities result in a lost value for the recyclables (mainly plastics, glass, paper, and metals) which are not enabled to generate financing. Given the current level of local demand the communities can benefit from plastic collected separately and sold to recycling plants directly.

2.6.1 Waste collection fee

Municipal solid waste

According to article 5 of the RA Law on Waste Collection and Sanitary Cleaning Services, the waste collection fee is a mandatory fee paid to the community budget or an extrabudgetary account. The fee rates are set by the community council. The fee for waste collection is defined by article 14 of the aforementioned law and may be maximum 400 AMD per month for each resident or it may be defined according to the area of the residential building or apartment, setting at maximum 25 AMD per square meter.

³⁴ The report is available to download at:
https://ec.europa.eu/environment/waste/studies/pdf/financingmunicipalwaste_management.pdf

1. In residential buildings and/or facilities, the fee for waste collection is defined in the following ways:
 - a. According to the number of registered individuals - people who are registered at particular addresses in the community in accordance with passport registration rules – and/or from 50 to 400 AMD per resident, or
 - b. According to the surface area of the residential building or apartment, setting the fee for each square meter at up to 25 AMD.

2. In non-residential buildings and/or facilities, including public and industrial and public buildings and/or facilities, the fee for waste collection is set according to the following rates of the overall surface area of the facility:
 - a. 50 to 100 AMD per square meter is defined for commercial facilities (including markets), food and other service facilities;
 - b. 20 to 50 AMD per square meter for hotels and hotel-related services, as well as public facilities carrying out different operations;
 - c. 5 to 15 AMD per square meter for industrial, production and office facilities;
 - d. 3 to 15 AMD per square meter for educational, cultural, health, sports, scientific and research and other such facilities;
 - e. In facilities where there is more than one type of economic activity implemented, the fee for waste collection is calculated based on the highest rate for economic operations;

3. The waste collection fee for non-municipal waste is defined in the following way:
 - a. Per volume – 3,000 AMD for one cubic meter of waste or
 - b. Per weight – 10,000 AMD for a ton of waste

4. The methods applied for setting a waste collection fee and the rates of the waste collection fee for every community are defined by the community council in a procedure defined by law and within the ranges defined by sections 1-3 of the present article.

5. For different types of wastes, the rates defined by sections 1-3 of the present article may be applied while considering the purpose or operational significance of the site (real estate) generating the waste.

The insufficient level of registration and collection of service fees significantly reduces the funds available for the implementation of waste collection and modernization of the system. The communities receive financing from state budgets as subsidies, parts of which are spent on waste collection and sanitary cleaning. In the planning of community budgets for 2019 the incomes for waste collection have increased and the costs on the other hand have gone down.

Finances are set aside in the community budgets for the implementation of waste collection and sanitary cleaning services. If there is also a landfill in the community, then funds are allocated for its operation as well. Only 30 percent of community budgets are formed locally, while the rest is provided by the RA state budget [ii].

In 2018, Armenian provinces collected total 2.08 billion AMD (1.4 billion paid by physical entities and 673.4 million paid by legal entities) for waste collection services (see Figure 9). However, the total costs for waste

collection and sanitary cleaning in the country amounted to 4.74 billion AMD (3 billion AMD for waste collection and 1.74 billion AMD for sanitary cleaning as shown in Figure 10).

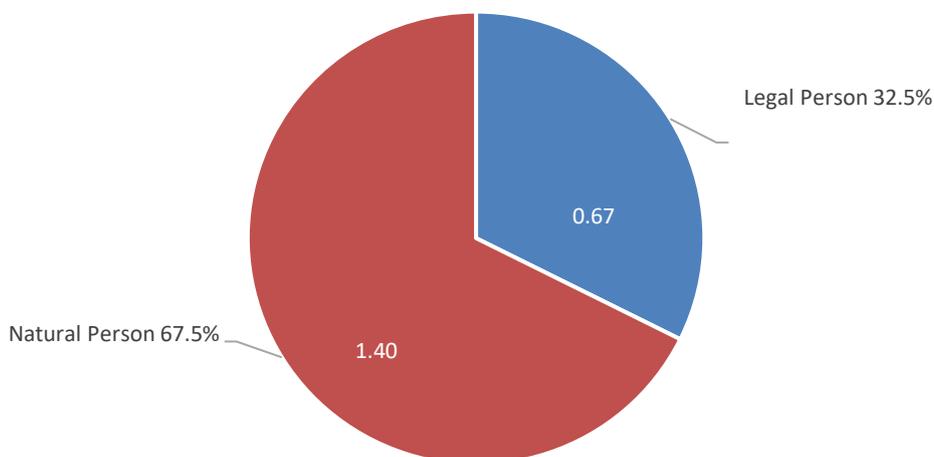


Figure 9 - Fees collected for waste collection services in RA provinces in 2018 (billion AMD)
Source: Data provided by the RA Ministry of Territorial Administration and Infrastructure, 2019

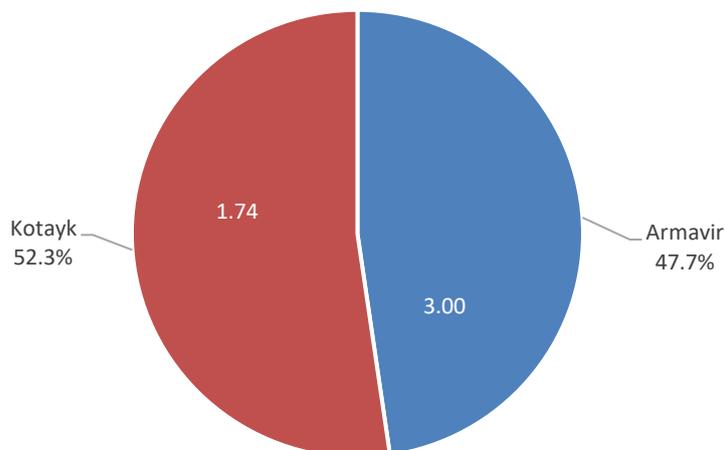


Figure 10 - The costs for waste collection and sanitary cleaning in RA provinces in 2018 (billion AMD)
Source: Data provided by the RA Ministry of Territorial Administration and Infrastructure, 2019

Thus, the collected fees cover only around 70% of the service costs. Figure10 shows the share of the collected fees in waste management service costs in Armenian provinces.

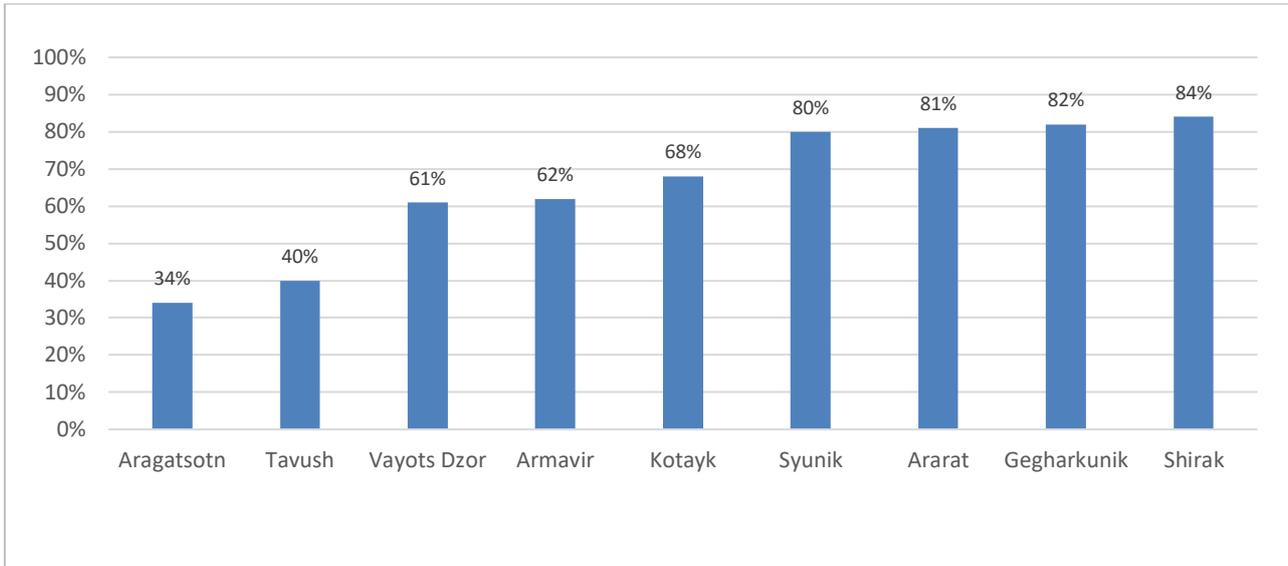


Figure 11 - The share of the collected fees in waste management and sanitary cleaning costs (by provinces)
 Source: Data provided by the RA Ministry of Territorial Administration and Infrastructure, 2019

Hazardous wastes

The entity generating hazardous wastes pays licensed companies for the collection, transportation, neutralization, and liquidation of those wastes. On average the hazardous waste handling service for medical institutions varies from 450 to 650 AMD per kg depending on location and the amounts of generated waste. The medical waste treating companies make revenue also by receiving expired products from cosmetics retailers.

2.6.2 Landfill tax

The landfill tax is set out by the RA Tax code as an environmental tax. According to the Article 170 of the RA Tax code, the rates of environmental tax for placing and storing mining wastes, industrial wastes and/or consumption wastes in specially designated areas (waste allocation sites, landfills, waste deposits, refuse dumps, complexes and/or constructions) are presented in Table 15.

The taxes paid for disposal of wastes in the landfills was 72.6 million AMD in 2017 and comprised 6.7% of the total environmental taxes. The taxes paid for goods produced and sold in RA that cause damage to the environment was 458.1 million AMD in 2017 and comprised 42.1% of the total environmental taxes.

Notably, while the mixed (unsorted) municipal waste is considered having fourth degree of hazard due to containing batteries, flammable, infections objects, among other hazardous materials, its placing in landfills by an operator is taxed differently than the wastes of fourth degree of hazard (1,500 AMD per tonne). The operators performing activities of garbage disposal and sanitary cleaning of sorted and unsorted consumption wastes pay environmental tax equal to only 60 AMD per tonne of waste. This exception creates a wrong incentive in terms of municipal waste sorting practices.

Industrial wastes and/or consumption wastes according to hazard degree	Rate per each tonne (AMD)
Wastes of first class of hazard	48,000
Wastes of second class of hazard	24,000
Wastes of third class of hazard	4,800
Wastes of fourth class of hazard (except for operators performing activities of garbage disposal and sanitary cleaning of unsorted consumption wastes generated by natural persons)	1,500
Non-hazardous wastes (except for mining wastes and in case of operators performing activities of garbage disposal and sanitary cleaning of sorted consumption wastes generated by natural persons)	600
For operators performing activities of garbage disposal and sanitary cleaning of sorted and unsorted consumption wastes generated by natural persons.	60

Table 16 - Rates of environmental tax for placing and storing subsoil wastes before 2021 (RA Tax code)

Source: RA Tax Code

It should be noted that according to Article 172 on Environmental tax benefits, natural persons shall, in respect of consumption wastes, be exempt from environmental tax for placing and/or storing industrial wastes and/or consumption wastes in specially designated areas. Starting from January 1st, 2021 the environmental tax for one-time storage of industrial wastes and/or consumption wastes (except for subsoil management wastes) in specifically designated areas, industrial sites, shall be calculated against the tax base at the rates presented in Table 16.

Industrial wastes and/or consumption wastes according to hazard degree	Rate per each tonne (AMD)
Wastes of first class of hazard	62,400
Wastes of second class of hazard	31,200
Wastes of third class of hazard	6,240
Wastes of fourth class of hazard	1,950
Non-hazardous wastes	780

Table 17 - Rates of environmental tax for placing and storing subsoil wastes since (RA Tax code) after 2021

Source: RA Tax Code

The environmental taxes collected for waste disposed in landfills, including hazardous wastes, are presented in Figure 12 for years 2013-2018. The annual average for the presented years is 74.4 million AMD.

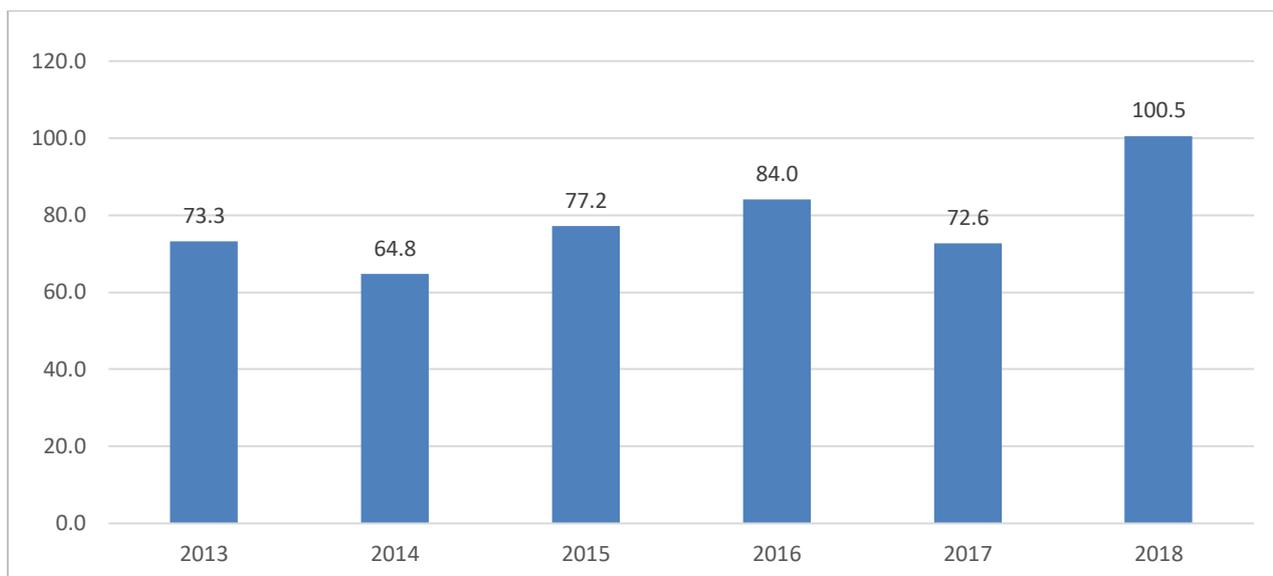


Figure 12 - The environmental taxes collected for waste disposed in landfills (million AMD)

Source: Armstat. *Environment and Natural Resources in the Republic of Armenia for 2018*.

Available at <https://www.armstat.am/en/?nid=82&id=2202>

The landfill tax and gate fee have become a very common economic instrument in European Union for reaching both EU and national targets to reduce the amounts of landfilled waste. Figure 13 shows the typical charge (gate fee and landfill tax) for legal landfilling of non-hazardous municipal waste in EU Member States and regions as of 2013 published by the European Environment Agency.³⁵ Tax rates vary across the EU from 3€/t as in Lithuania to more than 100€/t as in Belgium. For more detailed information on EU landfill taxes and bans we refer to 2012 report published by the Confederation of European Waste-to-Energy Plants (CEWEP).³⁶

In the United Kingdom, the landfill tax introduced in 1996 has contributed to the drastic reduction of waste landfilling from 50 to 10 million tonnes annually within 20 years, while increasing the landfill from around 5 to current 94.21 euro per tonne (see Figure14). Additionally, the part of the collected landfilled taxes in the UK are channeled to the Landfill Communities Fund (LCF) for land reclamation, remediation or restoration projects.³⁷

³⁵ Source: <https://www.eea.europa.eu/data-and-maps/figures/typical-charge-gate-fee-and/>

³⁶ *Landfill taxes and bans, 2012*, CEWEP. Available at <http://www.cewep.eu/wp-content/uploads/2017/12/Landfill-taxes-and-bans-overview.pdf>

³⁷ *Landfill Tax in the United Kingdom, 2017*. Institute for European Environmental Policy. [xx] Available at <https://ieep.eu/uploads/articles/attachments/e48ad1c2-dfe4-42a9-b51c-8fa8f6c30b1e/UK%20Landfill%20Tax%20final.pdf?v=63680923242>

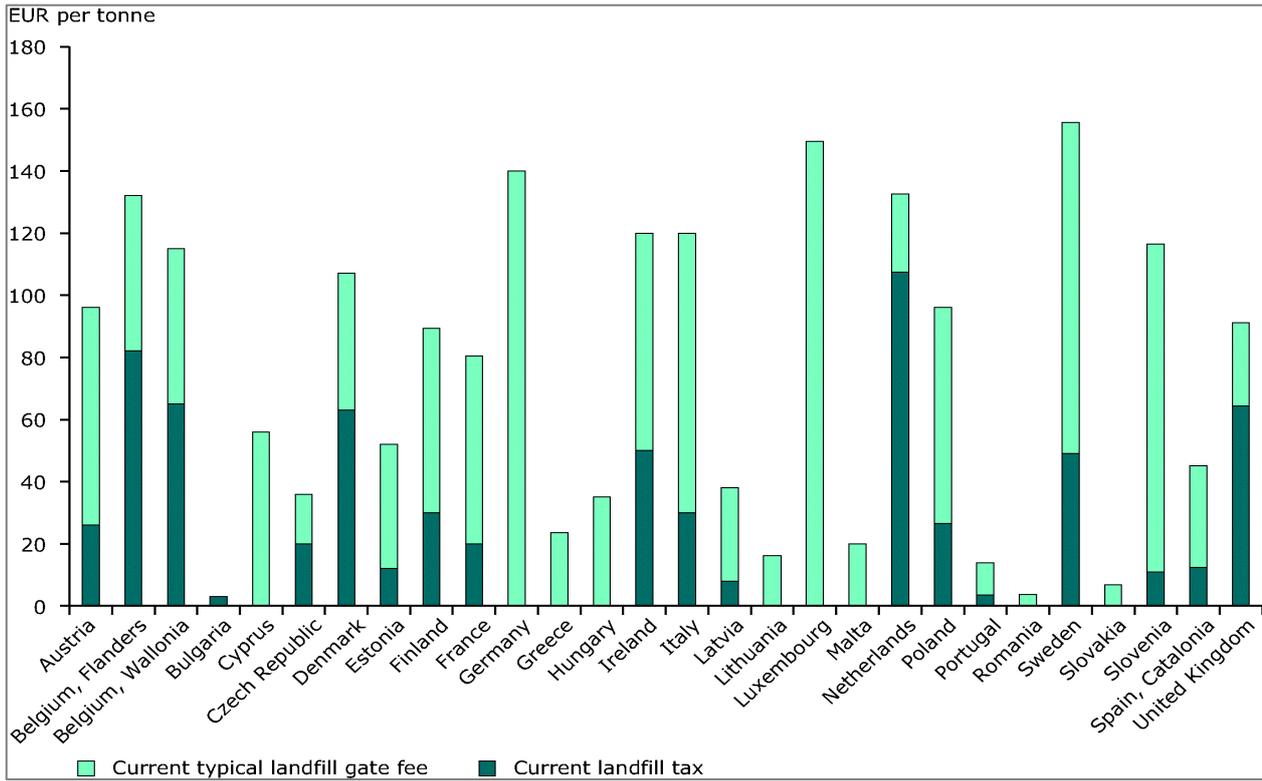


Figure 13 - Gate fee and landfill tax for legal landfilling of non-hazardous municipal waste in EU Member States and regions, 2013
 Source: Landfill taxes and bans, 2012, CEWEP. Available at <http://www.cewep.eu/wp-content/uploads/2017/12/Landfill-taxes-and-bans-overview.pdf>

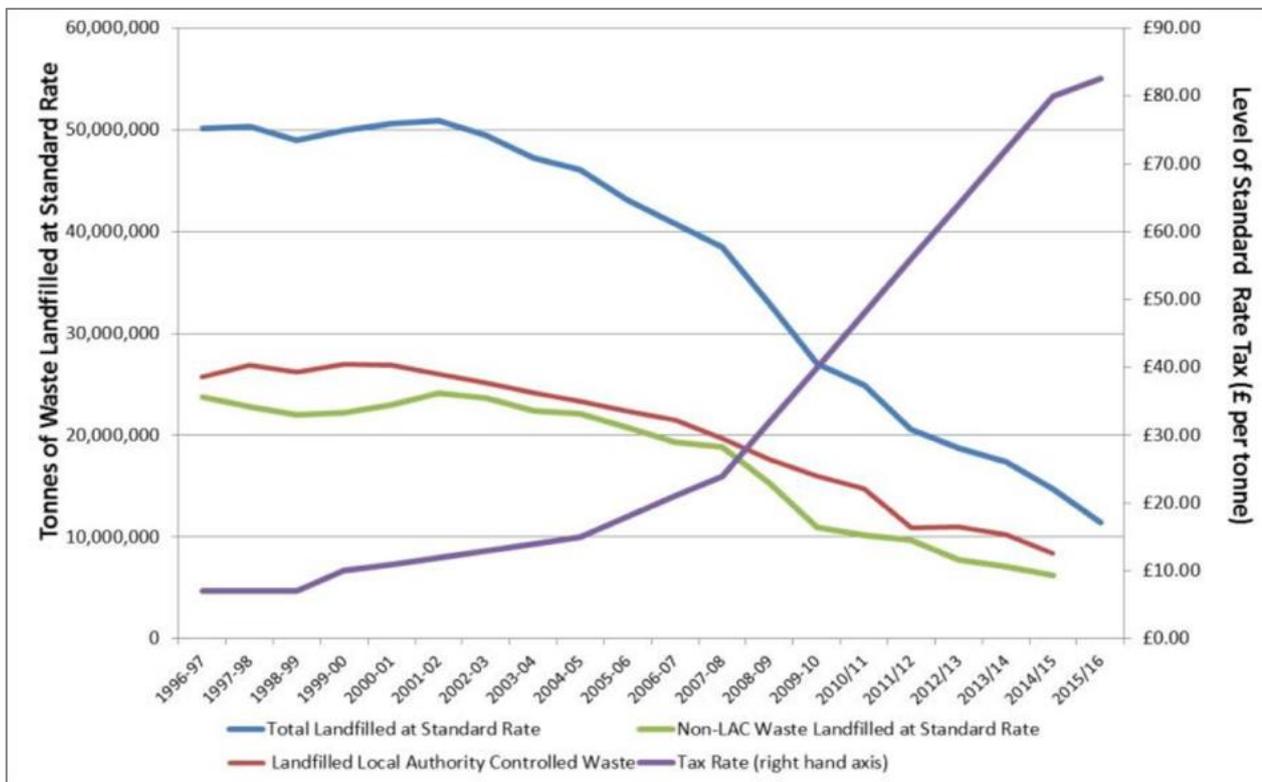


Figure 14 - Rates and effectiveness since the landfill tax Introduction in the UK
 Source: Landfill Tax in the United Kingdom, 2017 Institute for European Environmental Policy. Available at <https://ieep.eu/uploads/articles/attachments/e48ad1c2-dfe4-42a9-b51c-8fa8f6c30b1e/UK%20Landfill%20Tax%20final.pdf?v=63680923242>

2.6.3 Waste-related expenditure overview

The below graphs show different expenditures related to waste management in Armenia for years 2013-2018 reported by the RA Statistical Committee.³⁸ According to the protocol this report is required for those legal entities, organizations, and private entrepreneurs operating treating facilities or implementing environmental actions who are notified about the reporting obligation.³⁹

Figure 15 shows the expenditure for land protection against industrial waste and other hazardous substances can see a drastic decrease in the expenditure for land protection against industrial waste and other hazardous substances for years 2013-2018 reported by the accountable entities. Notably, the drastic decrease from 2015 is due to reduction of direct spending by the entity itself, while the amounts paid to other organizations or private entities for handling (transporting to landfills, treatment or disposal facilities) the wastes remains almost the same, which amounts for around 90% of the total expenditures. Yet due to the weak environmental control it is yet unknown if the wastes transferred to other organizations do not end up in landfills or dumpsites.

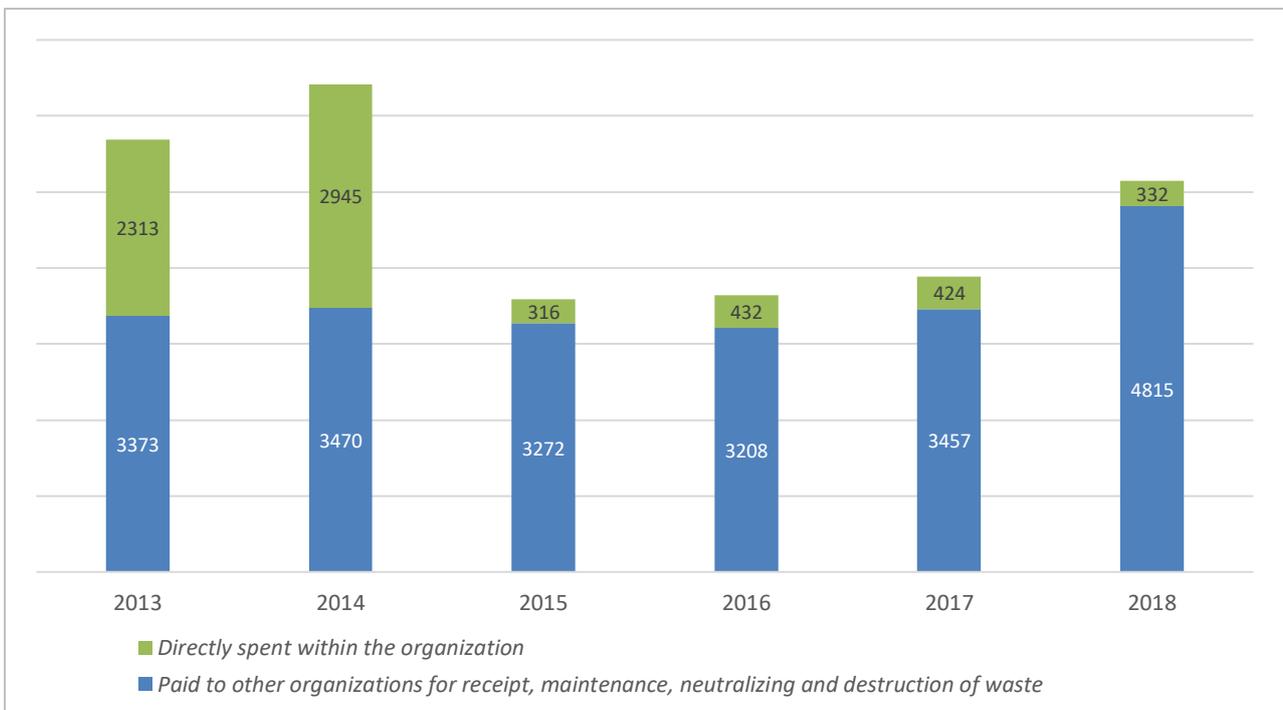


Figure 15 - The expenditure for land protection against industrial waste and other hazardous substances (million AMD)

Source: Armstat. *Environment and Natural Resources in the Republic of Armenia for 2018*.

Available at <https://www.armstat.am/en/?nid=82&id=2202>

Figure 16 presents the spending of the abovementioned accountable entities for land recultivation, including top-spoil transportation and conservation, as well as other operational costs, excluding the capital

³⁸ *Environment and Natural Resources in the Republic of Armenia for 2018*. [xxi] Available at <https://www.armstat.am/en/?nid=82&id=2202>

³⁹ The decision and reporting form is available at <https://www.arlis.am/DocumentView.aspx?DocID=16228>

investments for recultivation. And Figure 17 shows the average annual values of fixed assets for capital repair of fixed assets for installations and plants for treatment, neutralizing, and destruction of wastes for the years 2013-2018.

As discussed in the section titled “Ongoing projects on municipal solid waste management”, there are two projects on sanitary landfill construction and waste collection infrastructure supported by the European Bank for Reconstruction and Development (EBRD) which will include also a closure of some of the existing dumpsites in the provinces included in the project. This kind of investment projects are virtually the main source of financing dumpsite closure and land reclamation in Armenia.

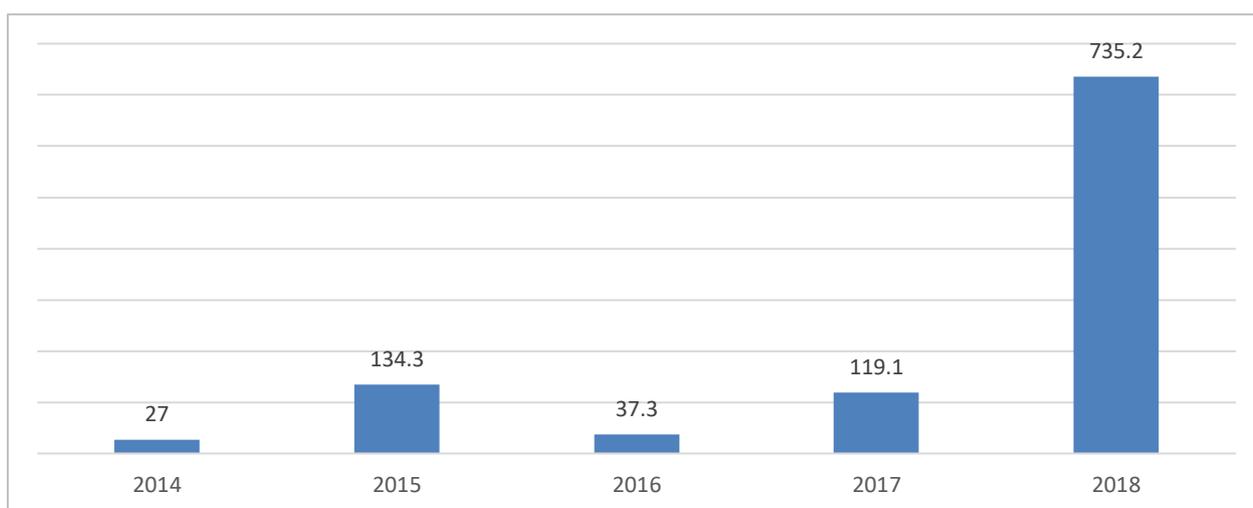


Figure 16 - Expenditure for land recultivation (million AMD)

Source: Armstat. Environment and Natural Resources in the Republic of Armenia for 2018.

Available at <https://www.armstat.am/en/?nid=82&id=2202>

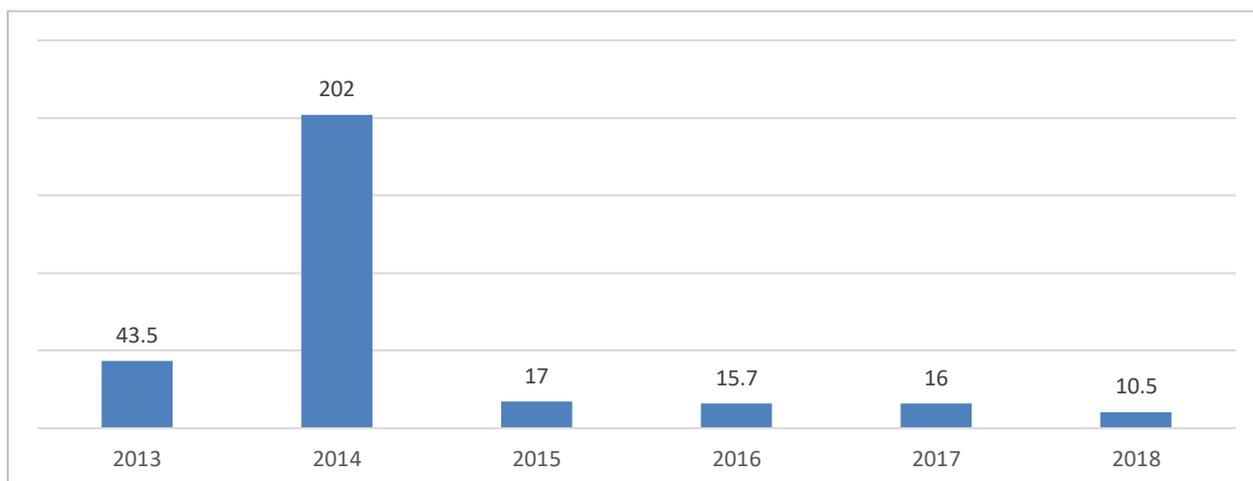


Figure 17 - Expenditure for capital repair of fixed assets for installations and plants for treatment, neutralizing and destruction of wastes (million AMD)

Source: Armstat. Environment and Natural Resources in the Republic of Armenia for 2018.

Available at <https://www.armstat.am/en/?nid=82&id=2202>

2.6.4 Key financial drawbacks related to financial mechanisms

Low waste management fee insufficient for full cost-recovery

The waste management fee in Armenia is inadequately low. Also, the fee collection mechanism is inefficient both in case of residents and business organizations. The previous two points in effect result in an incomplete cost recovery.

Additionally, the costing for waste management operations does not include costs arising during the whole life cycle of waste, e.g. landfill management and after-care, environmental costs, remediation costs, etc. but merely based on fuel expenses, RCV fleet and waste bins maintenance. These costs are externalized and are not reflected in the waste collection fee.

Inadequately low environmental tax for landfilling unsorted municipal solid waste

As of December 2019, the rate for landfilling one tonne of MSW is set at 60 AMD by the RA Tax Code. This inadequately low landfill tax creates a wrong incentive in terms of municipal waste sorting practices. For a comparison, the landfill tax rates vary across the EU from 3€/t as in Lithuania to more than 100€/t as in Belgium for non-hazardous municipal solid waste.

Poor costing of waste management operations

The costing for waste management operations does not include costs arising during the whole life cycle of waste, e.g. landfill management and after-care, environmental costs, remediation costs, etc. but merely based on fuel expenses, RCV fleet and waste bins maintenance. These costs are externalized and are not reflected in the waste collection fee.

Polluter pays principle tools are not fully enabled for full cost recovery

Establishment of full cost recovery mechanism in accordance with the polluter pays principle and extended producer responsibility principle is part of CEPA requirements. As discussed in sections on financial tools, the waste collection fee and landfill taxes are the only polluter pays tools in Armenia. Both are inefficiently implemented.

Lost value from recyclables due to lack of knowledge and basic capacity

It is estimated that around 2000 tons of recyclable plastics (mainly PET and PP) is received by the waste recovery plants annually. There are no estimates for the metal and glass materials sent to recycling. However, most of these materials are collected from dumpsites by informal sector, while the municipalities or communities cover the costs of collecting and transporting these materials to the dumps. The communities can benefit at least partial cost recovery from these valuable materials in case of sorted collection. Another issue to solve in this regard is the ownership of waste which is uncertain in the legislation.

More details on identified gaps are discussed in section 3.3 *Financial mechanisms gaps* and the corresponding policy recommendations are presented in section 4.3 *Recommendations on financial mechanisms*.

2.7 Infrastructure

SECTION CONTENTS

- 2.7.1 Municipal solid waste handling infrastructure
- 2.7.2 Biological waste treatment infrastructure
- 2.7.3 Hazardous medical waste
- 2.7.4 Other hazardous wastes
- 2.7.5 Construction and demolition waste (C/D)
- 2.7.6 Key infrastructure drawbacks

2.7.1 Municipal solid waste handling infrastructure

Collection and disposal of MSW

The technical capacities of the waste collection system are very poor all over the country. Only several bigger cities operate compacting Refuse Collection Vehicles (RCVs) along with open-body truck that suppose manual load of waste.

According to an inventory of technical capacities, as of November 2018, Armenian provinces had 774 garbage trucks, of which only 204 with compacting mechanisms, as well as 11,868 garbage bins (0.3, 0.7 liters). Around 75 percent of the communities have only 1 truck (RCV) which causes risks of delayed waste collection in case the vehicle is broken or on repair. Around 11% of communities have no trucks at their disposal. Additionally, more than 60 percent of all RCVs in the country are open body trucks, which require lots of manual labor which makes the collection inefficient and thus costly (see figures below). Bad conditions of the old trucks often result in increased out-of-service time and thus decreased lifetime of the entire fleet and most importantly lower quality of service (see Figure 18).

In 2014 the municipality of Yerevan contracted a waste collection and sanitary cleaning operator, Sanitek CJSC, which has invested about 10 million euros and acquired new equipment and closed wheeled containers with the capacity of 1,100 liters.⁴⁰ By the end of 2017, most of the bins have been damaged (wheels broken, lids dysfunctional) and the part of the RCV fleet out of order, resulting in delayed collection and raising complaints from the residential side. In response to even more worsened waste collection in the capital by late summer 2019, the municipality has launched its own municipal company called “Waste removal and sanitary cleaning of Yerevan”.

In the provinces the garbage is loaded onto the trucks using shovels. During the years 2018-2019, with support from the EU as well as in the frameworks of state subsidy programs mostly consolidated communities have been able to acquire garbage trucks and bins. However, there are many rural communities, such as Ttu Jur and Dzoraglukh villages of Aparan community, where waste collection is not

⁴⁰ It should be noted that damaged containers or those completely out of order used to be replaced by new ones, whereas since 2018, the majority of the containers are broken, with big holes, have no covers and have broken wheels. Only in 2019 did the company start replacing ruined containers with new ones, which, unlike the previous ones, do not have the option of opening the cover by foot. This has partially become the cause for users leaving the bin open.

done at all due to inaccessible roads. Locals instead burn their household waste or dump it in brooks and rivers or simply create their own unauthorized landfills.

The selection of the number, type, and location of garbage bins in a community is often conditioned by the existing RCV fleet, the financial limitations, and by the previous experience. However, upgrading the bins should be part of a wider strategic planning with clear targets and performance indicators like collection rates, recycling rates, and service time, among others. Local authorities do not develop and use such plans ending up investing out of current necessity.

Procurement of inadequate amount and type of garbage bins and their wrong placement results in increased operational time per served collection spot, very labor-intensive waste collection operations, and overall low quality collection service. Overflow of waste may result from wrong selection of size or number of bins. Too large bins may cause damage to the RCVs. Bins with no lids make access to waste for animals.

Additionally, no community uses civic amenity sites to provide citizens a possibility for free of charge sorted disposal of household construction components, white waste, furniture, and other bulky wastes. As a result, the MSW or construction waste collection contractors often end up provide an extra service collecting bulky items left next to the household garbage bins.

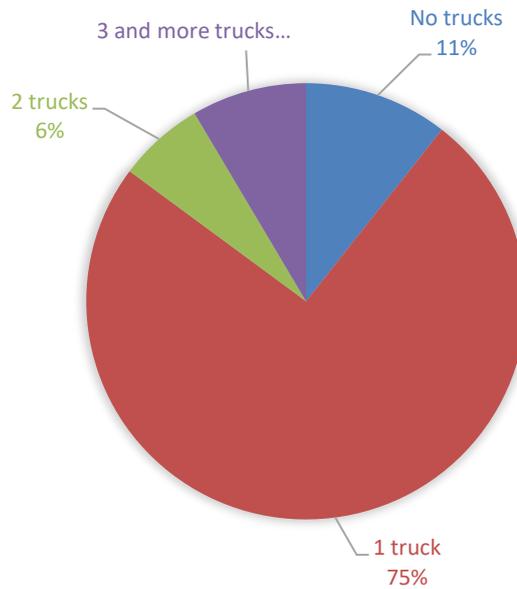


Figure 18 - RCV fleet size in communities by number of vehicles

Source: Data self-reported by the municipalities in the frames of Waste Handling Mapping 2019, RA MTAI and AUA Acopian Center for the Environment. Available at <https://whm-ace.aua.am/>

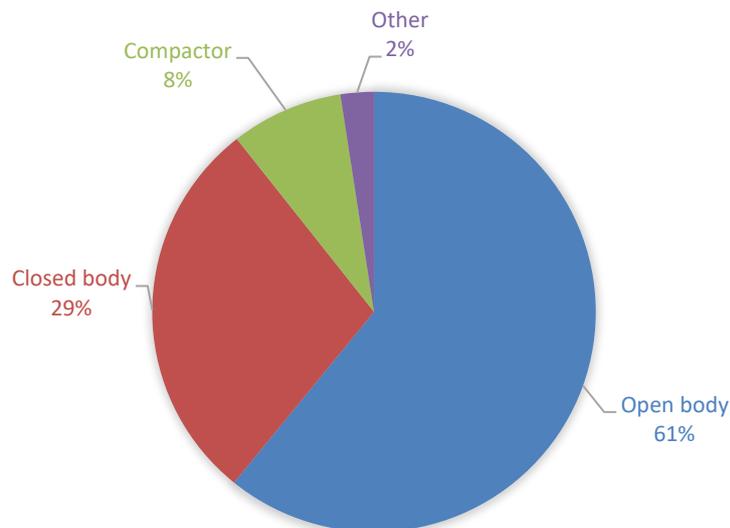


Figure 19 - RCV fleet in communities by vehicle type

Source: Data self-reported by the municipalities in the frames of Waste Handling Mapping 2019, RA MTAI and AUA Acopian Center for the Environment. Available at <https://whm-ace.aua.am/>

Drawbacks

- Weak capacity of Refuse Collection Vehicle (RCV) fleets.
- Inadequate amount, type, and placement of garbage bins for MSW.
- No infrastructure for sorted collection of recyclables. Very few communities with the aid of internationally sponsored programs have installed separate plastic bottle bins that are not currently used due to inconsistent collection of the recyclables.
- No infrastructure for separate food or other organic waste collection.
- Many communities use legacy chutes and bunkers systems.
- No civic amenity sites (now being more and more discussed).

The information on the quantity of generated waste is critical for a robust waste management planning. Acquiring this information on regular basis with relevant accuracy requires basic infrastructure such as weighbridges at the landfills or transfer stations where each RCV is weighed and registered. Weighbridges should be available for each community's MSW collection operators.

The abovementioned drawbacks result in overall unsustainable, inefficient, and low-quality waste collection services in the country including:

- no waste collection service provided to some communities resulting in local improper waste disposal practices such as burial or open burning
- irregular and delayed waste collection in many communities
- overall very labor-intensive solid waste collection operations
- overall very long operational time per served collection spot

Dumpsites and Landfills

Dumpsites existing in the country do not meet any international or technical, environmental, and sanitary and hygienic standards and are simply places for accumulating trash. The areas of the dumpsites were never designed in advance and they have mostly popped up sporadically over the years.

Not a single dumpsite in the country has liner and there is no collection of methane done anywhere. The only exception is the Nubarashen dumpsite of Yerevan. The Japanese Shimizu Corporation has installed a gas extraction system in a section of the dumpsite. (See the below section titled “Nubarashen Landfill in Yerevan”.)

Dumpsites have no modern system for the collection of leachates and lack the proper infrastructure for receiving trash. Collected trash is simply unloaded at the dumpsites mostly without any compacting. In many dumpsites there are breakouts of fires that are sometimes man-made. Dumpsites are usually not fenced and isolated and are accessible to animals and people. Landfills also lack wheel washing facilities, which lead to garbage trucks leaving landfill sites with contaminated wheels. Additionally, most of dumpsites have ruined access roads that cause a lot of damage to the operating RCVs.

Nubarashen Landfill in Yerevan

The Nubarashen landfill is used mainly by the Yerevan Municipality, which provides the following report regarding the landfill in 2018.

Nubarashen city dump is located at 4, Nubarashen highway which was put into operation in the 1950s. It is 9-10 km away from the city center and occupies an area of 52.3 hectares. Currently, 1000-1200 tons of garbage is dumped here daily (annually 365-440 tons). The garbage is not recycled but compacted and covered with a 25-30 cm layer of soil.

On March 10, 2009 Yerevan Municipality and “Shimizu” corporation (Japan) signed the treaty on getting biogas from the dumpsite. On the whole the realization of the project will take 16 years.

The treaty is valid till 2023, and it is estimated that 512 thousand tons of CO₂ is to be reduced by that time. The financing of the project for all the years included, as well as the maintenance and operation costs of the system is covered by the Japanese side. The facility has been given to the Armenian side with the right of ownership and its operation is carried out by Nor Barekargum CJSC.⁴¹

The gas is captured on an area of about 8 hectares. The project had also foreseen the establishment of a 1.7 megawatt power plant. However, the extracted gas is now only flared to reduce the greenhouse effect.

In December 2019 the Yerevan Municipality has fenced the whole area of the dumpsite as well as set up a check point to prevent uncontrolled dumping. In addition, a simple wheel washing facility has been set up. These transitional measures have been taken to improve the dumpsites conditions before its closure and rehabilitation foreseen in the frames of the Yerevan Solid Waste Project assignment (see the below section).

⁴¹ The information is taken from the official website of the Yerevan Municipality <https://www.yerevan.am/am/communal-services/>

Ongoing projects on municipal solid waste management

Kotayk and Gegharkunik Solid Waste Management Project

Following the technical and economic reviews, the construction of the first sanitary landfill in Armenia commenced in 2016 with the support of European Bank for Reconstruction and Development (EBRD). The project aims to build a new sanitary landfill in the administrative area of Hrazdan community in the province of Kotayk, which will serve all the communities of both Kotayk and Gegharkunik provinces of Armenia. A waste collection system meeting all European norms is also planned to be introduced in all communities of these two provinces, including the construction of 2 transshipment stations, acquisition of necessary technologies, garbage trucks and garbage bins. The project is expected to be completed by the end of 2020.⁴²

Yerevan Solid Waste Project

Within the project for the introduction of a waste collection system in Yerevan supported by EBRD, the construction of a regional landfill in Nubarashen has been planned. This landfill will serve Yerevan as well as all urban and rural communities of Aragatsotn and Armavir provinces that are located in the close vicinity of Yerevan. The existing landfills in Nubarashen and Ajapnyak will be closed and conserved.⁴³

Incomplete projects on municipal solid waste management

- A technical and economic review was conducted with the support of the German KfW Bank regarding the construction of a sanitary landfill (Ghursa) as well as for the introduction of a waste collection system in line with European standards for the communities of the provinces of Lori and Tavush. The project, however, was not implemented due to lack of finances.
- A technical and economic review was conducted with the support of the Asian Development Bank regarding the introduction of a waste collection system in the province of Shirak that would see the introduction of a waste collection system with European standards for all communities of the province and the construction of a sanitary landfill (Beniamin). However, the project was not implemented due to lack of finances.
- A technical and economic review was conducted with the support of the Asian Development Bank regarding a project for the introduction of a waste collection system in the Province of Syunik that proposed the introduction of waste collection systems meeting international standards for all communities of the province as well as the construction of a sanitary landfill (Chatin). However, the project was not implemented due to lack of finances.

2.7.2 Biological waste treatment infrastructure

Lusakert Biogas Plant

An important model for the management of biological wastes has been the Lusakert Biogas Plant, which was the first such plant that was dealing with the improvement of poultry waste management. This project was unprecedented in both Armenia and the Caucasus and in many ways should have served as a guideline for future such projects. The facility started its operation in 2008 and stopped working in 2014 due to lack of feedstock, low income from the sale of CO₂ and low tariffs.

⁴² See the project official page:

<https://www.ebrd.com/cs/Satellite?c=Content&cid=1395271526518&d=Mobile&pagename=EBRD%2FContent%2FContentLayout>

⁴³ See the project official page: <https://www.ebrd.com/work-with-us/projects/esia/yerevan-solid-waste-project.html>

Community-scale biogas plants

In the frameworks of the project “Integrated Support for Sustainable Economic Development in Rural Mountainous Areas of Armenia”⁴⁴ carried out by Shen NGO, biogas plants were built in the Gegharkunik Province villages of Areguni (40 m³), Geghamasar (250 m³) and Pambak (40 m³). The Areguni and Geghamasar biogas stations are already operational, while Pambak is still in the construction phase. There are dryers located next to the biogas plants. Three more such plants are planned to be built in three communities of Sisian. On average, 1 ton of dry manure generates 20 m³ of gas.

ORWACO vermicomposting plant

Armenian-Norwegian joint venture ORWACO CJSC⁴⁵ has been active in Armenia since 2011. The company does composting and vermicomposting through the recycling of fertilizers used in the production of mushrooms, manure, and other types of organic wastes. The ORWACO plant now has 20 employees and uses only a small part of its potential, which can be enhanced if there is relevant infrastructure and a growth in demand. The company can also create subsidiary plants for organic waste management all across Armenia, which would manage and recycle all sorts of organic waste (including biodegradable organic wastes that are mixed with SDW).

Composting

In fall 2019, the Yerevan Municipality has started to develop a pilot project on small scale composting facilities that will receive and treat organic wastes from city parks and gardens, and streets trees. It is planned to include also organic kitchen waste separately collected from public institutions such as kindergartens, schools, and universities among others.

Importantly, source separation is one of the critical preconditions when considering the use of bio-waste in municipal stream for fertilizer generation. Table 17 presents heavy metal content in different types of MSW derived compost in comparison to EU legal demands on heavy metals.

Heavy metal	MSW compost (1)	OFMSW compost (2)	Bio-waste compost (3)	EU standards
Cd	9	2	0.8	1.5
Cu	530	150	35	150
Ni	80	40	9	75
Pb	830	400	85	150
Zn	1600	800	140	400

Table 18 - Heavy metal content of different types of MSW-derived composts and EU legal demands (in mg/kg of dry matter)

Source: Veeken, Adrie & Hamminga, P. & Mingshun, Zhang. (2006). *Improving sustainability of municipal solid waste management in China by source separated collection and biological treatment of the organic fraction. Innovative environmental management & sustainable development.* [xviii]

⁴⁴ For more details visit <https://bit.ly/2Xq5c6e>

⁴⁵ For more details visit <https://orwaco.am>

The columns in the table correspond to the following:

- 1) MSW compost - obtained from MSW which is integrally collected; the compost (organic fraction) is mechanically separated after composting.
- 2) OFMSW compost - obtained from MSW which is integrally collected; the organic fraction is mechanically separated before composting.
- 3) Bio-waste compost - obtained from the organic fraction of MSW which is separately collected at the source before composting.

The table clearly suggests that heavy metal levels in the 1. MSW compost obtained from mixed municipal solid waste exceed all limits set by the EU standards. The 2. OFMSW compost hardly meets EU standards except for Nickel content. And only the compost obtained from source-separated MSW does meet the EU standards and is suitable for using as fertilizer in terms of heavy metal content.

Policy Considerations for Biogas Implementation in Armenia

With the support of a comprehensive policy framework, the expansion of biogas in Armenia could have financial, environmental, and benefits, especially to Armenia's rural communities. These benefits are listed in Table 18. Notably, they include the reduction of greenhouse gas emissions, the replacement of chemical fertilizers with organic fertilizers, reduced costs and additional income for farmers, reliable access to electricity and heat, and the generation of skilled labor jobs that strengthen communities and rural economies. While biogas implementation can be hugely beneficial, legislative safeguards are necessary to guarantee these benefits and prevent the exploitation of rural communities and the environment.

Environmental	Financial	Social
<ul style="list-style-type: none"> • Reduced GHG emissions & improved air quality • Improved water quality due to decreased eutrophication • Decreased odor & Pest issues • Provides non-chemical fertilizers • Decreased use of firewood can combat deforestation 	<ul style="list-style-type: none"> • Reduced transport and disposal costs • Reduced energy costs • Reduced fertilizer costs • Potential income from sale of energy & fertilizer • Increased revenue from larger crop production associated with fertilizer use 	<ul style="list-style-type: none"> • Provides access to electricity and heating source • Creates jobs • Increased skilled labor force • Improves sanitation and public health

Table 19 - Recognized benefits of anaerobic digestion of agricultural waste

Feasibility assessments [xix] in 2017 have identified potential for biogas to make significant contributions to Armenia’s energy sector.⁴⁶ When including solely waste from large-scale cattle operations of greater than 100 heads, large poultry farms averaging 50,000 heads, and greenhouses of greater than 10 hectares, the estimated electricity production potential is 216,469 MWh and the estimated biogas production is 412 million cubic meters, which is comparable to 20% of the volumes of natural gas annually imported to Armenia from Russia.⁴⁷ This does not include energy generation potential from other types of livestock, such as goats and pigs, or from individual households that could utilize small biogas reactors (see Table 19).

	Cattle	Pig	Poultry	Total
Republic of Armenia, total	655,771	175,549	3,814,205	
Waste production (t)	5,901,939	579,311	310,370	
Average yield of biogas (m ³ /t)	62	9	130	
Specific el. Energy production (kWhe/t)	134	20	283	
Biogas production (m ³)	365,920,218	5,213,799	40,348,100	411,482,117
Electricity production (kWhe)	790,859,826	11,586,220	87,834,710	890,280,756

Table 20 - Theoretical biogas potential in livestock production, 2017

Source: Feasibility assessment of Agricultural Waste to energy Potential and Opportunities for Armenia. UNDP, 2017 [xix]

Armenia has extensive natural gas utilization infrastructure for transport, heating, and electricity, so that it is a high priority task to assess the energy and nutrient recovery potential from all sorts of biomass produced in the country, including organic waste contained in municipal and industrial waste streams, agricultural wastes, as well as the forestry biomass. Figure 20 presents 10-year average EU-28 annual domestic biomass production from the land-based sectors presented in the report “Biomass production, supply, uses and flows in the European Union. First results from an integrated assessment” by EU JRC Science Hub [xii]. The biomass production totals to 1,466 Mtons of dry matter, the 30% of which is the residue production.

⁴⁶ Feasibility assessment of Agricultural Waste to energy Potential and Opportunities for Armenia, 2017. The full report is available at http://nature-ic.am/Content/announcements/10538/FS_Biogas%20Potential_final.pdf

⁴⁷ The report from Gazprom Armenia is available at <https://armenia.gazprom.com/press/news/2019/10/5/>

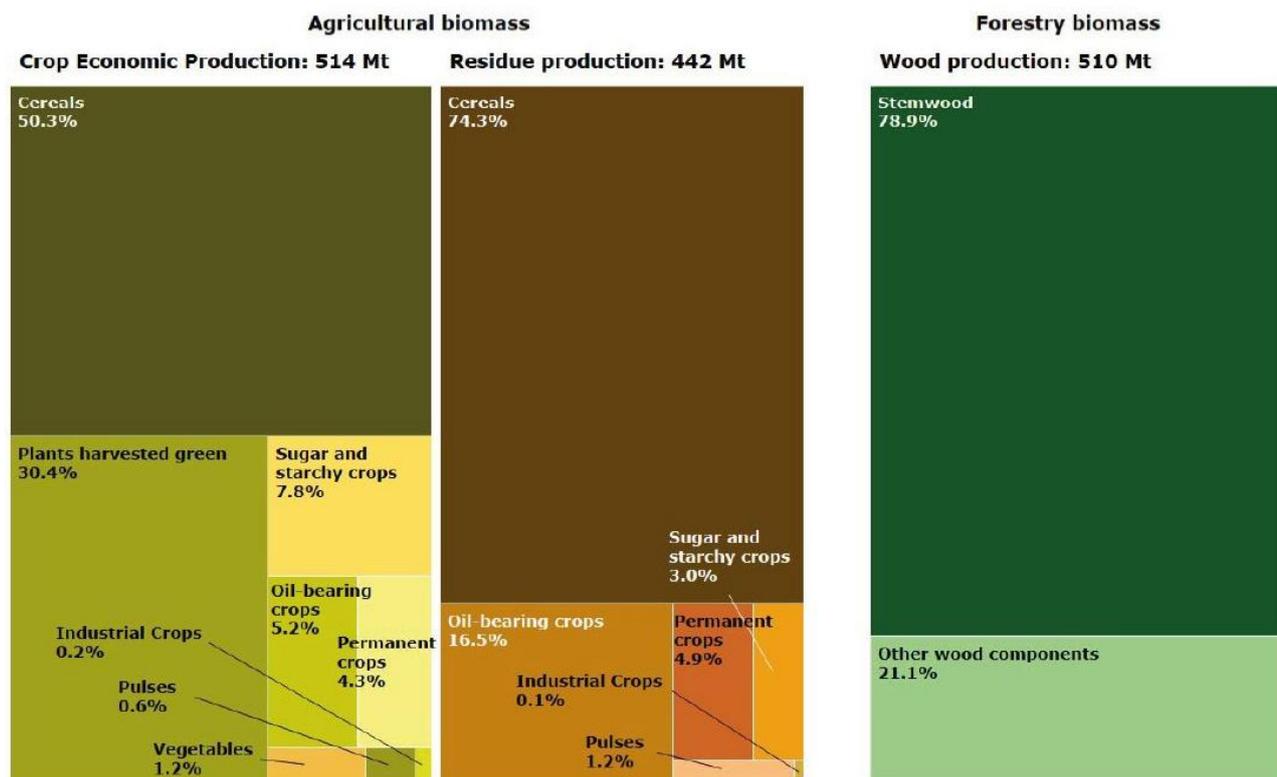


Figure 20 - 10-year average EU-28 annual domestic biomass production from the land-based sectors

Source: Biomass production, supply, uses and flows in the European Union. First results from an integrated assessment. 2018 [xii].

Biological waste treatment infrastructure summary

- No infrastructure for separate food waste collection
- Poor infrastructure for farming waste (crop residues, manure, etc.) collection
- Missing infrastructure and control results in organic waste disposed in landfills or in nature
- Some infrastructure for organic waste aerobic or anaerobic treatment, including:
 - Lusakert Biogas Plant using poultry manure (currently not operating)
 - Small-scale biogas plants using cow manure in three villages of Gegharkunik
 - ORWACO using mushroom production waste and manure for vermicomposting and bio-humus production

2.7.3 Hazardous medical waste

Most of the medical facilities of the country are located in Yerevan though such facilities exist all over the country. There is mandatory separation of wastes at medical institutions regulated by certain legislation. Further processing, neutralization, storage, transportation, and disposal of medical wastes are carried out by licensed companies, whilst the rest of the wastes are collected by the local municipal solid waste handling operators.

There are two companies in the country that treat medical wastes: “Ekologia VKH” from Ejmiatsin that has a plant for elimination of biological wastes, and Ecoprotect LLC from Yerevan, which also has a non-official regional representation. Each of these companies have three specialized vehicles equipped with fridges that

keep temperatures as low as 4-5°C. The frequency of collection of medical wastes from medical institutions is every 24 hours in the summer and maximum every 72 hours in winter.

According to data provided by Ecoprotect LLC, burning of 250 kg of medical wastes produces 50 gr of fly ash. Incineration is done at temperatures of 1,200-1,500°C. The fly ash is then landfilled in pits built in accordance with certain requirements and at relevant depths. The company monthly eliminates 8-10 tons of medical wastes subject to incineration and has about 800 active contracts also including the pharmacies. All medical institutions in the country must have contracts with such licensed company. Pharmacies usually store their expired medications, and waste collection from such facilities is done on average 1-3 times annually.

It is important to note since the above-mentioned two companies are based in Yerevan and Ejmiatsin, there might be some risks in remote communities with regards to the proper management of medical wastes (e.g. some local solutions such as illegal improper incineration or burning, burying, etc.)

2.7.4 Other hazardous wastes

As of October 2019, there were no special landfills for hazardous (especially highest, 1st class of hazard) substances in the entire republic, which leads to uncontrolled dumping and accumulation. In rare cases, the generators who act responsibly trying to find proper ways to dispose hazardous wastes end up keeping the later upon the request of the respective authorities. As a result, objects containing mercury and other hazardous substances end up in dumpsites. There is also no funding for treatment of waste with 1st class of hazard, e.g. mercury containing lamps, etc.

Elimination of Obsolete Pesticide Stockpiles and Addressing POPs Contaminated Sites⁴⁸

In April 2015, UNDP Armenia has started the “Elimination of Obsolete Pesticide Stockpiles and Addressing POPs Contaminated Sites” project that aimed at the following outcomes:

- Removal of priority POPs pesticide waste from the Nubarashen burial site, secure containment of residual contamination on-site, site stabilization and restoration, with the site secured under appropriate institutional arrangements providing effective access limitations, monitoring, and future land use control, all endorsed by an informed public;
- Development of the Kotayk national hazardous waste management site equipped with secure storage and basic infrastructure to allow introduction of HW treatment soil remediation technologies;
- Removal from Armenia of all substantially all high priority POPs pesticides, associate very high concentration wastes and obsolete pesticide stockpiles;
- Development of institutional and regulatory capacity for sound chemicals management.

⁴⁸ The project description is available at https://www.am.undp.org/content/armenia/en/home/operations/projects/environment_and_energy/elimination-of-obsolete-pesticide-stockpiles-and-addressing-pops.html

2.7.5 Construction and demolition waste (C/D)

C/D waste landfills

Many communities in Armenia operate dumpsites designated for C/D waste along with ones dedicated for municipal waste. For instance, a 10 hectare plot from the unused territory of the quarry site of the Spandaryan industrial site was allocated for the disposal of construction and demolition waste and a corresponding permit was issued to the operator⁴⁹ of the location by the 30.06.2016 № 2391-A decision of the Mayor of Yerevan.

In addition to the specially designated landfills, construction and demolition wastes are also illegally and arbitrarily disposed in other areas, including rivers, gorges, abandoned industrial sites, municipal solid waste sites, etc.

In Armenia, to this day, there is a common practice of placing CDW in garbage bins or next to garbage bins designated for municipal solid wastes. According to the data provided by the company carrying out CDW collection in Yerevan, every month about 2,000 cubic meters of CDW is collected and transported to the landfill. In addition to that, the operator also collects the bulky waste that residents simply leave next to the bins meant for the household waste.

2.7.6 Key infrastructure drawbacks

Overall Armenia has a weak infrastructure for solid waste management including:

- Insufficient capacity of Refuse Collection Vehicle (RCV) fleets
- Inadequate amount, type, and placement of garbage bins for MSW
- No infrastructure for sorted collection, including civic amenity sites
- Many communities use legacy chutes and bunkers systems
- Lack of sanitary landfills and special landfills for hazardous wastes
- Lack of minimal equipment at dumpsites (fence, gate, weighbridges, etc.)
- Bad access roads at the majority of existing dumpsites

More details on identified gaps are discussed in section 3.3 *Financial mechanisms gaps* and the corresponding policy recommendations are presented in section 4.3 *Recommendations on financial mechanisms*.

⁴⁹ The decision is available on the official web site of the municipality: <https://www.yerevan.am/am/mayors-decisions/2391-a-3/>

2.8 Waste management practices in Armenia

SECTION CONTENTS

- 2.8.1 Prevention and reduction
- 2.8.2 Reuse (prepare for reuse)
- 2.8.3 Material recovery (recycling)
- 2.8.4 Energy recovery (waste-to-energy)
- 2.8.5 Separation and sorted collection
- 2.8.6 Collection, transportation, and disposal

2.8.1 Prevention and reduction

Plastic bags

RA Ministry of the Environment has developed a project aimed at reducing the consumption of polyethylene bags of one-time use. The city of Talin was selected as the pilot area. Installation of dual compartment garbage bins, recycling of plastic bottles, as well as fencing and renovation works of the Talin landfill are currently in process. This policy is supposed to start with only one community, which will then be attempted to be scaled up for the entire province, then later the country.

Medical waste

N 2.1.3-3 sanitary rules and norms on the “Hygienic and anti-epidemic requirements for medical waste management” a separate chapter is devoted to the reduction of wastes as a priority. According to this, the institution is to assess the opportunities for reduction of hazardous chemical wastes in the following order: priority is given to the reduction of generation, followed by recycling and reuse, neutralization, and final elimination. Various recommendations on the reduction of hazardous chemical wastes are also described.

Industrial waste

In 2015, the United Nations Industrial Development Organization (UNIDO) initiated the Resource Efficient and Cleaner Production (RECP) program that aimed to improve the environmental performance and resource efficiency of SMEs of targeted industrial sectors, including reduction of waste particularly in sectors of agriculture/food and production of chemical and construction materials.⁵⁰

⁵⁰ For more details on the program visit <http://recp.am/http-recp-am-about-project-2/?lang=hy>

2.8.2 Reuse (prepare for reuse)⁵¹

Various sectors of the Armenian economy have a common practice of reusing products through repairing or direct use.

Construction

Main reused materials are obtained from the demolition of buildings and structures, i.e. rocks, doors and windows, roof covers and other materials, which are still possible to use for what they were initially intended for.

Furniture

A great example of reuse of bulky waste is the “Norogi” Resource Center that was founded in 2018 with the support of the EU in the frameworks of “Restoring living conditions in Armenia” project of Habitat for Humanity Armenia foundation. The Resource Center repairs furniture and other home appliances it receives as donations and then sells them with affordable prices to low-income families.⁵²

Automotive spare parts

An example of reuse through repairs is the automobile sector, where it is very common to repair parts subject to replacement, i.e. the system of brakes (brake pads and discs, shock absorbers, etc.)

Paint containers

Plastic containers of used paint are commonly used in rural households to collect or store milk or water, which indeed may cause high health risks.

Plastic and glass bottles

In rural areas these often burned for heat with the reasoning that it burns faster and more efficiently than wood and generates more heat.

There is a certain uncontrolled practice of reuse of plastic and glass bottles that does not meet any sanitary norms. These bottles are usually collected from garbage bins by individuals or entities who then later wash it and sell it for 5 to 15 AMD per bottle to be reused for bottling of products like wine, syrups, etc.

WEEE

There is a well-developed infrastructure and market for repaired electric equipment such as refrigerators, washing machines, vacuum cleaners, irons, boilers, A/C systems, and cooking appliances like mixers, blenders, toasters, ovens, etc. There are several online platforms for second-hand electric equipment repaired and put on the market. For example, Sarnaran.am⁵³ platform is specialized on refrigerators and freezers repaired and sold for affordable prices, up to 90,000 AMD.

As of 2019 there was no waste prevention programs initiated on national or local level in Armenia. The national policies should ensure the implementation of such programs following the international practice aiming to decouple economic growth from the environmental and public health impacts of solid waste

⁵¹ Here the reuse is referred as multiple use with the initial purpose of the product.

⁵² More details about the center are available at <http://www.norogi.am/hy/>

⁵³ For more details visit <http://sarnaran.am/>

generation. In 2012 the EU Commission has developed a Guidance on Preparing a Waste Prevention Program⁵⁴ to support EU Member States and other interested parties take advantage of the many opportunities in waste prevention and resource efficiency.

2.8.3 Material recovery (recycling)

Overview

The practice of solid waste recycling in Armenia is becoming increasingly popular, despite the insufficient level of awareness, which often gives the wrong impression that no waste recycling happens in Armenia. The conducted research has shown that as of 2019 there are more than 24 companies in Armenia recycling various types of solid waste. Ten of these companies recycle paper, 5 recycle plastic, 4 recycle glass, 5 recycle metals, and many small and medium-sized entities recycle polyethylene.

What follows is the main findings of the surveys conducted with 16 companies involved in material recovery.⁵⁵

Twelve of the 16 surveyed companies report a lack of input materials. Despite the availability of recyclables at landfills not every recycling plant accepts materials from that source, however, out of 16 companies 10 receive waste also from landfills. The informal sector delivers recyclables to 8, and sorted collection civic initiatives deliver recyclables to 12 of those 16 companies. Nine companies have their own collection infrastructure. Three companies export the materials both processes and unprocessed.

According to approximate estimates, Armenia generates 350 tons of PET bottles per month, of which only 150-200 tons are recycled (50%). It is obvious that in the value chain of waste management the link between waste generators (population and industry) with recycling companies is weak. There is also a cooperation link among some recycling companies. For instance, a company recycling PET bottles separates the HDPE caps of the bottles and delivers them to other producers, thus creating some sort of an industrial symbiosis.

As previously mentioned, the major part of recovered materials like plastic, glass, and metals is sourced at landfills. Metals like copper, iron, and aluminum are recovered through open burning at almost every major landfill in the country. The waste recyclables collected from the landfills are transported to plants dirty or contaminated and are then washed in mostly insufficient sanitary conditions before going through all the production phases thus also exposing all the employees of the plant to all sorts of risks.

The facilities are often organized independently by major companies. Some schools, like the one in the village of Mets Mantash, collect paper waste, which they later trade it for toilet paper thus reducing costs. However, some of the raw materials used for the production of toilet paper are still extracted from landfills

⁵⁴ The report is available to download at:

<https://ec.europa.eu/environment/waste/prevention/pdf/Waste%20prevention%20guidelines.pdf>

For more EU initiatives on waste prevention see: <https://ec.europa.eu/environment/waste/prevention/index.htm>

⁵⁵ The comprehensive up to date list of organizations involved in material and energy recovery in Armenia can be found in the Waste Resource Library developed by the AUA Acopian Center for the Environment available at <https://wrl-ace.aua.am/institutions/#private>

and the process of its recycling basically does not go through any inspections or control, which can lead to serious health risks.

Researches have shown that joint activities with existing companies that recycle as well as granting of certain favorable conditions by the government will create the opportunity of significantly improving the current situation. Many recycling entities have never heard of local or international grant programs. A lot of these have developed and functioned outside the legal system thus trying to avoid many obstacles.

Studies have shown that recycling of even low quality plastic wastes is a competitive economic venture. For instance, the price of a vase made from recycled plastic is between 300 and 950 AMD, while imported vases cost between 500 and 1,200 AMD. A simple soap holder made from recycled plastic costs 70 AMD, while an imported one costs around 160 AMD.

Plastics

Cleanland, the major plastic and paper waste recycling company founded in 2009, was one of the first in Armenia to carry out sorting and processing of waste. Based on existing contracts, some cities give their waste to Cleanland for processing. The plant currently recycles PET bottles to get PET flakes. About 160 tons of plastic bottles are recycled monthly. All of the output is exported. The plant also produces paper rolls and corrugated cardboard boxes from recycled paper.

PET, HDPE, PP, LDPE, PS along with other plastics are recycled in Armenia. HDPE, PP, PS types become raw materials for buckets, hangers, vases and over 20 other kinds of products put on the local market.

“Turning Environmental Challenges into Opportunities: Introducing construction materials from plastic waste”, a project⁵⁶ funded by the European Union and implemented by the Urban Foundation provides opportunity to collect plastic waste in 10 selected cities in the two southern regions of Armenia and turn it into sand-polymeric pavement or tile blocks in a workshop founded by the project.

Lots of polyethylene used in greenhouse construction is recycled together with single- and multiple-use plastic bags, which eventually are downcycled to trash bags.

Paper and cardboard

There are around 10 companies in the country that recycle cardboard, white paper, and graphic paper waste to produce packaging cardboard, wrapping paper, toilet paper, and other kinds of paper goods. However, there is an issue with inspection and control of some toilet paper producers in regard with meeting required standards. A small start-up plant recycles all kind of paper waste into fuel briquettes by adding timber to the paper waste.

Glass

Glass is recycled in different factories according to colors. White/transparent glass are recycled to make various bottle-statues as souvenirs (depending on the order) and are bottled not only in local plants for alcoholic beverages, but also exported to the international market.

⁵⁶ For more details visit https://eeas.europa.eu/delegations/armenia/56768/node/56768_en/

Lead batteries

The recovery of lead from old batteries is usually done by smaller entities like car shops selling and replacing batteries. These entities recycle lead independently or sell the old batteries to companies that do recycling and most probably export. There are three companies having received a permit from RA Governments for recycling batteries, namely:

1. “Edmet” LLC licensed in 2015 to recycle, neutralize, store, transport, and install hazardous waste (to store used lead batteries for future export)
2. “Metexim” LLC licensed in 2016 to recycle, neutralize, store, transport and install hazardous waste (to collect, store, and transport used acid batteries and for storage and export of metal scrap)
3. “Minasyan Recycling Company” LLC licensed in 2017 to recycle, neutralize, store, transport and install hazardous waste (for the collection and temporary storage of batteries of non-consumable cars).

Car carcasses

For many years, there used to be a lot of uncontrolled dumping of out-of-use car carcasses in roadsides, fields, gorges, and other places. There are several metal smelter facilities around the country that organize collection of this waste for metal recovery. One of such facilities is "Dzulakentron" OJSC located in Charentsavan, Kotayk region. Edmet and Metexim companies mentioned above also accept this kind of metal waste.

It is important to note that operations of the above-mentioned organizations recycling certain types of solid wastes should probably be subject to health and environmental impact assessments, as defined by RA legislation. In this respect, it is important to mention all the shortcomings and gaps of the environmental control and monitoring mechanisms in Armenia.

2.8.4 Energy recovery (waste-to-energy)

Generating energy from waste is not a common practice in the country. There are no incinerators for municipal mixed waste, however, as discussed in the section 2.7.2 *Biological waste treatment infrastructure*, there have been several major bio-waste-to-energy infrastructure investments implemented in Armenia such as:

- “Lusakert Biogas” Plant
- “Integrated Support for Sustainable Economic Development in Rural Mountainous Areas of Armenia”
- “BioRuralHeating” - Biomass heating solutions for rural development
- Gas extraction and flaring system at the Nubarashen dumpsite in Yerevan

On a smaller scale yet there are the following practices of recovering energy from waste:

- Producing methane from manure in some villages⁵⁷
- Producing fuel pellets from biological waste⁵⁸

⁵⁷ Pambak village case <https://hetq.am/hy/article/79179>

⁵⁸ Basen village case <https://www.ecolur.org/en/news/energy/-/8841/>

- Burning dried manure in rural areas for heating and cooking
- Burning of wood waste separated from construction and demolition wastes
- Burning of biomass (leaves, pruning residues) in cities
- Burning of paper waste
- Burning of mixed wastes in rural areas, particularly in cold weather

The AmEska company treats waste tires and oils through pyrolysis to produce fuel and carbon black. There are no existing facilities treating any other kind of waste through pyrolysis. A 2019 study⁵⁹ commissioned by the RA Ministry of Territorial Administration and Infrastructure and financed by USAID explored the feasibility of using pyrolysis and gasification to treat MSW in Armenia.

Drawbacks

Armenia currently has a well-developed gas infrastructure. According to Gazprom Armenia, in 2014 the 77% of the cars in Armenia run on Concentrated Natural Gas (CNG), while there were 334 filling stations, where over 450 million cubic meters of gas has been distributed in that year.⁶⁰ The residential sector also widely uses natural gas for heating and cooking purposes. Despite this demand and the existing infrastructure for natural gas on one hand, and the substantially large amounts of organic wastes present both in municipal, agriculture and food industry waste streams, the bio-gas recovery potential is undervalued in the country.

2.8.5 Separation and sorted collection

Since 2018, there are several organizations and initiatives in Armenia that carry out separation and sorted collection of plastic, glass, and paper wastes from the municipal solid waste in order to sell them to recycling plants. Some of these initiatives are financed by international organizations such as the UN, EU, Eurasia Foundation, while others operate by leaning on civic support. The operations of these initiatives are usually not cost-effective even when financial support is available. This results in these initiatives charging certain fees to provide the separated waste collection service through annual subscriptions that cost between 6,000 and 16,000 AMD. Thus, people and entities that use paid community waste collection services end up paying double for the disposal of their plastic, glass, and paper wastes.

Some communities do partial separation of waste, i.e. plastic bottles, glass, paper, etc. However, it is difficult to identify to what extent this separation meets the requirements of sanitary and hygienic norms. Kanakeravan is one of the exemplary communities where the local self-governing body, with the help of the local population, carries out waste separation.

In 2019, the municipal waste collection service of the City of Yerevan has started a pilot on collecting separated cardboard from big supermarkets and stores in two districts with plans to further include more areas. Additionally, the municipality of Yerevan has started developing a project on installing waste sorting bins in 150 locations in the city.

⁵⁹ *Feasibility of Application of Pyrolysis and Plasma Gasification Technologies in Armenia*. Available to download at: https://wrl-ace.aua.am/files/2019/11/PG-feasibility-in-Armenia_EN.pdf

⁶⁰ <https://armenia-am.gazprom.com/press/news/2014/10/315/>

In February 2011 UNDP, in partnership with USAID and private Armenian Eco-Engineering company, launched the “Collection and Reuse of Plastic Refuse” (CRPR) project⁶¹ in 14 major urban communities in seven regions of Armenia serving over 330,000 people. In 18 months after launch of the project the targeted communities separate, process and send to recycling more than 60 percent of PET waste accumulated in the project areas. Such a result has been achieved through applying a balanced model of public-private partnership between the private PET recycling companies and local municipalities. Eco-Engineering company head Harutyun Petrosian said about 6,000 tons of plastic waste is disposed in the country each year. He said during 12 months of its operation the company has recycled already 1000 tons of plastic bottles. The project stopped in 2016.

Drawbacks

- Existing separation initiatives are unsustainable and rely on donor support while having very small coverage
- Most of the collected recyclable wastes are harvested from the landfills and transported to plants dirty or contaminated
- Food waste and other organic wastes (e.g. from agriculture and farming) are mostly sent to landfills with some rare exceptions
- MSW sent to landfills contains hazardous substances and objects that contaminate soil, water, and air.

2.8.6 Collection, transportation, and disposal

Waste collection in the communities of Armenia is now either implemented by the communities or the private sector. As of 2018, in 153 communities in the country waste collection services were provided by 33 private companies. Short-term contracts are signed with private operators. This is funded by state subsidies and the small amount of fees collected for the waste collection services. Currently, the procedure of concluding contracts with private entities for waste collection services is in the process of regulation.

If about a year and a half ago there were only 8,800 contracts with legal/business entities for the provision of waste collection services, now, following the implementation of corresponding measures, this number has grown to more than 19,000. Moreover, the rates fixed within the contracts now identified based on the service area and the targeted objective of activities.

The waste collection services now implemented in the Sevan National Park and the Dilijan National Park can be hailed as positive examples. In the frameworks of the SMW management project (Solid Municipal Waste Management Project for the RA Provinces of Kotayk and Gegharkunik)⁶² for the RA Provinces of Kotayk and Gegharkunik, the wastes generated in the territory of the Sevan National Park are planned to be transported to the Province of Kotayk.

⁶¹ For more details visit:

http://www.am.undp.org/content/armenia/en/home/ourwork/povertyreduction/successstories/_collection-and-reuse-of-plastic-refusewaste-management-and-publ.html

⁶² The official website of the project is available at

<https://www.ebrd.com/cs/Satellite?c=Content&cid=1395271526518&d=Mobile&pagename=EBRD%2FContent%2FContentLayout>

Drawbacks

The interviews with several municipalities revealed that the waste collection operators have low level of training and miss technical guidance on sustainable operation of waste management systems and infrastructure (bins, RCV, landfills, etc.) resulting in reduced lifespan of the systems and higher costs. Specifically, because of improper operation the lifecycle of the bins with wheels shortens as a result of wheel damage at the same time increasing inefficiency and service time for each collection point.

Many communities use legacy chutes and bunker systems which cause major problems for communities in terms of management, public health, and environment, despite the legislation that defines mandatory norms for the maintenance of common equity ownership in apartment buildings. Chutes system increases operational time for waste collection requiring lots of manual work.

With only a few exceptions, the majority of communities use inefficient waste collection schemes, resulting in irregular and delayed waste collection service provision, labor-intensive operations, long operational time per served collection spot, and often, increased operational costs.

With only a few exceptions, the majority of communities experience lack of basic knowledge and capacity to implement simple steps to manage dumpsites more sustainably, including access road management, fire control, proper tipping and compacting.

2.9 Current level of awareness

SECTION CONTENTS

- 2.9.1 Public awareness
- 2.9.2 Environmental trainings
- 2.9.3 Waste management in formal education
- 2.9.4 Awareness on hazardous medical wastes in healthcare institutions
- 2.9.5 Waste-related Resource Library

There is a need for raising the level of awareness on adequate waste management as well as the negative impacts of solid municipal wastes not only among the public, but also among different levels of government, including government agencies and local self-governing authorities.

The level of awareness is especially low for the following areas:

- Health risks, environmental risks
- Value chains of waste management
- Polluter pays principle
- Composting of organic waste
- Advantages and negative impacts of incineration
- Impacts of recycling of plastic waste
- Waste reduction practices
- Impacts of open burning of waste in landfills
- Impacts of individual types of wastes (plastic, polyethylene, batteries)

Projects for raising awareness are usually implemented by NGO's and within the frameworks of community development projects of international organizations, which are carried out very irregularly and are not enough to provide mass awareness. NGO's mainly touch upon issues related to composting and waste separation topics with a specific highlight on the development and implementation of practical models at schools.

2.9.1 Public awareness

EcoAghb NGO⁶³ has been implementing awareness campaigns since February of 2018, carrying out separation of waste directly on busy streets while engaging passers-by, university, and school students. Very often residents of apartment buildings join these flash mobs, which are carried out once or twice every month after getting proper approvals for it by the municipality. Such awareness campaigns are also carried out in different villages of Armenia. Eco Gyugh project is being implemented in the village of Tatev in Syunik Province. Villagers receive credits for each kilogram of waste, which they later trade with items made from recycled plastic and paper, thus reducing costs for the residents, and displaying the actual value of wastes. The NGO, together with the "White Brigade" initiative organize cleaning-day campaigns in various public places through engaging locals and sorting waste, which is then sent to be recycled.

⁶³ For more details visit <https://www.facebook.com/ecoaghb/>

Clean Armenia⁶⁴ is an initiative running from 2017 to improve the cleanliness of the cities, villages, parks, roads, and other places through public participation and raised public awareness. It organized a number of country scale clean-ups as well as developed in 2018 one of the smartphone applications allowing citizens to report littering places using public participation GIS tools.

CLEANUPARMENIA⁶⁵ is an initiative involving 10,000 volunteers in all regions of Armenia. It independently organizes the World Cleanup Day Armenia getting to clean around 300 areas around the country including Lake Sevan.

In September 2015 the EU initiated and funded 2-year project called Biomass heating solutions for rural development.⁶⁶ It aimed to raise the level of local public awareness and acceptance, promote the benefits of use of biomass for domestic heating and develop a set of decision-making tools for social enterprises to sustainably produce and utilize biomass in heating applications in rural areas.

2.9.2 Environmental trainings

In 2018, the AUA Acopian Center for the Environment, with support from UNDP, developed environmental training packages for decision makers in ministries, state authorities, regional and local self-governing bodies. A significant portion of these trainings is on Sustainable Waste Management.⁶⁷

In 2015, the United Nations Industrial Development Organization (UNIDO) initiated the Resource Efficient and Cleaner Production (RECP) program that aimed to improve the environmental performance and resource efficiency of SMEs of targeted industrial sectors, including reduction of waste particularly in sectors of agriculture/food and production of chemical and construction materials.⁶⁸

In 2016 Generate UNDP Armenia has set up the “Global Environmental Benefits through Environmental Education and Raising Awareness of Stakeholders” project. The objective of the project was to strengthen Armenia’s capacity to use environmental education and awareness raising as tools to improve the capacity of stakeholders involved in the management of natural resources.⁶⁹

2.9.3 Waste management in formal education

According to the response to an inquiry sent to the RA Ministry of Education, Science, Culture and Sport, the only educational institution that have courses dedicated to or containing topics on waste management is the National Polytechnic University of Armenia. The courses designed both for bachelor’s and master’s programs include topics on zero-waste technologies, radioactive and hazardous waste management, industrial and household waste management, and mining waste management among other topics.

⁶⁴ For more details visit <https://www.facebook.com/cleanarmenia/>

⁶⁵ For more details visit <https://cleanuparmenia.org/>

⁶⁶ For more details visit <https://bit.ly/2p1gHRL>

https://eeas.europa.eu/delegations/armenia_en/11303/Biomass%20heating%20solutions%20for%20rural%20development%20-%20BioRuralHeating

⁶⁷ For more details visit <https://ace.aua.am/hy/projects/undp-environmental-education-training-modules/>

⁶⁸ For more details visit <http://recp.am/about-project/>

⁶⁹ For more details visit

https://www.am.undp.org/content/armenia/en/home/operations/projects/environment_and_energy/generate-global-environmental-benefits-through-environmental-edu.html

Another example of such an educational institution is the American University of Armenia⁷⁰ that has several general education courses that cover topics on waste as well as a special course on solid and hazardous waste management basics.

Armenian educational system, specific programs and individual courses must include more topics on solid waste management and circular economy, covering aspects of waste hierarchy from prevention and reduction to environmentally sound disposal of waste.

2.9.4 Awareness on hazardous medical wastes in healthcare institutions

There are no specific awareness programs for the public regarding medical waste management, however, for the medical organizations such as hospitals and clinics the relevant training is a legal requirement.

According to Decree № 03-N of the RA Minister of Health, “The employees of the organization, whose working responsibilities have to do with medical waste management, prior to assuming their roles go through mandatory training on safe medical waste management and become familiar with the requirements of the Act. The training of employees is certified by the order of the organization’s director. Employees who have not undergone training on safe management of medical waste shall not be dealing with medical waste.” The educational programs, trainings, monitoring, and supervision of medical waste management are implemented by state financing. This issue has been highlighted and is one of the objects for monitoring by the NCDPC of the Ministry of Health as a part of the prevention measures for in-hospital infections.

2.9.5 Waste-related Resource Library

In 2019, the AUA Acopian Center for the Environment has developed the Waste Resource Library⁷¹ to collect, maintain, and make available information on waste including:

- The current waste-related legislative framework in force,
- Public, business, and governmental institutions involved in the waste governance,
- Infrastructure investment projects related the waste,
- Research, policy, and strategy papers related the waste governance in Armenia.

⁷⁰ For more details visit <https://aua.am>

⁷¹ For more details visit <https://wrl-ace.aua.am/>

3 WASTE GOVERNANCE GAPS

The present chapter summarizes the waste governance gaps identified during the study and discussed in the previous chapter. The gap assessment chapter is divided into the following four sections:

- 3.1 Legislative and strategy gaps
- 3.2 Institutional gaps
- 3.3 Financial mechanisms gaps
- 3.4 Technological and infrastructural gaps

Each gap is presented in a table suggesting the gap title, domain, assessment and validation, references to the relevant sections in the ANALYSIS OF THE EXISTING SITUATION chapter, and finally the reference to the corresponding recommendation in the POLICY RECOMMENDATIONS chapter.

All references work as hyperlinks and cross references in the document.

3.1 Legislative and strategy gaps

3.1.1 Legislative Gap 1

Gap title	Waste governance considerations are missing from some key national priorities and strategies
Gap domain	Policies and strategies
Gap assessment	Government Program Action Plan of 2019 outlines main direction in country's waste governance emphasizing its importance in sectors such as industry, agriculture, healthcare, and construction. To ensure cross-sectoral approach to waste governance it is necessary that not only the strategies and policies that directly relate to waste governance but also the policies such as Energy Security Strategy include waste governance aspects. Energy sector may benefit from waste-to-energy solutions such as biogas production, targeted incineration, pyrolysis, and more. Similar cross-sectoral waste governance aspect needs to be integrated into agricultural, industrial, tourism, and other policies as they are developed.
Gap assessment reference	2.1.7 Key national priorities 2.3 National programs, strategies, and concept papers
Recommendation(s) addressing the gap	4.1.1 A. Adoption and promotion of Waste Hierarchy approach

3.1.2 Legislative Gap 2

Gap title	Waste legislation is missing the notion and definition of Waste Hierarchy and other important definitions
Gap domain	Laws and regulations
Gap assessment	<p>While containing and promoting all elements of Waste Hierarchy - from reduction to recovery and safe disposal - the law yet does not explicitly set the priority order which is central to the Waste Hierarchy approach. Specifically the notions of upcycling and downcycling are not introduced in the Law.</p> <p>To meet the requirements of the Comprehensive and Enhanced Partnership Agreement (CEPA) on “Preparation of waste management plans in line with the five-step waste hierarchy and of waste prevention programs” it will be necessary to include the notion of Waste Hierarchy in the law.</p> <p>The framework laws on waste miss also other important definitions such as:</p> <ul style="list-style-type: none"> • Upcycling • Downcycling • Types of recyclables • Bio-waste • Waste holder • Dealer • Separate collection • Circular economy
Gap assessment reference	2.4 Legislation and regulations 2.4.2 RA Law on Waste (ՀՕ159-Ն) 2.4.16 Key policy and legislation drawbacks
Recommendation(s) addressing the gap	4.1.1 A. Adoption and promotion of Waste Hierarchy approach

3.1.3 Legislative Gap 3

Gap title	Missing provisions promoting green procurement and Waste Hierarchy approach in the Procurement legislation and regulations
Gap domain	Laws and regulations
Gap assessment	<p>Neither the RA Law on Procurement (ՀՕ-21-Ն) nor the Norms on Procurement Procedure (N 526-Ն) do not include any provision on promoting or prioritizing green procurement and Waste Hierarchy approaches. This results in public procurements having higher health and environmental risks and impacts.</p> <p>Specifically, the public tendering could trigger innovative solutions to the sorted collection, transportation, and treatment of waste with a certain goal for waste reduction and recycling.</p> <p>There are Green Public Procurement efforts and procedures in the countries energy sector. These can be expanded to include green procurement in general, particularly with focusing on waste hierarchy. These practices have to be developed.</p>
Gap assessment reference	2.4 Legislation and regulations 2.4.16 Key policy and legislation drawbacks
Recommendation(s) addressing the gap	4.1.1 A. Adoption and promotion of Waste Hierarchy approach

3.1.4 Legislative Gap 4

Gap title	Missing waste management provisions in compliance with Waste Hierarchy approach in the licensing legislation and regulations
Gap domain	Laws and regulations
Gap assessment	The types of activities that require licensing are defined by RA Law on Licensing (ՀՕ-193) and include health, agriculture, education, energy, transport, environment, construction, and other sectors. Waste Hierarchy approach, specifically waste prevention, can be required and be part of the license.
Gap assessment reference	2.4 Legislation and regulations 2.4.6 RA Law on Licensing (ՀՕ-193)
Recommendation(s) addressing the gap	4.1.1 A. Adoption and promotion of Waste Hierarchy approach

3.1.5 Legislative Gap 5

Gap title	Lack of national policies that advance programs promoting Waste Hierarchy approach and specifically waste prevention both on national and local level
Gap domain	Policies and strategies
Gap assessment	In 2011 the RA Government has adopted the Cleaner Production Concept (CPC) that aims at reducing the negative impacts from production and services during their entire life-cycle – from material extraction to consumption and disposal. No implementation and no action plans followed the adoption of this concept. As part of the Comprehensive and Enhanced Partnership Agreement (CEPA) requirements, Armenia is now committed to the “Preparation of waste management plans in line with the five-step waste hierarchy and of waste prevention programs”.
Gap assessment reference	2.3 National programs, strategies, and concept papers 2.3.4 Cleaner Production Concept (CPC) 2.4.16 Key policy and legislation drawbacks
Recommendation(s) addressing the gap	4.1.1 A. Adoption and promotion of Waste Hierarchy approach

3.1.6 Legislative Gap 6

Gap title	Poor mechanisms for economic incentives to promote Waste Hierarchy compliant initiatives
Gap domain	Laws and regulations
Gap assessment	While the Article 23 of the Law on Waste promotes incentives for organizations introducing technologies contributing to reduction of waste generation, there is still no legal act or guideline issued to define the procedure of applying for receiving the benefits or what the benefits should be. Additionally, the Article 23 does not specify the type of benefits, e.g. tax benefit, import taxation, feed-in tariff, etc. Also, the 2019 RA Government Program and the action plan do not explicitly promote the use of economic incentives to promote waste hierarchy implementation and environmentally sound waste management and sustainable resource management. Furthermore, there’s no mention of circular economy.
Gap assessment reference	2.3.1 2019 RA Government Program 2.4 Legislation and regulations 2.4.2 RA Law on Waste (ՀՕ159-Ն) 2.4.3 RA sub-legislative acts 2.4.16 Key policy and legislation drawbacks
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.7 Legislative Gap 7

Gap title	Separation of waste is not promoted by RA laws
Gap domain	Laws and regulations
Gap assessment	<p>While the Law on Waste sets out the competences for a community mayor of “supporting the introduction of a system of sorted waste in the community”, there are no explicit requirements or promotion of sorted collection as a precondition for an efficient material recovery in any regulation. Neither there is a requirement to develop waste management plans that would include source separation requirement.</p> <p>Additionally, the Preparation of a national strategy reducing the amount of biodegradable municipal waste going to landfill is part of CEPA requirements</p>
Gap assessment reference	2.3.6 CEPA 2.4 Legislation and regulations 2.4.2 RA Law on Waste (ՀՕ159-Ն) 2.4.3 RA sub-legislative acts 2.5.8 Local self-government bodies
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.8 Legislative Gap 8

Gap title	Responsible consumption is not promoted by RA laws
Gap domain	Laws and regulations, policies, and strategies
Gap assessment	<p>The Law on Waste promotes responsible production through zero-waste, less-waste, and resource efficient technologies while not promoting zero-waste and less-waste responsible consumption. The same applies to other strategy papers and waste management plans that focus mainly on promoting technologies and do not explicitly promote responsible consumption practices.</p> <p>This gap echoes the Nationalized SDG12 on Responsible production and consumption as well as the CEPA requirement to promote waste prevention programs.</p>
Gap assessment reference	2.4 Legislation and regulations 2.4.3 RA sub-legislative acts
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.9 Legislative Gap 9

Gap title	Lack of local (community or province) level waste management strategies
Gap domain	Policies and strategies
Gap assessment	<p>There are only few cases where the community has developed a solid waste management strategy or plan. These are cases when an international or local organization implements a project where such a plan is necessary. Normally, the waste management is included in the yearly general programs and action plans of the communities, however, they address only collection and disposal issues with no focus on prevention, sorting, and recovery aspects. The preparation of waste management plans in line with the five-step waste hierarchy and of waste prevention programs is part of CEPA requirements.</p>
Gap assessment reference	2.3 National programs, strategies, and concept papers 2.3.1 2019 RA Government Program 2.4.16 Key policy and legislation drawbacks
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.10 Legislative Gap 10

Gap title	Missing regulations on individual waste streams
Gap domain	Laws and regulations
Gap assessment	<p>The RA legal framework includes regulations on waste oils and lubricants, construction and demolition waste, medical waste, hazardous chemicals.</p> <p>In its 2019 program the RA Government commits to develop conceptual approaches to waste management, directed to prevention and recycling of industrial, agricultural, medical, and C/D waste streams.</p> <p>However, there are no separate regulations or expressed wish to develop conceptual approaches for such solid waste streams as WEEE, end-of life vehicles, waste batteries, animal by-products and derived products, biodegradable wastes.</p>
Gap assessment reference	<p>2.3 National programs, strategies, and concept papers</p> <p>2.4.9 RA sub-legislative acts</p> <p>2.4.16 Key policy and legislation drawbacks</p>
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.11 Legislative Gap 11

Gap title	Missing adequate technical guidelines on landfills
Gap domain	Laws and regulations
Gap assessment	<p>One of the preconditions of environmentally sound solid waste management is the proper and controlled design, operation, maintenance, closure, and after-care of landfills that require good technical guidelines and norms set by the regulations. There are reportedly around 330 dumpsites in the Republic of Armenia the majority of which are subject to closure that would require a technical guidance that is missing.</p> <p>Additionally, part of the CEPA requirements are the establishment of control and monitoring procedures in the operation phase of landfills and of closure and after-care procedures for landfills to be disaffected as well as the establishment of conditioning plans for existing landfill sites.</p>
Gap assessment reference	<p>2.3.6 CEPA</p> <p>2.4.9 RA sub-legislative acts</p> <p>2.4.16 Key policy and legislation drawbacks</p> <p>2.7.1 Municipal solid waste handling infrastructure</p>
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.12 Legislative Gap 12

Gap title	Lack of a uniform technical guidance on waste quantity and composition analysis
Gap domain	Laws and regulations
Gap assessment	<p>Availability of data on quantity and composition of generated waste is critical to successful waste governance in the country. This availability, however, implies regularity, consistency, and accuracy. Since the year 2000, eight projects implemented in Armenia involved solid waste quantity and composition analysis either as part of the project or as its main purpose. All of the analyses have been carried out using different methodologies, in different parts of the country, and in different seasons, so that the results are not compatible with each other.</p>
Gap assessment reference	<p>2.2.3 Studies on quantity and composition of waste</p> <p>2.4.16 Key policy and legislation drawbacks</p>
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.13 Legislative Gap 13

Gap title	Missing laws or regulations on ESM (Environmentally Sound Management) facilities for hazardous wastes
Gap domain	Laws and regulations
Gap assessment	<p>Despite the norms and regulations related the handling hazardous waste are relatively well-developed there is still no single ESM (Environmentally Sound Management) facility for hazardous wastes (e.g. mercury containing lamps or thermometers, batteries, etc.) in the entire republic. There has been no decree or legal act enforcing design and construction of such a facility.</p> <p>As of September 2019, there has been no decree or legal act requiring design and construction of an ESM facility that would receive wastes with 1st class of hazard for at least storing.</p>
Gap assessment reference	<p>2.3.1 2019 RA Government Program</p> <p>2.4.10 Legislation related to hazardous wastes</p> <p>2.4.16 Key policy and legislation drawbacks</p>
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.14 Legislative Gap 14

Gap title	Limited responsibility and liability of waste producer
Gap domain	Laws and regulations
Gap assessment	<p>According to RA legal framework the generator (e.g. original producer) of waste is not responsible for the waste after handing it over to a waste handling company, so that if the collected waste is handled improperly (illegal dumping or other disposal) by the collecting entity, the generator has no liability but only the handling company has. As a result, having no liability for the end-of-life treatment the generators may select the handling companies basing on the cost of service only rather than the reputation or other records. The regulations do not specify in which cases the original waste producer is to retain responsibility for the whole treatment chain or in which cases the responsibility of the producer and the holder can be shared or delegated among the actors of the management chain. This issue is closely tied to the issue of ownership of waste on every stage of the waste management chain which is quite uncertain in RA legal framework.</p> <p>This gap echoes the CEPA requirements to establish rules and procedures aimed at preventing and remedying of damage to the environment (water, land, protected species, and natural habitats) based on the polluter-pays principle as well as to establish strict liability for dangerous occupational activities.</p>
Gap assessment reference	<p>2.4 Legislation and regulations</p> <p>2.4.2 RA Law on Waste (ՀՕ159-Ն)</p> <p>2.4.9 RA sub-legislative acts</p> <p>2.4.16 Key policy and legislation drawbacks</p>
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.15 Legislative Gap 15

Gap title	The Law on Waste does not clearly require the waste handling operators to report on collected and landfilled solid waste
Gap domain	Laws and regulations
Gap assessment	The law sets out the Cadaster of waste to include the “Registry of the objects of generation, recycling and recovery of waste” and the “Registry of waste disposal sites.” It does not, however, include the waste collection and transportation entities, so that the MSW operators in the country do not report data on collected and landfilled waste to the Cadaster. Only municipalities report this information based on rough volume estimations to the RA Statistical Committee. This gap echoes the CEPA requirement on “Establishment of procedures to review of decisions not to supply environmental information or to supply only partial information.”
Gap assessment reference	2.3.1 2019 RA Government Program 2.4 Legislation and regulations 2.4.2 RA Law on Waste (ՀՕ159-Ն) 2.4.9 RA sub-legislative acts 2.4.16 Key policy and legislation drawbacks
Recommendation(s) addressing the gap	4.1.2 B. Management improvement

3.1.16 Legislative Gap 16

Gap title	Poor mechanisms for economic incentives to promote development of ESM facilities for hazardous wastes
Gap domain	Policies and strategies
Gap assessment	The treatment and disposal of hazardous wastes may require support from state in form of subsidies, tax exemptions and other economic incentives. There are no explicit steps done to promote development of ESM facilities for hazardous wastes in the country.
Gap assessment reference	2.3.1 2019 RA Government Program 2.4.2 RA Law on Waste (ՀՕ159-Ն) 2.4.16 Key policy and legislation drawbacks
Recommendation(s) addressing the gap	4.1.1 A. Adoption and promotion of Waste Hierarchy approach

3.2 Institutional gaps

3.2.1 Institutional Gap 1

Gap title	Poor mechanisms for dissemination of environmental information
Gap domain	Institutions
Gap assessment	<p>The consultative meetings and interviews with the representatives of key governmental entities involved in SWM revealed the low level of awareness on the initiatives and processes carried out by individual entity, resulting in poor communication and cooperation. The reason for this is partly the poor mechanisms for disseminating information.</p> <p>In its 2019 program the RA Government commits to complete the Shared Environmental Information System (SEIS) before 2013.</p> <p>The access to environmental information (to public) is also one of the CEPA requirements.</p>
Gap assessment reference	<p>2.2 Information and data</p> <p>2.2.1 RA Statistical Committee</p> <p>2.5.15 Key institutional drawbacks</p> <p>2.3.1 2019 RA Government Program</p> <p>2.3.6 CEPA</p>
Recommendation(s) addressing the gap	4.2.1 A. Monitoring, data, and information

3.2.2 Institutional Gap 2

Gap title	Poor institutional setting for data acquisition, processing, and reporting
Gap domain	Institutions
Gap assessment	<p>The data on waste reported by the RA Statistical Committee is often unreliable because of data acquisition sources and methodology. For instance, the amounts of waste transported to landfills is reported by the municipalities to the Statistical Committee. These amounts are calculated based not on weight measured via weighbridges but based on volumes of trucks transporting waste to landfills. The shortcoming of this calculation is that due to the diverse fleet of refuse collection vehicles – compacting and non-compacting – the reported volumes of transported waste are very rough estimates that are later converted to weight with certain factor.</p> <p>Also, the institutional setting for data acquisition and processing is often sophisticated and allows for many inaccuracies to occur. As discussed in the section 2.2 Information and data the data on waste is acquired from different sources by four entities and there is no coherence in its processing, analyzing, distributing, among the key government agencies. The distribution and exchange of the collected data among the agencies is disorganized and complicated due to lack of clear protocols and tools for data exchange, which makes waste governance and decision making on all levels inefficient.</p>
Gap assessment reference	<p>2.2 Information and data</p> <p>2.2.1 RA Statistical Committee</p> <p>2.5.15 Key institutional drawbacks</p> <p>2.3.1 2019 RA Government Program</p> <p>2.3.6 CEPA</p>
Recommendation(s) addressing the gap	4.2.1 A. Monitoring, data, and information

3.2.3 Institutional Gap 3

Gap title	Insufficient capacity for lab testing
Gap domain	Institutions
Gap assessment	The consultative meetings and interviews with the representatives of the State Environmental and Mining Inspectorate and the Environmental Monitoring and Information Center at the Ministry of the Environment revealed complaints about unclear access to the lab testing facilities available in the republic. The mentioned agencies often have to make use of the better testing facilities of the National Center for disease control and prevention SNCO. Additionally, there's weak technical equipment at labs for analysis of waste and emissions, specifically POPs, EG, new POPs, UPOPs.
Gap assessment reference	2.5 Institutional framework 2.5.15 Key institutional drawbacks
Recommendation(s) addressing the gap	4.2.1 A. Monitoring, data, and information

3.2.4 Institutional Gap 4

Gap title	Weak contract management capacity, including PPP contracts
Gap domain	Institutions
Gap assessment	Many communities experience issues with contract management in waste handling and sanitary cleaning. The challenges are even greater in case of PPP contract when design, build and operate tenders require setting and monitoring a sophisticated set of KPIs for construction standards, investment amounts, delivered services, and taking adequate measures in case of failures.
Gap assessment reference	2.5.8 Local self-government bodies Monitoring and control
Recommendation(s) addressing the gap	4.2.2 B. Management capacity

3.2.5 Institutional Gap 5

Gap title	Lack of training and technical guidance for sustainable operation in SWM
Gap domain	Institutions
Gap assessment	The interviews with several municipalities revealed that the waste collection operators have low level of training and miss technical guidance on sustainable operation of waste management systems and infrastructure (bins, RCV, landfills, etc.) resulting in reduced lifespan of the systems and higher costs. Specifically, because of improper operation the lifecycle of the bins with wheels shortens as a result of wheel damage at the same time increasing inefficiency and service time for each collection point.
Gap assessment reference	2.8.6 Collection, transportation, and disposal Monitoring and control
Recommendation(s) addressing the gap	4.2.2 B. Management capacity

3.2.6 Institutional Gap 6

Gap title	Operationally inefficient waste collection schemes
Gap domain	Institutions
Gap assessment	With only a few exceptions, the majority of communities use inefficient waste collection schemes, resulting in irregular and delayed waste collection service provision, labor-intensive operations, long operational time per served collection spot, and often, increased operational costs. The cause for this mainly lack of training among the waste collecting operator staff.
Gap assessment reference	2.5.8 Local self-government bodies 2.8.6 Collection, transportation, and disposal Monitoring and control
Recommendation(s) addressing the gap	4.2.2 B. Management capacity

3.2.7 Institutional Gap 7

Gap title	Lack of knowledge and poor capacity for landfill management
Gap domain	Institutions
Gap assessment	With only a few exceptions, the majority of communities experience lack of basic knowledge and capacity to implement simple steps to manage dumpsites more sustainably, including access road management, fire control, proper tipping and compacting.
Gap assessment reference	2.5.8 Local self-government bodies 2.5.15 Key institutional drawbacks
Recommendation(s) addressing the gap	4.2.2 B. Management capacity

3.2.8 Institutional Gap 8

Gap title	Weak capacity for developing local waste management plans
Gap domain	Institutions
Gap assessment	With only a few exceptions, the majority of communities experience lack of basic knowledge and capacity to develop local waste management plans that would include sustainability aspects such as waste prevention programs, sorted collection, value recovery from dry recyclables, adequate cost recovery from the collected fees, and use of indicators.
Gap assessment reference	2.5.8 Local self-government bodies 2.5.15 Key institutional drawbacks
Recommendation(s) addressing the gap	4.2.2 B. Management capacity

3.2.9 Institutional Gap 9

Gap title	Weak capacity for controlling illegal dumping
Gap domain	Institutions
Gap assessment	Uncontrolled dumping is one of the biggest issues in regard with almost all waste streams. Manure waste from farms is often dumped into gorges and rivers, municipal waste, car carcasses, industrial waste, and lots of C/D waste is dumped on roadsides. The reasons for such practice include poor education and public awareness, lack of disposal location alternatives, insufficient use of the State Environmental and Mining Inspection Body's capacity, among others.

Gap assessment reference	2.5 Institutional framework Monitoring and control
Recommendation(s) addressing the gap	4.2.2 B. Management capacity

3.2.10 Institutional Gap 10

Gap title	While required by Law, de facto, permits for municipal waste collection are not issued
Gap domain	Institutions
Gap assessment	<p>The Law on Licensing (ՀՕ-193) requires the entities that recycle, treat, store, transport, and place hazardous waste to have a permit issued by the RA Government along with undergoing an examination and certification.</p> <p>According to the Law on Waste (ՀՕ-159) and the List of Hazardous Waste (N 430-Ն) the municipal household waste has a 4th class of hazard, which should require any household waste transporting and landfilling operator to receive a license for their operation. In reality, no single municipal waste collector in the country has a permit.</p> <p>Additionally, the establishment of a permitting system for establishments or undertakings carrying out disposal or recovery operations, with specific obligations for the management of hazardous wastes is part of CEPA requirements.</p>
Gap assessment reference	2.3.6 CEPA 2.4 Legislation and regulations
Recommendation(s) addressing the gap	4.2.3 C. Institutional setting

3.2.11 Institutional Gap 11

Gap title	While required by Law, de facto, EIA for municipal waste collection and landfilling is not done
Gap domain	Institutions
Gap assessment	<p>The RA Law on Environmental Impact Assessment and Expert Examination (ՀՕ-110-Ն) states that the following activities are subject to assessment and expert examination of Category A:</p> <ul style="list-style-type: none"> • Collection, storage, use, processing, treatment, disposal, liquidation, placement, and burial of hazardous wastes; • Installation of landfills or municipal waste recycling facilities to service communities with 15,000 or more residents or to receive at least 10 tons of waste per day, and/or treatment of domestic waste. <p>The unsorted municipal solid waste from residential households and household spaces of organizations is defined as having 4th class of hazard according to the List of wastes classified by hazardousness (RA Government decision N 430-Ն). Neither the waste collection operators nor the dumpsite operators at the communities go through an EIA or Expert Examination process required by RA Law.</p>
Gap assessment reference	2.4 Legislation and regulations 2.4.4 RA Law on Environmental Impact Assessment and Expert Examination 2.5 Institutional framework Monitoring and control
Recommendation(s) addressing the gap	4.2.3 C. Institutional setting

3.2.12 Institutional Gap 12

Gap title	Weak institutional setting to deal with investors
Gap domain	Institutions
Gap assessment	As of October 2019, there is a lack of institutional capacity to deal with the investors. Many investors seek access to politicians and government in search of guarantees for their businesses. This creates institutional chaos and bad reputation for the country for foreign investors.
Gap assessment reference	2.5.15 Key institutional drawbacks
Recommendation(s) addressing the gap	4.2.3 C. Institutional setting

3.2.13 Institutional Gap 13

Gap title	Fragmentation among the key government agencies responsible for waste governance in the country
Gap domain	Institutions
Gap assessment	The consultations with the stakeholders representing the key government agencies involved in the country's waste governance and management have revealed a certain level of fragmentation within the interagency institutional setting. The competencies and responsibilities defined by the framework laws on waste do not relate to specific waste streams but rather waste in general and often overlap for two or more agencies. Only in some instances the competencies and responsibilities are specified in terms of hazardousness of wastes. The fragmentation is noticeable when it comes to functions such as monitoring, data collection, or licensing, permitting, and enforcement.
Gap assessment reference	2.5.15 Key institutional drawbacks
Recommendation(s) addressing the gap	4.2.3 C. Institutional setting

3.2.14 Institutional Gap 14

Gap title	Ownership of land used for dumpsites used by communities is not uniform
Gap domain	Institutions
Gap assessment	The majority of the dumpsites are owned by communities, yet some communities operate dumpsites owned by a private entity. At least 10% of the communities exploit dumpsites that have been formed spontaneously, not based on any decree or decision.
Gap assessment reference	2.5.15 Key institutional drawbacks
Recommendation(s) addressing the gap	4.2.3 C. Institutional setting

3.2.15 Institutional Gap 15

Gap title	Lack of knowledge and capacity to recover value from recyclables
Gap domain	Institutions
Gap assessment	The low level of awareness, lack of knowledge chains, capacities, and mobilization among communities and local authorities result in a lost value for the recyclables (mainly plastics, glass, paper, and metals), which could generate funds for waste handling. Given the relatively high-level of in-country demand for recyclables (esp. plastics, glass, metals, and paper), communities can benefit from separated collection.
Gap assessment reference	2.5.15 Key institutional drawbacks 2.6 Financial mechanisms Financial mechanisms
Recommendation(s) addressing the gap	4.2.3 C. Institutional setting

3.2.16 Institutional Gap 16

Gap title	Lack of sufficient information on waste handling, recovery, and treatment capacities in the country to support adoption of EPR
Gap domain	Policies and strategies
Gap assessment	EPR adoption would require assessing in-country capacities for handling, recovery, and treatment, as well as sorted collection and transportation of the specific types of wastes (end-of-life products), selected according to the draft list of non-consumable products, including packaging, subject to recovery.
Gap assessment reference	2.2 Information and data 2.3 National programs, strategies, and concept papers 2.3.5 Extended producer responsibility (EPR)
Recommendation(s) addressing the gap	4.1.1 A. Adoption and promotion of Waste Hierarchy approach

3.3 Financial mechanisms gaps

3.3.1 Financial Gap 1

Gap title	Low waste handling fee insufficient for full cost-recovery
Gap domain	Financial mechanisms
Gap assessment	<p>The waste management fee in Armenia is inadequately low, resulting in</p> <ul style="list-style-type: none"> • low level of responsibility among the citizens and organizations • poor implementation of ‘polluters pay’ principle • insufficient funds for waste collection and modernization of the system • the waste management fee does not include costs associated with the negative impacts of waste <p>Additionally, the fee collection mechanism is inefficient both in case of residents and business organizations.</p> <p>The previous two points in effect result in an incomplete cost recovery while the establishment of full cost recovery mechanism in accordance with the polluter pays principle and extended producer responsibility principle is part of the requirements of CEPA.</p>
Gap assessment reference	<p>2.6 Financial mechanisms</p> <p>2.6.1 Waste collection fee</p> <p>2.6.4 Key financial drawbacks related to financial mechanisms</p> <p>2.3.6 CEPA</p>
Recommendation(s) addressing the gap	4.3.1 A. Financial improvement

3.3.2 Financial Gap 2

Gap title	Inadequately low environmental tax for landfilling unsorted municipal solid waste
Gap domain	Financial mechanisms
Gap assessment	<p>The mixed (unsorted) municipal waste may contain batteries, flammables, infectious objects, chemicals, and other hazardous substances. As such, this waste stream is considered to have a 4th class of hazard level according to list of hazardous waste adopted by RA regulations. The RA Tax Code sets a landfill tax of 1,500 AMD per tonne for 4th grade with the exception of municipal waste collection and sanitary cleaning operators. For these operators, the rate is set at 60 AMD per tonne. This exception together with the inadequately low landfill tax create a wrong incentive in terms of municipal waste sorting practices.</p> <p>For a comparison, the landfill tax rates vary across the EU from 3€/t as in Lithuania to more than 100€/t as in Belgium for non-hazardous municipal solid waste.</p>
Gap assessment reference	<p>2.6 Financial mechanisms</p> <p>2.6.2 Landfill tax</p> <p>2.6.4 Key financial drawbacks related to financial mechanisms</p> <p>2.3.6 CEPA</p> <p>Monitoring and control</p>
Recommendation(s) addressing the gap	4.3.1 A. Financial improvement

3.3.3 Financial Gap 3

Gap title	Poor costing of waste management operations
Gap domain	Financial mechanisms
Gap assessment	The costing for waste management operations does not include costs arising during the whole life cycle of waste, e.g. landfill management and after-care, environmental costs, remediation costs, etc. but merely based on fuel expenses, RCV fleet and waste bins maintenance. These costs are externalized and are not reflected in the waste collection fee.
Gap assessment reference	2.6 Financial mechanisms 2.6.4 Key financial drawbacks related to financial mechanisms
Recommendation(s) addressing the gap	4.3.1 A. Financial improvement

3.3.4 Financial Gap 4

Gap title	Polluter pays principle tools are not fully enabled for full cost recovery and incentivizing desired waste-related behavior
Gap domain	Financial mechanisms
Gap assessment	Establishment of full cost recovery mechanism in accordance with the polluter pays principle and extended producer responsibility principle is part of CEPA requirements. As discussed in sections on financial tools, the waste collection fee and landfill taxes are the only polluter pays tools in Armenia. Both are inefficiently implemented. Other tools could include variable charging (i.e. pay-as-you-throw) schemes, producer responsibility schemes, and deposit-refunds designed to incentivize positive behavior by households. There could also be other schemes such as benchmarking waste practices among companies.
Gap assessment reference	2.6 Financial mechanisms 2.6.2 Landfill tax 2.6.4 Key financial drawbacks related to financial mechanisms 2.3.6 CEPA Monitoring and control
Recommendation(s) addressing the gap	4.3.1 A. Financial improvement

3.3.5 Financial Gap 5

Gap title	Lost value from recyclables due to lack of knowledge and basic capacity
Gap domain	Financial mechanisms
Gap assessment	It is estimated that around 2000 tons of recyclable plastics (mainly PET and PP) is received by the waste recovery plants annually. There are no estimates for the metal and glass materials sent to recycling. However, most of these materials are collected from dumpsites by informal sector, while the municipalities or communities cover the costs of collecting and transporting these materials to the dumps. The communities can benefit at least partial cost recovery from these valuable materials in case of sorted collection. Another issue to solve in this regard is the ownership of waste which is uncertain in the legislation.
Gap assessment reference	2.6.4 Key financial drawbacks related to financial mechanisms
Recommendation(s) addressing the gap	4.3.1 A. Financial improvement

3.4 Technological and infrastructural gaps

3.4.1 Tech. and Inf. Gap 1

Gap title	Insufficient capacity of Refuse Collection Vehicle (RCV) fleets
Gap domain	Technology and infrastructure
Gap assessment	<p>According to an inventory of technical capacities, as of November 2018, Armenian provinces had 774 garbage trucks, of which only 204 with compacting mechanisms, as well as 11,868 garbage bins (0.3, 0.7 liters).</p> <p>Around 75 percent of the communities have only 1 truck (RCV) which causes risks of delayed waste collection in case the vehicle is broken or on repair. Around 11% of communities have no trucks at their disposal. Additionally, more than 60 percent of all RCVs in the country are open body trucks, which require lots of manual labor which makes the collection inefficient and thus costly. Bad conditions of the old trucks often result in increased out-of-service time and thus decreased lifetime of the entire fleet and most importantly lower quality of service.</p>
Gap assessment reference	<p>2.6 Financial mechanisms</p> <p>2.7 Infrastructure</p> <p>2.7.1 Municipal solid waste handling infrastructure</p>
Recommendation(s) addressing the gap	4.4.1 A. Collection infrastructure

3.4.2 Tech. and Inf. Gap 2

Gap title	Inadequate amount, type, and placement of garbage bins for MSW
Gap domain	Technology and infrastructure
Gap assessment	<p>The selection of the number, type, and location of garbage bins in a community is often conditioned by the existing RCV fleet, the financial limitations, and by the previous experience. However, upgrading the bins should be part of a wider strategic planning with clear targets and performance indicators like collection rates, recycling rates, service time among others. Local authorities do not develop and use such plans ending up investing out of current necessity.</p> <p>Procurement of inadequate amount and type of garbage bins and their wrong placement results in increased operational time per served collection spot, very labor-intensive waste collection operations, and overall low-quality collection service. Overflow of waste may result from wrong selection of size or number of bins. Too large bins may cause damage to the RCVs. Bins with no lids make access to waste for animals.</p>
Gap assessment reference	<p>2.7 Infrastructure</p> <p>2.7.1 Municipal solid waste handling infrastructure</p>
Recommendation(s) addressing the gap	4.4.1 A. Collection infrastructure

3.4.3 Tech. and Inf. Gap 3

Gap title	No infrastructure for sorted collection of dry recyclables
Gap domain	Technology and infrastructure
Gap assessment	<p>There are several organizations and initiatives in Armenia that carry out separation and sorted collection of plastic, glass, and paper wastes from solid domestic. The operations of these initiatives are usually not cost-effective even when financial donor-support is available which makes them very unsustainable.</p> <p>Despite several attempts, there is no community having sorted collection today. Unsorted mixed municipal waste containing organic and hazardous substances still ends up in dumpsites contaminating soil, underground waters, and air.</p> <p>Some of the recyclable wastes sorted and collected from the landfills are transported to plants dirty or contaminated and are then washed in mostly insufficient sanitary conditions before going through all the production phases thus also exposing all the employees of the plant to risks.</p>
Gap assessment reference	<p>2.7 Infrastructure</p> <p>2.7.1 Municipal solid waste handling infrastructure</p> <p>2.8.5 Separation and sorted collection</p>
Recommendation(s) addressing the gap	4.4.1 A. Collection infrastructure

3.4.4 Tech. and Inf. Gap 4

Gap title	No civic amenity cites for bulky waste and other waste types from households that need separate collection
Gap domain	Technology and infrastructure
Gap assessment	No community uses civic amenity sites to provide citizens a possibility for free of charge sorted disposal of household construction components, white waste, furniture, and other bulky wastes. As a result the MSW or construction waste collection contractors often end up provide an extra service collecting bulky items left next to the household garbage bins.
Gap assessment reference	<p>2.7.1 Municipal solid waste handling infrastructure</p> <p>2.8.5 Separation and sorted collection</p>
Recommendation(s) addressing the gap	4.4.1 A. Collection infrastructure

3.4.5 Tech. and Inf. Gap 5

Gap title	No infrastructure for sorted collection and treatment of food and other organic wastes
Gap domain	Technology and infrastructure
Gap assessment	<p>While some of the recyclable wastes (plastics, glass, and metals) are sorted and collected from the landfills, the food waste, and other organic wastes (e.g. from agriculture and farming) end up rotting in the landfills emitting methane and other greenhouse gases. The exception is the rare cases when the manure, garden waste, crop residues, and other organics are locally used for biogas, fuel, or fertilizer production or for a direct burning. Some of the food waste is used for feedstock.</p> <p>However, the major portions of generated organic wastes are sent to dumpsites. No organic waste treatment options including composting, AD or returning food waste to animal feed are applied by major organic waste producers such as food processing and agricultural companies.</p> <p>Additionally, the preparation of a national strategy reducing the amount of biodegradable municipal waste going to landfill is part of the CEPA requirements.</p>

Gap assessment reference	2.3.6 CEPA 2.7.1 Municipal solid waste handling infrastructure 2.8.5 Separation and sorted collection
Recommendation(s) addressing the gap	4.4.1 A. Collection infrastructure

3.4.6 Tech. and Inf. Gap 6

Gap title	Many communities use legacy chutes and bunkers systems
Gap domain	Technology and infrastructure
Gap assessment	<p>Many communities use legacy chutes and bunker systems which cause major problems for communities in terms of management, public health, and environment, despite the legislation that defines mandatory norms for the maintenance of common equity ownership in apartment buildings, including:</p> <ol style="list-style-type: none"> 1. Disposal of consumption (household) waste at least once every three days, and in case of temperatures of +50°C and above – every day; 2. Disinsection (extermination of insects) and deratization (extermination of rodents) in common areas, chutes and waste collecting rooms at least once every three months. <p>Besides sanitary issues, the chute systems increase operational time for waste collection requiring lots of manual work.</p>
Gap assessment reference	2.7.1 Municipal solid waste handling infrastructure 2.8.6 Collection, transportation, and disposal
Recommendation(s) addressing the gap	4.4.1 A. Collection infrastructure

3.4.7 Tech. and Inf. Gap 7

Gap title	Lack of sanitary landfills
Gap domain	Technology and infrastructure
Gap assessment	<p>Despite the two sanitary landfill infrastructure projects on the way, the solid waste generated in communities still ends up in more than 300 dumpsites.</p> <p>Additionally, the establishment of control and monitoring procedures in the operation phase of landfills and of closure and after-care procedures for landfills to be disaffected, as well as the establishment of conditioning plans for existing landfill sites, and of an application and permit system and of waste acceptance procedures are part of the CEPA requirements.</p>
Gap assessment reference	2.3.6 CEPA 2.7.1 Municipal solid waste handling infrastructure 2.7.4 Other hazardous wastes 2.8.6 Collection, transportation, and disposal
Recommendation(s) addressing the gap	4.4.2 B. Landfills

3.4.8 Tech. and Inf. Gap 8

Gap title	Lack of special landfills for hazardous substances
Gap domain	Technology and infrastructure
Gap assessment	There were no special landfills for hazardous substances in the entire republic, which leads to uncontrolled dumping and accumulation. In rare cases, the generators who act

	<p>responsibly trying to find proper ways to dispose hazardous wastes end up keeping the later upon the request of the respective authorities. As a result, objects containing mercury and other hazardous substances end up in dumpsites.</p> <p>The UNDP project Elimination of Obsolete Pesticide Stockpiles and Addressing POPs Contaminated Sites includes the development of the Kotayk national hazardous waste management site equipped with secure storage and basic infrastructure to allow introduction of HW treatment soil remediation technologies. As of October 2019 the Kotayk site was not implemented.</p> <p>It is also a part of CEPA requirements to ensure that the relevant wastes are subject to treatment before landfilling.</p>
Gap assessment reference	<p>2.3.6 CEPA</p> <p>2.7.1 Municipal solid waste handling infrastructure</p> <p>2.7.4 Other hazardous wastes</p> <p>2.8.6 Collection, transportation, and disposal</p>
Recommendation(s) addressing the gap	<p>4.4.2 B. Landfills</p>

3.4.9 Tech. and Inf. Gap 9

Gap title	Uncertain capacity for treating medical and other hazardous wastes
Gap domain	Technology and infrastructure
Gap assessment	<p>There is mandatory separation of wastes at medical institutions regulated by certain legislation. Further processing, neutralization, storage, transportation, and disposal of medical wastes are carried out by licensed companies, and all medical institutions in the country must have a contract with at least one company.</p> <p>As of 2019 there are two licensed companies in the country that treat medical wastes with limited collection and treatment capacities, which cause some risks in remote communities with regards to the proper management of medical wastes (e.g. some local solutions such as illegal improper incineration or burning, burying, etc.).</p>
Gap assessment reference	<p>2.3.6 CEPA</p> <p>2.7.1 Municipal solid waste handling infrastructure</p> <p>2.7.4 Other hazardous wastes</p> <p>2.8.6 Collection, transportation, and disposal</p>
Recommendation(s) addressing the gap	<p>4.4.2 B. Landfills</p>

3.4.10 Tech. and Inf. Gap 10

Gap title	Lack of equipment for waste quantity measurement (weighbridges, etc.)
Gap domain	Technology and infrastructure
Gap assessment	The information on the quantity of generated waste is critical for a robust waste management planning. Acquiring this information on regular basis with relevant accuracy requires basic infrastructure such as weighbridges at the landfills or transfer stations where each RCV is weighed and registered.
Gap assessment reference	2.7.1 Municipal solid waste handling infrastructure 2.8.6 Collection, transportation, and disposal
Recommendation(s) addressing the gap	4.4.2 B. Landfills

3.4.11 Tech. and Inf. Gap 11

Gap title	Bad access roads at the majority of existing dumpsites
Gap domain	Technology and infrastructure
Gap assessment	Bad access roads (2-4 km) at the existing dumpsites result in reduced lifespan of the waste collection fleet due to wheel and other damages. None of the dumpsites has a weighbridge to monitor the amounts of disposed waste. Only a few dumpsites are fenced, while the most of the major dumpsites have open burning and scavengers.
Gap assessment reference	2.7.1 Municipal solid waste handling infrastructure 2.8.6 Collection, transportation, and disposal
Recommendation(s) addressing the gap	4.4.2 B. Landfills

4 POLICY RECOMMENDATIONS

The present chapter summarizes the waste governance recommendations resulting from this study and based on the gap assessment. This chapter is divided into the following four sections:

- 4.1 Recommendations on legislation and strategies
- 4.2 Recommendations on institutions
- 4.3 Recommendations on financial mechanisms
- 4.4 Recommendations on technology and infrastructure.

The present chapter can be considered as an action guideline towards improved waste governance based on the principles of waste hierarchy and circular economy.

The recommendations are compiled into thematic packages organized in separate tables suggesting the following information:

- Proposed action
- Responsible party to carry out the action
- Reference to the gap(s) addressed by the proposed action
- Link to CEPA indicating if the action addresses also any of relevant CEPA requirements.

In this section no timelines are recommended. Timelines for the proposed actions should be set in consultation with relevant authorities. Some timelines, however, are specified by CEPA requirements. The latter case is indicated by YES in the last column. For more details see section 2.3.6 CEPA.

4.1 Recommendations on legislation and strategies

4.1.1 A. Adoption and promotion of Waste Hierarchy approach

#	Proposed action	Responsible party	Gap(s) addressed	CEPA
1	Revise existing national strategies and policies to include waste governance aspects and components with a focus on Waste Hierarchy.	RA Government Respective Ministries	3.1.1 Legislative Gap 1 Waste governance considerations are missing from some key national priorities and strategies	
2	Introduce the following notions and definitions into RA legislation: <ul style="list-style-type: none"> • Waste Hierarchy • Upcycling • Downcycling • Types of recyclables • Bio-waste • Waste holder • Separate collection • Circular economy 	RA Government Ministry of Territorial Administration and Infrastructure	3.1.2 Legislative Gap 2 The Law on Waste is missing the notion and definition of Waste Hierarchy and other important definitions	YES
3	Integrate prioritization of Waste Hierarchy compliant products and services in public procurement process.	RA Government	3.1.3 Legislative Gap 3 Missing provisions promoting green procurement and Waste	

	For instance, construction and renovation facilities, purchase of equipment and supplies, and others can be subject to requiring a contractor or vendor to have a waste hierarchy (recycling or other recovery) policy and plan.	<p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Environment</p> <p>Ministry of Economy</p> <p>Ministry of Finance</p>	Hierarchy approach in the Procurement legislation and regulations	
4	Integrate Waste Hierarchy compliance as one of the requirements for issuing a license .	<p>RA Government</p> <p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Environment</p> <p>Ministry of Economy</p> <p>Ministry of Finance</p>	3.1.4 Legislative Gap 4 Missing waste management provisions in compliance with Waste Hierarchy approach in the licensing legislation and regulations	
5	<p>Develop and introduce mechanisms and guidelines to support local authorities to develop and implement local waste prevention programs.</p> <p>Introduce a requirement on local authorities to develop and implement local waste prevention programs</p>	<p>RA Government</p> <p>Ministry of Territorial Administration and Infrastructure</p>	<p>3.1.5 Legislative Gap 5 Lack of national policies that advance programs promoting Waste Hierarchy approach and specifically waste prevention both on national and local level</p> <p>3.1.8 Legislative Gap 8 Responsible consumption is not promoted by RA laws</p>	YES
6	Article 23 of the Law on Waste defines organizations that are eligible to receive benefits for waste-reduction technologies, etc. Define and regulate the procedures for applying to receive benefits for these organizations.	<p>RA Government</p> <p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Environment</p> <p>Ministry of Economy</p> <p>Ministry of Finance</p>	3.1.6 Legislative Gap 6 Poor mechanisms for economic incentives to promote Waste Hierarchy compliant initiatives	
7	EPR adoption would require assessing in-country capacities for handling, recovery, and treatment, as well as sorted	<p>Ministry of Environment</p> <p>Ministry of Economy</p>	3.2.16 Institutional Gap 16 Lack of official information on waste handling, recovery, and	YES

	<p>collection and transportation of the specific types of wastes (end-of-life products), selected according to the draft list of non-consumable products, including packaging, subject to recovery (see Action 3 in EPR action plan).</p>	<p>Ministry of Finance</p>	<p>treatment capacities in the country to support adoption of EPR</p>	
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4.1.2 B. Management improvement

#	Proposed action	Responsible party	Gap(s) addressed	CEPA
8	<p>Develop and introduce guidelines and mechanisms to support local self-governing bodies to develop waste management plans.</p>	<p>Ministry of Territorial Administration and Infrastructure</p>	<p>3.1.9 Legislative Gap 9 Lack of local (community or province) level waste management strategies</p> <p>3.1.5 Legislative Gap 5 Lack of national policies that advance programs promoting Waste Hierarchy approach and specifically waste prevention both on national and local level.</p>	<p>YES</p>
9	<p>Introduce a requirement on local self-governing bodies to develop local waste management plans.</p> <p>The plans could have schemes to provide households with a sorted collection service for recyclables and food waste.</p>	<p>Ministry of Territorial Administration and Infrastructure</p>	<p>3.1.9 Legislative Gap 9 Lack of local (community or province) level waste management strategies</p>	<p>YES</p>
10	<p>Designate competent authorities and develop national landfill management program, that will include action plan for maintenance, closure, and after-care procedures for landfills to be disaffected as well as the establishment of conditioning plans for existing landfill sites.</p> <p>The program should include: development of a registry of exiting dumpsites, a system of classification, new landfill site requirements, licensing requirements, and exploitation plan for each dumpsite.</p>	<p>RA Government</p> <p>Ministry of Territorial Administration and Infrastructure</p>	<p>3.1.11 Legislative Gap 11 Missing adequate technical guidelines on landfills</p> <p>3.4.7 Tech. and Inf. Gap 7 Lack of sanitary landfills</p> <p>3.4.11 Tech. and Inf. Gap 11 Bad access roads at the majority of existing dumpsites</p>	

11	<p>Designate competent authorities and develop a national strategy to reduce the amount of biodegradable municipal waste going to landfill. The strategy shall include:</p> <ul style="list-style-type: none"> • Promote diversion of biodegradable municipal solid waste from landfills. • Introduce a requirement on urbanized local self-governing bodies to provide households with a collection service for food waste. • Develop adequate infrastructure to treat diverted biodegradable MSW. • Set targets to substantially reduce methane emissions. • Require businesses to separate organic waste, e.g. food waste from restaurants, and present it for collection. Incentivize businesses to invest in separate food waste collection infrastructure. 	<p>RA Government</p> <p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Environment</p>	<p>3.1.7 Legislative Gap 7 Separation of waste is not promoted by RA laws</p> <p>3.1.8 Legislative Gap 8 Responsible consumption is not promoted by RA laws</p> <p>3.4.5 Tech. and Inf. Gap 5 No infrastructure for sorted collection and treatment of food and other organic wastes</p>	YES
12	<p>In its 2019 program the RA Government commits to develop conceptual approaches to waste management, directed to prevention and recycling of industrial, agricultural, medical, and C/D waste streams. In addition to these develop conceptual approach and regulatory framework for WEEE, end-of-life vehicles, waste batteries, animal by-products and derived products, agricultural wastes.</p>	<p>RA Government</p> <p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Environment</p>	<p>3.1.10 Legislative Gap 10 Missing regulations on individual waste streams</p>	
13	<p>Designate competent authorities and develop technical guidelines on landfills. These guidelines shall include design, operation, and closure and after-care procedures for landfills to be disaffected.</p>	<p>RA Government</p> <p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Environment</p>	<p>3.1.11 Legislative Gap 11 Missing adequate technical guidelines on landfills</p>	

14	Designate competent authorities and develop uniform technical guidelines on waste quantity and composition analysis.	RA Government Ministry of Territorial Administration and Infrastructure	3.1.12 Legislative Gap 12 Lack of a uniform technical guidance on waste quantity composition analysis 3.2.5 Institutional Gap 5 Lack of training and technical guidance for sustainable operation in SWM	
15	Develop RA legislation to support construction of ESM (Environmentally Sound Management) facilities for hazardous wastes.	RA Government Ministry of Environment Ministry of Territorial Administration and Infrastructure	3.1.13 Legislative Gap 13 Missing laws or regulations on ESM facilities for hazardous wastes 3.1.16 Legislative Gap 16 Poor mechanisms for economic incentives to promote development of ESM facilities for hazardous wastes 3.4.7 Tech. and Inf. Gap 7 Lack of sanitary landfills	
16	Develop schemes and options for ESM (Environmentally Sound Management) of certain kinds of wastes for which the treatment is impossible in Armenia.	RA Government Ministry of Environment Ministry of Territorial Administration and Infrastructure	3.1.13 Legislative Gap 13 Missing laws or regulations on ESM (Environmentally Sound Management) facilities for hazardous wastes 3.1.16 Legislative Gap 16 Poor mechanisms for economic incentives to promote development of ESM facilities for hazardous wastes	
17	Develop and introduce changes to laws or regulations to extend the waste producer's liability for improper handling and treatment of wastes. Changes should be introduced to more accurately define the ownership of waste on different stages of management chain. The regulations should specify in which cases the original waste producer is to retain responsibility for the whole	Ministry of Territorial Administration and Infrastructure Ministry of Environment	3.1.14 Legislative Gap 14 Limited responsibility and liability of waste producer	YES

	treatment chain or in which cases the responsibility of the producer and the holder can be shared or delegated among the actors of the treatment chain.			
18	Develop and introduce changes to RA legislation to require entities involved in waste collection and transportation to report data on handled waste.	Ministry of Territorial Administration and Infrastructure Ministry of Environment	3.1.15 Legislative Gap 15 The Law on Waste does not clearly require the waste handling operators to report on collected and landfilled solid waste 3.2.1 Institutional Gap 1 Poor mechanisms for dissemination of environmental information	YES

4.2 Recommendations on institutions

4.2.1 A. Monitoring, data, and information

#	Proposed action	Responsible party	Gap(s) addressed	CEPA
19	Develop institutional capacity and ensure funds to carry out solid waste composition analysis at least four times a year (during different seasons) every three years or after any substantial change of the waste management system.	RA Government Ministry of Territorial Administration and Infrastructure Ministry of Environment	3.2.2 Institutional Gap 2 Poor institutional setting for acquisition, processing, and reporting	
20	Ensure adequate laboratory capacity and inter-institutional arrangements to increase adequacy and efficiency of waste-sector monitoring and inspections.		3.2.3 Institutional Gap 3 Insufficient capacity for lab testing	
21	Develop and introduce a comprehensive centralized waste reporting on-line (web-based) tool for tracking and reporting waste data ensuring that public authorities make waste management information available to the public. This requirement should extend to private businesses and contractors handling waste.	Ministry of Territorial Administration and Infrastructure Ministry of Environment Statistical Committee	3.2.1 Institutional Gap 1 Poor mechanisms for dissemination of environmental information 3.2.2 Institutional Gap 2 Poor institutional setting for acquisition, processing, and reporting	YES
22	Assess medical waste quantities and inspection capacity. This should establish procedures to monitor and ensure sufficient capacity to collect and treat all medical hazardous waste generated in the country.	Ministry of Health Ministry of Environment	3.4.9 Tech. and Inf. Gap 9 Uncertain capacity for treating medical and other hazardous wastes	
23	Revise and simplify the institutional setting for data acquisition and reporting.	Ministry of Territorial Administration and Infrastructure Ministry of Environment Statistical Committee	3.2.1 Institutional Gap 1 Poor mechanisms for dissemination of environmental information 3.2.2 Institutional Gap 2 Poor institutional setting for acquisition, processing, and reporting	YES

4.2.2 B. Management capacity

#	Proposed action	Responsible party	Gap(s) addressed	CEPA
24	Develop and introduce regular training programs for local authorities to raise capacity in sustainable public procurement, contract management, and sustainable environmental management.	RA Government Ministry of Economy Ministry of Territorial Administration and Infrastructure Ministry of Environment Civil Society Organizations	3.2.4 Institutional Gap 4 Weak contract management capacity, including PPP contracts 3.2.5 Institutional Gap 5 Lack of training and technical guidance for sustainable operation in SWM 3.2.6 Institutional Gap 6 Operationally inefficient waste collection schemes 3.2.7 Institutional Gap 7 Lack of knowledge and poor capacity for landfill management 3.2.8 Institutional Gap 8 Weak capacity for developing local waste management plans 3.4.2 Tech. and Inf. Gap 2 Inadequate amount, type, and placement of garbage bins for MSW	
25	Develop and introduce mechanisms to control/prevent illegal waste dumping, including adoption of technology and awareness raising. Communities may initiate self-organized monitoring and control activities.	Environmental Protection and Mining Inspection Body Ministry of Environment Ministry of Territorial Administration and Infrastructure Local authorities	3.2.9 Institutional Gap 9 Weak capacity for controlling illegal dumping	
26	Introduce performance based contracting (e.g., including KPIs) and management in the waste sector.	Ministry of Territorial Administration and Infrastructure Ministry of Economy	3.2.4 Institutional Gap 4 Weak contract management capacity, including PPP contracts 3.2.5 Institutional Gap 5 Lack of training and technical guidance for sustainable operation in SWM	

			<p>3.2.6 Institutional Gap 6 Operationally inefficient waste collection schemes</p> <p>3.2.1 Institutional Gap 1 Poor mechanisms for dissemination of environmental information</p>	
27	<p>Develop mechanisms to ensure a cost recovery through enabling recycling/recovery value chains or polluter pays and extended producer responsibility principles.</p> <p>CSOs can raise public awareness on value in recyclables and governments can incentivize businesses.</p>	<p>RA Government</p> <p>Ministry of Environment</p> <p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Economy</p> <p>Civil Society Organizations</p>	<p>3.3.5 Financial Gap 5 Lost value from recyclables due to lack of knowledge and basic capacity</p> <p>3.2.4 Institutional Gap 4 Weak contract management capacity, including PPP contracts</p> <p>3.2.5 Institutional Gap 5 Lack of training and technical guidance for sustainable operation in SWM</p> <p>3.2.6 Institutional Gap 6 Operationally inefficient waste collection schemes</p>	YES

4.2.3 C. Institutional setting

#	Proposed action	Responsible party	Gap(s) addressed	CEPA
28	Ensure that all hazardous waste handling operators, including the mixed municipal solid waste classified having 4 th class of hazard, meet the licensing requirement of RA legislation. This requirement could be implemented progressively, over several years.	<p>Environmental Protection and Mining Inspection Body</p> <p>Ministry of Environment</p>	<p>3.2.10 Institutional Gap 10 While required by Law, de facto, permits for municipal waste collection are not issued</p> <p>3.2.11 Institutional Gap 11 While required by Law, de facto, EIA for municipal waste collection and landfilling is not done</p>	YES
29	Ensure that all hazardous waste handling operators, including the mixed municipal solid waste classified having 4 th class of hazard, meet the EIA requirements of RA legislation. This requirement could be implemented progressively, over several years.	<p>Environmental Protection and Mining Inspection Body</p> <p>Ministry of Environment</p>	<p>3.2.11 Institutional Gap 11 While required by Law, de facto, EIA for municipal waste collection and landfilling is not done</p>	YES

30	<p>Develop and introduce one-stop shops in waste management sector to mainstream, inform, and guide prospective investors on Armenia’s waste handling opportunities, providing information on tenders, incentives, strategies, and policies. This should be interlinked with other business investment portals.</p>	<p>RA Government</p>	<p>3.2.12 Institutional Gap 12 Weak institutional setting to deal with investors</p>	
31	<p>Consider creating a national Environment Protection Agency (EPA) or a similar body to carry on regulatory, enforcement, licensing, permitting, and data collection functions, while the policy development is distributed between the key ministries engaged with the waste governance, and the inspection and enforcement is the role of the state inspectorates.</p> <p>Forming such an agency should be considered as one of the solutions for the interagency fragmentation issue.</p> <p>Such an agency will relief the burden from many minor ministerial divisions and state agencies overloaded with the duties and functions for which they lack resources and capacity.</p>	<p>RA Government</p> <p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Environment</p> <p>Ministry of Economy</p> <p>Ministry of Finance</p>	<p>3.2.13 Institutional Gap 13 Fragmentation among the key government agencies responsible for waste governance in the country</p>	

4.3 Recommendations on financial mechanisms

4.3.1 A. Financial improvement

#	Proposed action	Responsible party	Gap(s) addressed	CEPA
32	<p>Implement full cost recovery based on “polluter pays” principle. This includes assessing the real operational and environmental costs of the WM in the country and revise the calculations of the waste collection fees.</p> <p>Review the fee limits set by RA legislation to align with full cost recovery approach.</p>	<p>RA Government</p> <p>Ministry of Environment</p> <p>Ministry of Economy</p> <p>Ministry of Finance</p> <p>Ministry of Territorial Administration and Infrastructure</p>	<p>3.3.1 Financial Gap 1</p> <p>Low waste management fee insufficient for full cost-recovery</p>	YES
33	<p>Improve the fee collection efficiency from residents and business organizations by connecting the fee payment with other utility payments, e.g. electricity bills.</p>	<p>RA Government</p> <p>Local authorities</p>	<p>3.3.1 Financial Gap 1</p> <p>Low waste management fee insufficient for full cost-recovery</p>	
34	<p>Eliminate the exception of municipal waste collection and sanitary cleaning operators in regards to the landfill tax.</p>	<p>State Revenue Committee</p> <p>Ministry of Territorial Administration and Infrastructure</p> <p>Ministry of Finance</p>	<p>3.3.2 Financial Gap 2</p> <p>Inadequately low environmental tax for landfilling unsorted municipal solid waste</p>	

4.4 Recommendations on technology and infrastructure

4.4.1 A. Collection infrastructure

#	Proposed action	Responsible party	Gap(s) addressed	CEPA
35	Ensure funding for the upgrading of the RCV fleet in communities. At the same time, ensure technical training for equipment use, maintenance, and fleet routing optimization as part of sustainable waste management. In addition, see recommendation on road repairs.	RA Government Ministry of Territorial Administration and Infrastructure Ministry of Economy Ministry of Finance Local authorities	3.4.1 Tech. and Inf. Gap 1 Insufficient capacity of Refuse Collection Vehicle (RCV) fleets	
36	Ensure funding for upgrading the garbage bins in communities at the same time training on proper handling of bins to extend their life span.	RA Government Ministry of Territorial Administration and Infrastructure Ministry of Economy Ministry of Finance Local authorities	3.4.2 Tech. and Inf. Gap 2 Inadequate amount, type, and placement of garbage bins for MSW	
37	Develop and promote mechanisms and guidelines to introduce community-scale feasible solutions for sorted collection of recyclables, including low-cost bins, low-cost transportation options, and community-initiated collection events. Local authorities and CSOs should collaborate to promote this direction.	Ministry of Territorial Administration and Infrastructure Local authorities CSOs	3.4.3 Tech. and Inf. Gap 3 No infrastructure for sorted collection of dry recyclables	
38	For more efficient material recovery from recyclable wastes and better collection operations introduce Civic Amenity Sites in those communities where it is feasible and raise awareness among the communities on proper disposal of bulky wastes, WEEE, small batteries, etc.	Local authorities CSOs	3.4.4 Tech. and Inf. Gap 4 No civic amenity sites for bulky waste and other waste types from households that need separate collection	YES

	The best practice is that the land for the facility is allocated from the community properties.			
39	To divert from landfills the organic waste contained in household and commercial streams promote sorted food waste collection schemes in communities where community or district scale composting option might be feasible; In communities where community or district scale composting option might NOT be feasible, promote food waste household composting schemes.	Local authorities CSOs	3.4.5 Tech. and Inf. Gap 5 No infrastructure for sorted collection and treatment of food and other organic wastes	YES
40	Develop and introduce local solutions to the legacy chutes and bunker systems used by many communities to address sanitary as well as the operational issues.	Ministry of Territorial Administration and Infrastructure Local authorities CSOs	3.4.6 Tech. and Inf. Gap 6 Many communities use legacy chutes and bunkers systems	

4.4.2 B. Landfills

#	Proposed action	Responsible party	Gap(s) addressed	CEPA
41	All sanitary landfill investments should ensure prevention of hazardous waste from entering the landfill.	Ministry of Territorial Administration and Infrastructure Local authorities	3.4.7 Tech. and Inf. Gap 7 Lack of sanitary landfills	YES
42	Allocate funds and develop landfills for hazardous wastes. Integrate development of hazardous waste cells into the new sanitary landfill projects.	RA Government	3.4.8 Tech. and Inf. Gap 8 Lack of special landfills for hazardous substances 3.1.16 Legislative Gap 16 Poor mechanisms for economic incentives to promote development of ESM facilities for hazardous wastes	

43	<p>As part of national landfill management program develop weighbridges at regional transfer stations and/or specific landfills.</p> <p>Integrate development of weighbridges into all future landfill projects.</p>	<p>Ministry of Territorial Administration and Infrastructure</p> <p>Local authorities</p>	<p>3.4.10 Tech. and Inf. Gap 10</p> <p>Lack of equipment for waste quantity measurement (weighbridges, etc.)</p>	
44	<p>As part of national landfill management program allocate funds to repair roads at the dumpsite planned to be exploited (for more than certain amount of time).</p>	<p>Ministry of Territorial Administration and Infrastructure</p> <p>Local authorities</p>	<p>3.4.11 Tech. and Inf. Gap 11</p> <p>Bad access roads at the majority of existing dumpsites</p>	

APPENDIX A - INTERNATIONAL BEST PRACTICE

CONTENTS

- A1 Cross-cutting international best practices
- A2 MSW management strategy best practice
- A3 Waste collection best practice
- A4 Waste treatment best practice
- A5 Waste management environmental impact control

The basis for any Waste Management Strategy development comprises of a detailed analysis of the country's existing situation, including studies on legislative, infrastructural, institutional and knowledge capacities, as well as the availability of data on separate waste streams in the country.

One of the main components of any Waste Management Strategy is its clear targets defined by various indicators, including generation, separation, material and energy recovery, disposal of separate waste streams, etc. The knowledge of international best practices in the sector may contribute to both defining and reaching the targets.

In this chapter we have summarized selected best practices being implemented and applied in many EU countries today by using the following sources:

- 1) *Best Environmental Management Practice for the Waste Management Sector* [x], the 2018 report by EU Joint Research Center
- 2) *Best Practice Municipal Waste Management: Information pool on approaches towards a sustainable design of municipal waste management and supporting technologies and equipment* [xi], the 2018 report by Germany EPA
- 3) *Best Available Techniques (BAT) Reference Document for Waste treatment* [xii], the 2018 EU report
- 4) *Guidelines for National Waste Management Strategies* [xiii], the 2013 report by UNEP
- 5) *Towards a circular economy: A zero waste program for Europe* [xiv], the 2014 communication from the EU Commission to the European Parliament
- 6) *Closing the loop - An EU action plan for the Circular Economy* [xv], the 2015 communication from the EU Commission to the European Parliament

A1 Cross-cutting international best practices

CONTENTS

- A 1.1 Waste Hierarchy
- A 1.2 Zero-waste
- A 1.3 End-of-waste criteria
- A 1.4 Integrated waste management strategies
- A 1.5 Life-cycle assessment of waste management options
- A 1.6 Economic instruments
- A 1.7 Extended producer responsibility (EPR) schemes

This section summarizes the best practices on Waste Governance specifically focusing on Waste Hierarchy and Zero-waste approaches, End-of-waste criteria, Integrated Waste Management and Life-cycle Assessment approaches, and various economic instruments.

A1.1 Waste Hierarchy⁷²

Any discussion of sustainable waste management involves the use of various specialized concepts. Waste Hierarchy is one of the cornerstone concepts of waste management policy along with waste prevention or minimization, zero-waste, end-of-waste criteria, product life-cycle, resource efficiency, and environmentally sound management, among others.

Waste Hierarchy sets a priority order for steps to minimize and manage waste, and is usually presented as a diagram (see Figure 2). The inverted pyramid suggests that the most preferred policy step is to prevent the generation of waste. The next preferred step is to reduce and minimize waste generation through reuse, repair, and other preparation for reuse. Material recovery is the next preferred action, followed by the downstream steps of other recovery options such as producing nutrient and energy from waste. If energy is recovered from processes such as combustion and pyrolysis, or from landfill, it also belongs at this level of the hierarchy.

The final action is disposal, either in landfills or through incineration without energy recovery. This final step is a last resort for waste which has not been able to be prevented, diverted, or recovered in the preceding steps. Below incineration without energy recovery or properly engineered and managed landfills are the controlled and uncontrolled dumps to which waste is often consigned in low-income countries (and even in some middle-income countries).

Often the waste hierarchy is used in an abbreviated version as a communication tool, referred to as the “3Rs” which identify the choices, in order of preference, as “reduce, reuse, recycle”.

The hierarchy captures the progression of a material or product through successive stages of waste management, and represents the latter part of the life-cycle for each product. The life-cycle begins with design, then proceeds through manufacture, distribution, use and the various options reflected in the lower

⁷² The Waste Hierarchy is defined in article 4 of the Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste, available at <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32008L0098>

stages of the hierarchy (reuse, recovery, recycling, and the disposal options). Each stage of the life-cycle offers opportunities for policy intervention: to rethink the need for the product, to redesign it to minimize its waste potential, to modify or extend its use to reduce its waste potential and to recover the resources embodied in it. The resources that make up the product are the ultimate driver for better waste management policy. The aim of policy is not to manage waste better or to ensure compliance with waste management regulations, but rather to optimize the use of the world's limited material resources by avoiding the generation of waste and, where waste is nevertheless generated, by treating waste as a resource waiting to be recovered and used. These three principles: waste hierarchy, life-cycle of products and the concept of waste as a resource, form the underpinnings of the entire document, and should serve as the foundation for any process of strategy development.

A1.2 Zero-waste

Many countries have identified “zero waste” by a date as a national (or sometimes regional or local) target. No country or even city has yet reached that target; but no country or city has ever been satisfied that its waste minimization efforts have gone far enough. Every success breeds an ambition to do even better. This ambition is the driver of continuous improvement in waste management.

The adoption of zero waste as a national target is a recognition that incremental improvements in rates of waste generation or recycling are not enough in themselves, and that a goal that aims to eliminate waste is needed. A zero-waste target reflects the never-ending nature of waste management tasks – a recognition that there will always be a need for improvement, and that once one target has been achieved, others, more demanding and difficult, will still remain to be tackled. Zero waste is a target that can be useful as a reminder of the need to look beyond short-term improvements and focus on radical and long-term change. It needs to be supported by clear, measurable goals or subsidiary targets to provide a metric of progress towards the long-term aim of eliminating waste in its entirety.

A1.3 End-of-waste criteria⁷³

End-of-waste criteria specify when certain waste ceases to be waste and obtains a status of a product (or a secondary raw material). According to Article 6 (1) and (2) of the Waste Framework Directive 2008/98/EC, certain specified waste shall cease to be waste when it has undergone a recovery (including recycling) operation and complies with specific criteria to be developed in line with certain legal conditions, in particular:

- The substance or object is commonly used for specific purposes
- There is an existing market or demand for the substance or object
- The use is lawful (substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products)
- The use will not lead to overall adverse environmental or human health impacts.

Such criteria should be set for specific materials by the Commission using the procedure described in Article 39(2) of the Waste Framework Directive (so called "comitology"). A mandate to set end-of-waste criteria was introduced to provide a high level of environmental protection and an environmental and economic benefit.

⁷³ This definition is available at the EU webpage https://ec.europa.eu/environment/waste/framework/end_of_waste.htm

They aim to further encourage recycling in the EU by creating legal certainty and a level playing field as well as removing unnecessary administrative burden.

A methodology to develop the criteria has been elaborated by the Joint Research Center (JRC reports). After having agreed this methodology with the Member States, the Commission is now preparing a set of end-of-waste criteria for priority waste streams. So far, the criteria have been laid down for:

- Iron, steel, and aluminum scrap (see Council Regulation (EU) No 333/2011)
- Glass cullet (see Commission Regulation (EU) N° 1179/2012)
- Copper scrap (see Commission Regulation (EU) N° 715/2013)

A1.4 Integrated waste management strategies

It is BEMP to develop and implement an integrated waste management strategy that considers:

- The waste hierarchy, prioritizing measures according to the hierarchy (firstly waste prevention, secondly preparation for reuse, etc.)
- The current and future expected trends of waste streams
- The availability and capacity of nearby waste sorting/treatment facilities
- The current environmental attitudes and perceptions of residents
- Any other specific condition affecting waste management (e.g. the significant presence of tourists/commuters, specific economic activities, climate).

The development of a waste management strategy requires knowledge of the quantity and quality of each major waste stream through an appropriate data monitoring approach and a sound evaluation of waste management options. This may require, in some cases, the use of a life-cycle assessment (LCA) to identify options associated with the best environmental performance (see the next BEMP), which may sometimes depart from the waste hierarchy.

A1.5 Life-cycle assessment of waste management options

It is BEMP to embed life-cycle thinking and assessment into waste management strategy and operations, with steps 1 and 2 (below) being essential and steps 3 to 8 needing an ad-hoc life-cycle assessment (LCA) to be carried out and not always necessary:

- 1) Systematic application of life-cycle thinking throughout waste management strategy design and implementation (to complement the waste management hierarchy).
- 2) Review of relevant LCA literature to rank the environmental performance of alternative waste management options, where studied systems are directly comparable with available options.
- 3) Application of LCA to specific management and technology options for which no reliable published literature can be found; this requires procurement of LCA services, or in-house use of relevant LCA software.
- 4) Careful consideration of system boundaries to ensure an accurate comparison across options, including system expansion and/or LCA for avoided processes (e.g. grid electricity generation).
- 5) Compilation and documentation of life-cycle inventories in relation to reference flows, if possible, using primary data recorded along the value chain, noting data quality and uncertainty ranges.
- 6) Selection of pertinent impact categories to capture the major environmental burdens.
- 7) Presentation of normalized results for relevant impact categories to evaluate complementarities or trade-offs, with clear indication of uncertainty errors and sensitivity analyses.

- 8) Validation of the LCA study by an independent third party (essential requirement under ISO 14044 for external dissemination of results, but good practice even when only used internally).

An example of an LCA tool for evaluation of waste management technologies is “EASETECH” (Environmental Assessment System for Environmental Technologies), developed at the Technical University of Denmark. EASETECH enables users to perform LCA of systems handling heterogeneous material flows, accounting for resource use, recovery, and emissions (e.g. Damgaard et al., 2011). The EASETECH and the module EASEWASTE are available for researchers, consultants, authorities, and technology developers, after training in the use and interpretation of the model has been undertaken at a cost of approximately EUR 5 000 (DTU, 2015).

Various other LCA software tools are available, on a free-to-use or commercial basis, including the examples below:

- OpenLCA - free LCA software⁷⁴
- SimaPro - commercial LCA software⁷⁵
- GaBI - commercial LCA software⁷⁶

A1.6 Economic instruments

It is BEMP to use economic instruments, to steer the behavior of citizens and organizations generating waste towards more environmentally friendly results. Economic instruments can support:

- Reducing the amount of waste generated or reducing the proportion of hazardous waste;
- Encouraging preparation for reuse and recycling of waste; decreasing incineration and landfilling;
- Improving product design (e.g. encouraging the use of recyclable materials in products).

The economic instruments related to waste management cover both incentives (positive economic signals, e.g. discounts, reward vouchers) and disincentives (negative economic signals, e.g. taxes, fees, penalties).

The application of economic instruments has been repeatedly recommended (EC, 2003, 2005, 2007, OECD, 2004, 2007). Some of the main applied instruments are detailed below:

- Taxes, such as:
 - Waste disposal tax
 - Landfill tax
 - Incineration tax
 - Product levies (e.g. on plastic bags or aggregates).
- Waste pricing, such as:
 - Unit-based pricing and pay-as-you-throw schemes
 - Differential and variable rates
 - Variable fee or charge systems
- Deposit refund schemes
- Extended producer responsibility systems
- Others, such as:

⁷⁴ For more details visit <http://www.openlca.org/>

⁷⁵ For more details visit <http://www.pre-sustainability.com/simapro/>

⁷⁶ For more details visit <http://www.gabi-software.com/>

- Tradable permits
- Recycling subsidies
- Vat exemptions
- Extension of depreciation periods
- Positive incentives.

A1.7 Extended producer responsibility (EPR) schemes

It is BEMP for producer responsibility organizations (PROs) to enhance the performance of their extended producer responsibility (EPR) scheme by setting up incentives (going beyond legal requirements) that drive increased separate collection, reuse and recycling rates for the waste collected under the EPR. Actions that PROs can implement include:

- Motivating citizens to source separate waste more and better through innovative communication actions, such as competitions among territories
- Close cooperation (financial, technical, and/or logistic) with public authorities at regional/local level
- Cooperation with social economy actors for the collection and reuse of products
- Incentivizing producers to design more sustainable products (e.g. Via “fee modulation”)
- Benchmarking environmental achievements of different areas covered by the EPR scheme, e.g. at the level of the territories of public authorities at a regional/local level.

A2 MSW management strategy best practice

CONTENTS

- A 2.1 Cost Benchmarking
- A 2.2 Advanced waste monitoring
- A 2.3 Pay-as-you-throw
- A 2.4 Performance-based contracting
- A 2.5 Awareness-raising
- A 2.6 Establishment of a network of waste advisers
- A 2.7 Home and community composting
- A 2.8 Waste prevention programs
- A 2.9 Waste reuse programs
- A 2.10 WM in tourism strategies

A2.1 Cost Benchmarking

Waste management is greatly affected by economic factors. It is, therefore, very helpful to carry out cost benchmarking to reflect the cost structure of a certain municipality (city, village, or county) and to eventually identify optimization options.

Cost benchmarking can be carried out by an independent third-party organization, or internally by a local public administration of a considerable size, or in cooperation with other municipalities.

In the evaluation of total costs, the following costs are usually considered:

- Costs for collecting the different waste fractions (e.g. residual waste, bio-waste, paper)
- Costs for the treatment/disposal of residual waste (e.g. incineration) and recycling/energy recovery of waste fractions with distinction between municipality-owned plants and third-party plants;
- Costs for operation, closure, and management of closed landfills (leachate treatment, cultivation, etc.)
- Costs for staff and administration related to waste management
- Costs by private waste management companies on behalf of the municipality
- Costs by the municipality itself
- Costs by municipalities providing services for another municipality
- Miscellaneous costs.

In the evaluation of revenues from recycling/recovery activities, the following ones can be considered:

- Selling electricity or/and heat from incineration of refuse-derived fuels, residual waste, biogas from anaerobic digestion of bio-waste or landfill gas
- Selling biogas from anaerobic digestion
- Selling separately collected or separated paper/board
- Selling separately collected packaging
- Selling separately collected glass
- Selling separately collected or separated scrap metal
- Selling compost

- Fees charged to businesses for waste collection and disposal.

A2.2 Advanced waste monitoring

The development and implementation of an efficient and effective waste management strategy is based on detailed knowledge of statistical data for the waste streams collected and managed at local level. It is thus BEMP to:

- Regularly collect and process available data at single waste stream level, and for the different steps of the collection, reuse/preparation for reuse, sorting, recycling, recovery, and disposal processes
- Regularly carry out a composition analysis of the mixed waste
- When waste management operations are contracted out, include contract clauses for the systematic communication of comprehensive data.

A2.3 Pay-as-you-throw

The aim of pay-as-you-throw (PAYT) is to enact the polluter pays principle in a fair way by charging users of the waste management system according to the amount of waste they generate.

It is BEMP to charge waste fees to users based on a fixed plus variable fee component, to reflect the cost structure of waste management and align incentives for users (i.e. lower fee when less waste is produced) and waste collectors (i.e. revenue stability from the fixed fee component).

In practice, the system can be implemented in various forms, typically:

- Volume-based schemes (choice of container size);
- Sack-based schemes (number of waste sacks used), e.g. With prepaid specific sacks;
- Weight-based schemes (the weight of the waste collected in each container);
- Frequency-based schemes (the frequency with which a container is left out for collection – this approach can be combined with volume- and weight-based schemes).

The scheme can be focused on charging for residual waste only or also separated streams, still with the aim of fostering source separation and waste prevention.

There are many examples of successful application of PAYT schemes. One of the most successful yet is the county of Aschaffenburg in Germany, where the PAYT system with identification and weighing of the waste bins (for residual waste as well as for bio-waste), collected door-to-door, was introduced in 1997 and the subsequent increase in recycled waste and the decrease in disposed of waste are obvious. As of 2013, the recycling rates in Aschaffenburg are the highest in Germany: up to 86 % in case of weight-based systems (Aschaffenburg, 2013).

Another case is the Treviso region in Italy, where the application of PAYT lead to only 55 kg residual waste per capita reported for 2015 (Contó, 2015; Contarina, 2015).⁷⁷

⁷⁷ Morlok, Juergen & Schoenberger, Harald & Styles, David & Galvez-Martos, Jose-Luis & Zeschmar-Lahl, Barbara. (2017). The Impact of Pay-As-You-Throw Schemes on Municipal Solid Waste Management: The Exemplar Case of the County of Aschaffenburg, Germany. Resources. 6. 8. 10.3390/resources6010008.

A2.4 Performance-based contracting⁷⁸

It is BEMP for local authorities that contract out the delivery of certain MSW management services to private suppliers to include performance-based contract clauses. Performance-based contracting can ensure that both environmental and financial objectives are met.

Three main characteristics are inherent to a performance-based contract:

- Definition of a series of objectives and indicators to measure contractor performance
- Collection of data on the performance indicators to assess the implementation of the service
- Good or bad performance impacting the contractor (higher revenue or penalties).

It is important for local authorities to base the performance clauses on a full set of indicators and appropriate monitoring. Special care needs to be taken in defining a baseline and bearing in mind the influence of the variation in external conditions (economic, social, regulations, etc.) on the benchmark mechanism.

The most appropriate indicators to monitor the implementation of this BEMP are:

- Share of the contract value depending on the achievement of the environmental objectives or of the defined environmental performance levels (%)
- Customer satisfaction (% of residents satisfied with household waste collection and specifically with the collection of the separately collected fractions).

Bristol, in the UK, started in 2009 a new contract service for its waste management service. A dialogue with pre-qualified companies was established to define the approach of the new contract, to achieve the maximum recycling rates and a reduction in emissions (Bristol City Council, 2013). For the first time, the call for tenders included desired outcomes instead of conformance-based technical specifications. These were:

- Reduce the 'carbon footprint' associated with the service in line with the agreed targets
- Increase waste reduction, reuse, recycling, and composting, towards an aim of zero waste
- Deliver significant reductions of untreated waste sent to landfill
- Maximize the efficient recovery of resources, i.e. recyclates and energy from residual waste
- Tackle and reduce the incidents of environmental crime (e.g. by storing and collecting evidence from 'fly tipping')
- Enhance community understanding of sustainable waste management.

A2.5 Awareness-raising

Best practice in awareness-raising is to effectively encourage waste prevention, reuse, and recycling behavior within the waste collection catchment area. Ultimately, this should translate into improved performance across key waste generation and separation indicators.

⁷⁸ More on this topic is available on <https://www.circular-europe-network.eu/library/thematic-guidance-material/public-procurement-waste-performance-contracts/>

Table 20 summarizes various awareness raising methods and the appropriate channels.

#	Methods	Communication channels
	Advertising	Radio, printed press, TV, outdoor billboards, mobile, online, cinema spots.
	Public relations	Media relations via radio, press, TV and online.
	Direct marketing	Door-to-door canvassing, leaflet/information distribution, exhibitions, and events.
	Community engagement	Outreach to schools, support for local community groups, collaboration with third-sector organizations. Also, roadshows, seminars, and door-to-door campaigns.
	Online engagement	Local authority, waste management organization, public agency or third-sector websites. Online calculators, interactive activities and videos, and apps, e.g. providing information on nearest collection points.
	Social media	Social media is an effective way for citizens to access real-time or location-specific information, and provides a convenient and flexible form of communication. Social media channels include YouTube, Facebook, Twitter. See some examples below: https://www.youtube.com/watch?v=PZEA63TPYT0 (DE, video) https://www.youtube.com/watch?v=jo-nPS3VWvw (GB, video) https://www.youtube.com/watch?v=q3deji0AGys (GB, video) https://twitter.com/ACRplus (EU, Twitter) https://twitter.com/2EWWR (EU, Twitter) https://twitter.com/LetsCleanUpEU (EU, Twitter)
	Product labelling	Producers may engage with other stakeholders, especially waste management organizations, to communicate with consumers via all the above pathways within extended producer responsibility schemes. In addition, producers may clarify use-by dates, storage instructions and recycling options on packaging to minimize consumption waste.
	Internal communication	Waste management organizations may inform their staff of the latest initiatives and plans via: staff magazines, intranet, information folders, activity reports, events, competitions (slogans, etc.), suggestions for improvements. ZeroWastePro have produced a training manual for staff of waste management companies. http://www.zerowastepro.eu/publications/ .

Table 21 - Awareness raising methods and the appropriate channels

A2.6 Establishment of a network of waste advisers

It is BEMP to set up a network of waste advisers (also called “waste (prevention) officers”, “recycling officers”, “waste (prevention) consultants”) at local level to raise the awareness of the general public (residents and small businesses delivering their waste to the local MSW management system).

The use of waste advisers is especially relevant to address specific issues by targeting a specific territory or audience with a poor separate collection rate or high contamination in separately collected fractions to deliver an adapted answer, as waste advisers can interact face to face.

Waste advisers typically have a prior qualification in the environmental field as well as knowledge of the practices of waste minimization, reuse, and recycling, and can be volunteers, part-time or full-time staff.

Waste advisers can perform a range of activities, such as:

- Make residents and small businesses aware of the environmental issues related to waste generation and management
- Inform residents and small businesses about the waste collection rules and how the different fractions are treated and recycled
- Provide residents and small businesses with guidance to identify possibilities to reduce or better manage (e.g. Better source separation) their waste
- Work with residents and small businesses on specific waste streams that are considered more problematic (food waste, textiles, nappies, etc.)
- Carry out engagement actions targeted to specific audiences (e.g. Children/teenagers, pensioners, businesses, foreign-language speakers)
- Gain a better understanding of what happens on the ground (drivers, reasons, shortfalls).

In Austria, municipal waste advisers are seen as one of the biggest success stories in public waste management. Over a period of three decades since they were first created, they have been contributing to raising separate collection rates (in some regions raising them from around zero to over 70 %), saving costs and generating new follow-up jobs.

Municipal waste advisers were first established in the country in 1986 as permanent full-time employees of regionally or locally based public waste authorities. They can be employed in public entities at different levels:

- Municipalities/local authorities
- Towns with more than 3,000 inhabitants
- Cities
- Associations of towns/districts
- Provincial authorities
- Associations under public contract
- Waste management entities at a municipal level.

Since the beginning, the underlying idea of employing waste advisers was to use human resources prior to legal restrictions and industrial investments to minimize environmental problems and reduce public expenses (“prevention” instead of “end-of- pipe-treatment”). The concept is: educating the population to prevent and separate waste instead of paying for expensive technical solutions to deal with the waste once it has already been (incorrectly) disposed of. As of 2016, 410 municipal waste advisers are the backbone of public waste management communication and public relations work. This means an average of one adviser for 20,000 inhabitants.

A2.7 Home and community composting

In cases when home and community composting is the most appropriate waste management option for bio-waste based on the waste management strategy adopted and/or on an LCA study on waste management options, it is BEMP to:

- Systematically deploy and promote home and community composting, keeping track of the number of residents involved, registering where composting equipment is installed and operated.
- Organize initial awareness-raising campaigns through graphic material, public meetings, waste advisers, etc. (see previous sections) informing and training residents about home and community composting, its benefits, its correct operation (to limit methane emissions and pollution to soil, and ensure that the output is good quality compost), which bio-waste is suitable, etc.
- Regularly update and train residents on the correct operation of home and community composting.
- Regularly monitor home and community composting sites. A number of representative sites can be inspected every year to check the correct operation of composting and ensure its environmental benefits.

SYBERT is a waste management company located in Besançon in France. They are undertaking various initiatives to overcome the challenges of community and urban composting, and have established over 230 community compost points throughout Besançon, including the examples below.

As of 2015, 11 composting sheds were installed in very dense areas, with 10 of them in operation. 5,380 households have access to them, representing about 10,450 people. Among these, 24% participate in their operation.

One automatic rotating drum composter is in service at a large apartment block, serving over 2,000 households. This is opened three times per week to receive waste, including meat, fish, and dairy products, along with wood pellets for structure/aeration. Leachate enters the sewer. Compost is generated over four weeks, leaving the composter only after it has achieved a temperature of 50 °C, followed by three to four weeks maturation in outdoor boxes.⁷⁹

A2.8 Waste prevention programs

It is BEMP to put in place waste prevention measures that target both households and public and private organizations. Some examples are adoption of local plastic bag charges, support for the setup of repair shops, introduction of product/material exchange areas in the territory as well as cooperation with social economy organizations, NGOs, and restaurants to encourage the development of agreements for the reduction of food waste, thanks to donations. Waste prevention measures can be identified by:

- Assessing current waste generation patterns in the territory
- Prioritizing the most relevant waste streams in terms of prevention potential, such as food waste and bio-waste, paper/cardboard, plastic (packaging), glass and textiles

⁷⁹ Dri M., Canfora P., Antonopoulos I. S., Gaudillat P., Best Environmental Management Practice for the Waste Management Sector, JRC Science for Policy Report, EUR 29136 EN, Publications Office of the EU, Luxembourg, 2018, ISBN 978-92-79-80361-1, doi:10.2760/50247, JRC111059; [x]

- Elaborating a local waste prevention strategy involving the relevant stakeholders (e.g. residents, local businesses, social economy organizations, NGOs)
- Monitoring the results of the waste prevention measures adopted and, in light of the results, reviewing the waste prevention strategy.

A2.9 Waste reuse programs

It is BEMP to encourage diversion of reusable products away from waste streams and into reuse streams, through the active establishment or facilitation of second-hand and municipal exchange markets (via repair workshops where necessary) or charity collections. Additionally, waste management organizations can send certain waste streams to preparation for reuse by establishing or facilitating the creation of reuse/repair centers. The BEMP covers four key measures:

- Collect products suitable for reuse before these are considered waste, repair them if needed, and distribute or sell them to residents and organizations, including charities
- Collect waste items suitable for reuse, have them prepared for reuse, and distribute or sell them to residents and organizations, including charities
- Establish effective information exchanges to advertise the demand for, and market the availability of, reusable used products
- Monitor the output (regardless of whether their input is classified as waste or product) of repair and reuse centers which have been accredited based on Annex IV to the Waste Framework Directive.

A2.10 WM in tourism strategies⁸⁰

Three directions for BEMP are discussed here in regard with tourism.

1. BEMP in Eco-tourism certification scheme and labelling
2. BEMP in accommodation activities
3. BEMP in selective collection of organic waste (SCOW) for recycling in tourist areas

1. BEMP in Eco-tourism certification scheme and labelling

Certification schemes play an important role in improving the environmental performance of the tourist industry. In this way they partly make great demands on a waste management system of the stakeholders involved.

Certification can be differentiated into Environmental Management System (EMS) certification (e.g. EMAS; ISO 14001) that essentially associated with monitoring and reporting of environmental performance, and environmental standards that cover requirements for implementation of specific environmental management practices or compliance with particular environmental specifications. However, there remains a variety of rigor criteria, and their verification, across standards. The most rigorous standards are the EU Ecolabel (EU Flower), the Nordic Swan and the Austrian Ecolabel that include extensive mandatory criteria related to respectable environmental practices and performance levels (Styles et al., 2013). Many other standards are typically less quantitative and/or less transparent, and differ in their level of implementation.

⁸⁰ <http://www.urban-waste.eu/wp-content/uploads/2017/02/URBANWASTE-Compendium-of-waste-management-practices.pdf>

The table below summarizes several sustainability standards and eco-tourism labels of European countries. A brief description and references of waste management requirements are given beside.

Certification	Waste Management Requirements
EU Ecolabel (EU Flower)	Awarded to organizations that are in compliance with a comprehensive range of mandatory criteria and a selection of optional criteria, the EU ecolabel includes quantitative performance benchmarks. It requires a waste management to facilitate waste separation by guests, to sort waste, to avoid disposable products and single-dose food packaging (except where required by law). http://ec.europa.eu/environment/ecolabel/
Green Tourism Business Scheme	A sustainable tourism certification scheme in the UK and Ireland that qualitatively assesses performance based on implementation across 120 environmental measures (e.g. cost savings by using returnable and reusable packaging). Businesses are rated according to three levels: Bronze, Silver, or Gold. http://www.greentourism.com/
Green Globe	Primarily legal compliance and sustainability monitoring criteria, but also qualitative requirements to implement better environmental practices. Waste management criteria, such as Plan and Reduce, Reuse and Recycling must be met, but the standards do not include quantitative performance requirements. http://greenglobe.com/
Green Key	An international sustainability certification scheme based on a set of 13 criteria areas. Most criteria are imperative and must comply, some of which are optional. These include specific environmental measures, but in some cases quantified benchmarks are missing (e.g. the establishment is encouraged to reduce the amount of waste). http://www.greenkey.global/
Ibex label	Swiss sustainability label for accommodations as well as clinics, health centers and senior citizen residences which combines the standards of ISO 9001 and 14001 with further criteria. This standard awarded at five levels depending on points obtained across five relevant sustainability areas: management, regional, social services, ecology, economics; http://ibexfairstay.ch
Latvia Green Certificate	Latvian ecolabel awarded to tourism establishments in rural areas / small towns, camping sites and small producers working in tourism that comply with a wide range of mandatory environmental and social criteria across 14 themes. Regarding waste management, minimum criteria must be met, but also additional criteria exist. http://eko.celotajs.lv/
Legambiente Turismo	Italian eco-tourism label for any type of tourist accommodation business. In compliance with good management practices described in relation to ten social and environmental themes that aim to, amongst others, waste minimization, recycling, using less water and energy, or promoting healthy food and typical local produce and products. http://legambienteturismo.it/en/home/

Nordic Swan	Nordic Ecolabelled hotels have to be in compliance with a comprehensive range of mandatory criteria and a selection of optional criteria. The label also includes quantitative performance benchmarks (e.g. limit value for hotels is set at 0.20 kg unsorted waste per hotel guest). http://www.nordic-ecolabel.org/
Travelife Sustainability System for Hotels	An international tour operator (supply chain) driven sustainability certification depending on performance across a range of environmental and social criteria. From 2014 onwards all Travelife audits are now undertaken against the new criteria that are more extensive and demanding. http://travelifecollection.com/awards

Table 22 - Sustainability standards and eco-tourism labels of European countries

2. BEMP in accommodation activities

The hotel industry can considerably reduce their waste generation by implementing and following a waste management system that is designed by the concepts of reduce, reuse, and recycle (Greenhotelier, 2004). Approximately 54 percent of a hotel's solid waste can be delivered to recycling or reuse processes (Alexander, 2002), Bohdanowicz (2005) also estimated those waste fractions by 50-60% in accommodation facilities.

Hotels are often limited not only by barriers to sorting and recycling their waste, but also by the waste management infrastructure in their locality, commonly owned and operated by the local authority, especially if there is no other purchaser for waste fractions that are not collected and treated by the local system.

Styles et al. (2013) identified that “a relevant starting point for waste prevention, sorting and recycling is to record on-site waste generation by category and source”. In addition, it may be useful to consider local reuse and recycling options, or rather seek opportunities for product reuse before waste is sent for recycling, e.g. returning packaging to suppliers. To implement a successful waste sorting and recycling plan, it demands a committed management to coordinate technical and human resource requirements across all departments, including educational measures, such as staff trainings, and time allocation (see Table 22).

Department	Measure	Description
All (management led)	Develop waste inventory and identify options	Survey of all areas and processes to identify types and sources of on-site waste generation. Identify waste recycling and packaging return options available locally
	Monitoring and reporting	Continuously monitor and periodically report waste generation and collection by fraction
Procurement	Procurement selection	Select products and packaging made from recycled and recyclable material

Housekeeping	Waste bins	Install separated waste collection bins in rooms
	Waste collection in rooms	Separate waste during room cleaning into fractions collected separately from accommodation premises
	Back-of-house waste management	Separate waste arising from public areas, maintenance of outdoor and indoor facilities, and other back-of-house areas into appropriate fractions for recycling and correct disposal
Catering	Green procurement	Consider packaging volume, production impact and recyclability when assessing products for green procurement
	Separation	Install and train staff to use conveniently located bins for separate collection of glass, plastics, and paper and cardboard in kitchen and dining areas.
Reception and public areas	Collection Points	Install collection points for paper and magazines, batteries, and other hazardous waste

Table 23 - Educational measures

Below are some examples of best practices for waste management in the hotels.

Hilton Slussen Hotel, Sweden

The Hilton Slussen in Stockholm sorts waste into 26 different fractions. Since the introduction of a sorting and recycling scheme in 1997 more than 125 tonnes per month sent to landfill were reduced by 76 %, to 0.3 kg per guest-night. In addition to cardboard which were recycled and wooden pallets which were diverted for heating buildings outside Stockholm, other combustible materials were sent to generate district heating for apartments. Also candle stumps were donated to day care centers and to a church to be made into new candles for sale. Further, separated organic waste is used for biogas production, food residues are sent to farmers outside Stockholm for anaerobic digestion (Baker, 2006; Styles et al., 2013).

Tower Hotel, United Kingdom

In 2006 the Tower Hotel in Perthshire (Scotland) installed an automated composting system that consumes less than 4 kWh per day and converts organic waste to compost in around 14 days (compared with 12 – 18 months for the basic compost heaps it replaced). The output material is screened for size, greater fractions are returned for further composting while finer material is stored for maturation for a further two months before use on the hotel grounds. Through this procedure 2.5 m³ (1.25 tonnes) of vegetable waste from the

hotel kitchen and 6 m³(1.25 tonnes) of garden waste could be processed to produce 1.5 tonnes of compost in the first year after installation (HUB4, 2007; Styles et al., 2013).

3. BEMP in selective collection of organic waste for recycling in tourist areas (SCOW)

This European project from 2013 to 2015, funded by the Cross Border Cooperation in the Mediterranean (ENPI CBCMED) Program, aims to develop low cost, technically simple and high quality bio-waste collection and recycling models in territories with touristic areas and agricultural activity in Mediterranean zones.

SCOW's goal is to define and build up an innovative and sustainable bio waste management system through effective collection and waste treatment into decentralized small-scale composting plants, situated near the bio-waste production areas, and, at the same time, where the compost could be applied. Amongst others the project includes following outputs:

- Database of Good Practices
- Technical study of the key elements and management options
- Guidelines defining the SCOW management model and monitoring protocols
- Handbook on small-scale composting facilities management / Vademecum
- Database with the result indicators of the implemented management models.

Recovery of used cooking oil

Another opportunity to selectively grade incurring wastes is the separation of useful organic fractions such as cooking oils, fats and grease before organic waste is sent to anaerobic digestion or composting. Oils can be stored in secure containers for collection by waste disposal contractor specializing in the production of biodiesel, or animal feed, soap, or cosmetics production. Oil traps, fitted in kitchen drains, can also be another option for recovery (Styles et al., 2013).

A3 Waste collection best practice

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A 3.1 Waste collection strategy

A 3.2 Inter-municipal cooperation (IMC) among small municipalities

A 3.3 Civic amenity sites

A 3.4 Logistics optimization for waste collection

A 3.5 Low-emission vehicles

A3.1 Waste collection strategy

It is BEMP to design and implement a waste collection strategy that considers:

- the main features of the waste management strategy (e.g. number of separately collected waste fractions)
- the targets set in the waste management strategy (e.g. share of separately collected waste out of the total waste collected, impurity rates of the separately collected fractions, revenues from recyclables)
- the characteristics of the collection area (e.g. population density and main housing types)
- the current environmental attitudes and perceptions of residents
- any other specific condition affecting waste collection (e.g. the relevant presence of tourists/commuters, specific economic activities, climate).

The main goal of a waste collection strategy is to collect, in a timely and economical manner, as much correctly source separated waste as possible, in order to ease the subsequent waste sorting/treatment with the aim to maximize recycling. In many cases, these objectives can be pursued by setting up the following:

- Frequent door-to-door separate collection of food waste (e.g. weekly or more often depending on the season and climate)
- Less frequent collection of mixed waste (e.g. every two weeks)
- Door-to-door collection of recyclables (e.g. paper, cardboard, cans, plastics, glass), individually source separated where public acceptability allows, otherwise co-mingled and sorted at a materials recovery facility
- A convenient network of civic amenity sites (see Appendix A section A.3.3 *Civic amenity sites*) that accept all waste fractions not collected door-to-door or in street containers from households, including hazardous waste and bio-waste.

A3.2 Inter-municipal cooperation (IMC) among small municipalities

It is BEMP for small and medium municipalities to adopt inter-municipal cooperation that allows the implementation of measures that would be too costly for them to implement alone and can result in the improved environmental performance of the waste management system. Municipalities can join together to operate or contract out some waste management services, with the aim of delivering economies of scale and building critical mass.

Inter-municipal cooperation makes it possible for the municipalities involved to:

- Share administrative overheads,
- Reduce unit costs and improve service quality through economies of scale,

- Attract investment funds reserved for projects of a specified minimum size (e.g. EU structural funds and other investment mechanisms), and
- Enhance economic performance through coordinated planning while allowing better environmental protection.

A study on the optimization of the waste services in the region of Harju in Estonia was published in 2015. It shows the probable impact of the implementation of centralized separate bio-waste and paper collection in rural areas. The study identified the administrative, economic, and logistical benefits of the adoption of inter-municipal cooperation. In rural areas, the main source of costs is transportation (i.e. the fuel consumed and the collection time per tonne of waste is higher). The administrative burden is identified as one of the main barriers for improvement. For instance, in the area analyzed, there are 23 officials or more in charge of waste management in the 23 municipalities. However, the multiplicity of tasks of these officials, with a very low specific dedication to waste, could easily be solved with only four officials in charge of a supra-municipal waste structure. In total, 70 % of the municipalities in Estonia have less than 4,000 inhabitants and would benefit from such schemes (Põldnurk, 2015).

A3.3 Civic amenity sites

As a key complement to an effective door-to-door (curbside) collection of the most common waste fractions, it is BEMP to run civic amenity sites (also called container parks, collection centers, clean points, eco-points, recovery sites, waste parks, etc.) where citizens and small businesses can drop off as many waste fractions as possible for separate collection.

Elements of best practice for civic amenity sites include the following:

- Presence of at least a civic amenity site in the local authority or regular periodical presence of a mobile site
- Separate collection of as many fractions as possible and the possibility to drop off any household waste
- Training of the staff of the civic amenity sites to maximize recycling, recovery, and appropriate safe disposal
- Watertight paved area and collection of run-off water for appropriate treatment.
- Proximity of the sites to citizens (e.g. Accessible without a car by a large share of the population), also thanks to mobile/temporary collection sites
- Long opening hours to enhance convenience for citizens. These may change across seasons (especially for green cuttings).

A3.4 Logistic optimization for waste collection

It is BEMP to optimize the logistics of waste collection by:

- Installing where appropriate an alternative collection system to road transport, such as a pneumatic system in urban areas
- Using computerized Vehicle Routing and Scheduling (CVRS) technology to optimize collection rounds
- Exploring collaboration opportunities with neighboring waste management organizations
- Benchmarking fuel/energy consumption and/or CO₂ emissions
- Incorporating one or more environmental metrics, such as cumulative energy demand (CED) and/or CO₂ emissions, into network design and route optimization algorithms
- Installing telematics equipment in collection vehicles for real-time route optimization based on GPS and training drivers in eco-driving techniques.

A3.5 Low-emission vehicles

It is BEMP to improve the fuel consumption and emissions of waste collection vehicles. Priority technology options include:

- Stop/start and idle shut-off
- Low rolling resistance tires
- Hybrid vehicles
- Dedicated natural gas/biomethane vehicles or dual-fuel vehicles (diesel/gas)
- Electrically powered vehicles.

There are already over 1 million gas-powered vehicles on Europe's roads (Tassan et al., 2013). This BEMP therefore focuses on the use of CNG- and biogas-powered refuse collection trucks, or the use of hybrid-electric vehicles. Best environmental performance can be achieved by the use of biomethane from organic waste, but where this is not yet available, converting collection fleets to run on CNG provides a useful step towards that goal. Alternatively, hybrid-electric vehicles significantly reduce transport impacts, and drive technological progress towards electrification of road transport which could lead to considerable future environmental benefits.

A4 Waste treatment best practice

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A 4.1 Organic waste composting

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A 4.4 Glass waste

A 4.5 Packaging waste

A 4.6 Light packaging waste

A 4.7 Bulky waste

A 4.8 Waste household batteries

The below sections use the Germany Environmental Protection Agency 2018 publication *Best Practice Municipal Waste Management: Information pool on approaches towards a sustainable design of municipal waste management and supporting technologies and equipment.*⁸¹

A4.1 Organic waste composting

The objective of the organic waste treatment is Recovery of useful organic and inorganic substances from the biodegradable waste fraction for the generation of a usable humus by biological processes and in conjunction therewith. A significant reduction of biodegradable waste that otherwise would have to be landfilled or become subject of other forms of waste treatment or the reduction of the reaction potential of organic rich waste or of the residues from biological treatment processes such as anaerobic digestion.

The input material should come from a separate collection, it has to be examined for components which may release hazardous substances (e.g. batteries) and must be freed from them and other disturbing materials such as large foils. Large components usually contained in forest residues, pruning and garden waste must be chopped.

The compost is particularly suited for agricultural applications, the use in gardening and landscaping, for fruit and special cultures, re-cultivation works and home gardening. The mainly wooden screen overflow suits well for use in thermal installations for energy production (biomass power stations). Composting residues may also be utilized as a bio filter material. Residues from composting processes such as foils separated during screening have to be treated with other (e.g. thermal) processes.

Waste composting offers good opportunities for the employment of both unskilled and higher qualified personnel. In the rather complex processes (e.g. tunnel composting) there is even a need for specially trained and qualified staff to take care of the facility management and operations control.

Composting facilities can basically be used in any places, it will be an advantage however to erect them close to the places where the relevant wastes are generated and at locations that have access to the road and transportation network allowing the compost product to be more easily sold. As with any treatment facility

⁸¹ The publication is available at https://publications.jrc.ec.europa.eu/repository/bitstream/JRC111059/jrc111059_bemp_waste_2018_final_04_2.pdf

for biological waste, a minimum distance to the nearest residential area should be maintained to avoid any potential nuisances by odors, rodents, or other unwanted vermin.

Financing can be through a fee charged in conjunction with the delivery of the waste to the composting facility or collection service via the corresponding collection system (separate bio-waste container).

Alternatively, the costs can be incorporated into the charges or a specific fee for general waste collection services or they are recovered over other (e.g. tax-based) mechanisms for waste management financing.

Specific advantages:

- Generates a product which is scarce and highly needed in many places
- Allows for a high proportion of waste diverted from final disposal with the consequence of saved capacities, costs, and emissions for further treatment
- Enhances other waste treatment operations through either a drying or removal of organic matter from the waste stream
- Relatively simple to perform and safe
- Generally little capital intensive
- Well known and also well investigated technology
- Widely dispersed technique with a generally high acceptance in all areas.

A4.2 Anaerobic digestion of organic waste

The objective of the anaerobic treatment of organic wastes, sewage sludge and waste water with very high COD, Reduction of the content of biodegradable organics and reactivity of the specified wastes, and Energy recovery from waste.

The waste input should be collected separately and freed from disturbing components such as bulky parts. A comminution to obtain the required particle size may have to be performed. For specific waste (e.g. slaughter- house waste) a pathogen elimination/hygienization might become necessary.

Organic and mineral digestion residues must be drained. Where these residues originate solely from a digestion input of separately collected biodegradable waste, the material can be used as compost following its hygienization or treatment in a composting process. A direct application onto farmland can be possible when certain conditions are fulfilled, in several countries this is generally permitted. Dried digestion residues are also energetically used in a number of cases.

Financing can be through a fee charged in conjunction with the delivery of the waste to the treatment facility or the collection via the corresponding collection system (separate bio-waste container). Alternatively, the costs can be incorporated into the charges or specific fee for general waste collection services or recovered over other flat rate mechanisms for waste management financing. Proceeds from the sale of generated electricity mark a source of income except for the electricity which is used for own purposes and reduces this way the operating costs of the respective plant.

Specific advantages:

- In addition to dry organic waste, moist constituents like catering waste and waste from food processing and farming can also be handled

- The biogas obtained can be used for producing electricity and heat and therefore to also generate income or to cover the treatment process' own demand on energy
- The fermented substrate to some extent can be utilized in liquid or dry conditions.
- The technical installations take up relatively little space.
- The waste quantities to be handled by incineration plants and/or sanitary landfills and the emissions/impact they consequently cause to the environment will be lowered.

A4.3 Paper waste

The collection of waste paper with other waste materials and in particular with such that are wet, fatty, or otherwise contaminated shall be avoided. The most suitable way to guarantee an efficient recycling and recycling products of high quality is the separation of the material at source and its selective collection. Waste paper which has not been separately collected and is recovered from commingled waste streams or at waste disposal sites, usually shows to have a quality which is rarely good enough for producing low-grade paper applications such as low quality cardboard. Beside separate collection at source no further pre-treatment is necessary before quality sorting.

The different paper fractions obtained with sorting can be directly used in the production of new paper applications or for other forms of recycling. Other recycling options include the use of recovered paper for example as insulating material for mold fiber applications, in fiber board or as an additive in asphalt.

Impurities and disturbing materials removed during the sorting operations must be disposed of. The most prominent options exist with incineration or the processing of refuse derived fuel. Essential for economically viable operations are larger areas of supply and a sufficiently high purity of the input (from separation at source) and especially as the sorted output is concerned. From the growth in electronic communication follow decreasing rates in graphic paper consumption. The decline in newsprint and office paper until 2020 is estimated to get as low as 50% of the demand this section has seen in 2008. Paper use in cardboard application and for packaging is assessed to rise or remain stable. Sorting operations should be flexibly designed in order to get adjusted and quickly cope with changes on the market.

Paper recycling reduces the need to use primary (wood) fibers for paper production and results in an overall lower consumption of energy for this process. In average an equivalent of 700 kg CO₂ is saved when one ton of waste paper is recycled and used to substitute primary raw materials in paper production.

A4.4 Glass waste

The collection of waste glass shall be done separately from other waste materials (selective collection). Also, a commingled collection of container glass with other glassware such as float glass, specialty glass or glass table-ware must be avoided due to the different material compositions and the negative influence this has on the production process and quality of the recycling products. Where the collection is not separate from other materials, a segregation of the glass fraction must be performed first.

To increase efficiency, possibilities, and quality of recycling it is also very useful to collect waste glass already separated by color. The collection of waste glass by color in Germany results in glass fractions separated at source in the proportion of 50% transparent / 40% green / 10% brown.

The glass fractions obtained in the sorting can be introduced directly in the production of new glassware or used for other applications, such as insulating products (glass wool, foam glass products). Metals sorted out from the collected glass can be directly recycled as well. Other residues from sorting such as inert non-glass materials to the most part can be landfilled without further treatment.

Glass recycling reduces the need to use primary material for glass production and results in an overall lower consumption of energy for this process. On average an equivalent of 500 kg CO₂ is saved when one ton of waste glass is recycled and used to substitute primary raw materials in glass production.

A4.5 Packaging waste

Processing the separately collected packaging waste from households and commercial sources to generate unpolluted recyclable fractions of metals, plastics and composite materials and other marketable material streams. No particular requirements of pre-treatment as long as the separate collection of packaging waste or dry waste components at source is ensured.

Part of the different fractions of recyclable material obtained in the sorting can be directly used for recycling (e.g. metals, cardboard). Especially plastic components may require further treatment and refining steps before they are suited for material recycling. Also their energetic use is possible and can have advantages.

Sorting residues must be properly disposed of. Those with a high calorific value usually suit for producing a refuse derived fuel material which can be co-incinerated in industrial processes (see fact sheet on “Industrial co- incineration”). If impossible, incineration with energy recovery should be considered, the inert fraction can be deposited at landfills.

The sorting of packaging waste in many cases can be manually performed. This opens up good employment opportunities whereby it is also possible to employ personnel with lower levels of education and technical qualification.

The process can be economically viable where a high output quality is obtained and good markets exist for it. Otherwise re-financing mechanisms such as packaging fees or licensing schemes similar to the Green-dot system which is used by many European countries may have to be implemented.

A4.6 Light packaging waste

When light packaging waste (i.e. packaging made of plastics, composites, aluminum and steel, sometimes also including fibers (paper and cardboard)) is collected together (co-mingled), it is BEMP to implement advanced sorting of the commingled packaging waste in materials recovery facilities (MRF).

A typical state-of-the-art plant has five main technical sections:

1. Feeding and preconditioning, that includes opening bags and feeding a constant flow of input material.
2. Pre-sorting, that involves removing unsuitable items.
3. Sorting, that includes several steps, e.g. Separating fiber from containers; sorting fiber; sorting metal containers by using magnets, eddy currents or X- ray; first sorting of plastic containers by polymer (e.g. separation of PET bottles from other plastic containers).

4. Refining, that consists of additional sorting steps, such as further sorting of polymers by type (e.g. HDPE, PP) and color in order for the material output quality to meet market requirements. Quality control is performed by automatic or manual sorting.
5. Product handling, that consists of the baling processes and product storage as bales, loose material or in containers; product handling can also include loading operations for further downstream processes.

As MRFs tend to receive and sort materials from different local collection schemes, with varying compositions, a state-of-the-art MRF must have the flexibility to efficiently accommodate these variations.

A4.7 Bulky waste

Beside the separate collection of bulky waste at source or separate delivery to points of reception no further pre-treatment is necessary. The different fractions of recyclable material obtained from sorting can either directly (e.g. metals) or after further processing steps be used for recycling. Also possible is the use of certain fractions for energy production. Sorting residues with a high calorific value can be incinerated whereas for the inert materials a disposal at landfills is possible.

Aftercare must be applied to sorting residues in that either an additional treatment is applied before final disposal or the common aftercare procedures are followed for landfills at which such waste is deposited. Of particular importance is noise protection, the protection from fire, and operational safety resp. accident prevention at all stages of the operations.

The sorting and processing of bulky waste in many cases can be manually performed. This opens up good employment opportunities whereby it is also possible to employ persons with lower levels of education and technical qualifications.

A special scheme for the processing of bulky waste is to commission part of the work to socially deprived people (e.g. disabled persons), persons in social support programs or such with a limited capacity to find employment elsewhere. Their work will be to separate from the amount of bulky waste those items which may have a potential to be resold or used for other purposes (e.g. old furniture, antiques, certain technical devices), and to repair, refurbish or dismantle them until they are fit for sale or reuse as spare parts, in charity programs or public institutions becomes possible.

A good accessibility and sufficient space for temporary storage should be ensured for collection and as far as the facilities for sorting and reprocessing are concerned. Long distance transport of bulky waste are inefficient and uneconomical.

The process can be economically viable where output quality is high, reusable items are recovered and good markets exist for recyclables as well as for second-hand products. Refinancing in general must be secured by instruments such as a tipping fee or a general charging mechanism, however. Expenses for processing are ideally incorporated in the general charges for waste services or subject of a special levy whereby the latter can be charged for each unit forwarded (e.g. per m³) or only for those units forwarded in excess to a fixed annual amount of such waste. Proceeds from the sale of refurbished and repaired components/items or from the sale of recovered spare parts should be considered in the calculation of the charge. In that way it

might be possible to offer part of the bulky waste collection for free or to collect especially those items free of charge which have a potential for further utilization or sale after their refurbishment.

A4.8 Waste household batteries

Batteries and accumulators shall be collected separately from household waste and other waste streams to achieve a high recycling quota. The installation of separate take-back systems for old batteries and accumulators has proven to be a very effective collection system. In Germany, producers of batteries and accumulators are legally obliged to transfer their producer responsibility to a take-back system: This is possible through the participation in a common, non-profit and comprehensive take-back system or through the installation of an own, producer-specific take back system of one or more producers. Additionally, producers of vehicle batteries and industry batteries shall offer an acceptable take-back option to their distributors free of charge. The transfer of these duties to existing take-back systems as well as the establishment of producer specific take-back systems is possible, too.

It is recommended to establish a central register that monitor, control and publishes producers that are active at the market to create transparency for all participants. Producers shall transfer information about their brand, the amounts put on the market as well as information about their realization of their take-back obligations to the register. Additionally, producers should ensure that the transport (partially hazardous materials), the sorting of battery mixtures, the treatment and the recycling is conducted according to state of the art technologies.

No costs should incur for private end users to achieve a high as possible participation quota. It also should guarantee that private end users are sufficiently informed by producers about

- the meaning of labels/symbols printed on the batteries, e.g. the meaning of toxic substances subject to labelling, which are contained in the producer's batteries
- the legal obligation of end users to deliver old batteries and accumulators at official collection points to make them available to an adequate recycling
- the possibility of a take-back free of charge at sale points of the producers

The labelling of each battery and accumulator with the following symbol sensitize end user about the necessity of a separate collection and the importance to make old batteries and accumulators available to a secure disposal system.



Take-back and special collection schemes are the most common ways for the collection and recovery of used batteries and accumulators. Take back can be most efficiently realized via the stores and vendors who are selling batteries, thru public amenity sites and recycling stations of the municipalities or by pick-up arrangements between recycling companies and the (commercial) users, or thru dedicated collection campaigns (in the municipalities).

It is recommended that take-back partners make use of special containers to draw attention on and facilitate the separate collection and safe storage of the used batteries/accumulators in their premises. Moreover, the damage of batteries can be prevented at an early stage because collection containers can be exchanged and don't have to be transferred. Damaged batteries can cause short circuits, which may lead to fires during transportation.



Picture 7 - Collection container for used lithium batteries

Source: INTECUS GmbH

A5 Waste management environmental impact control

CONTENTS

- A 5.1 Overall environmental performance
- A 5.2 Monitoring
- A 5.3 Emissions to air
- A 5.4 Noise and vibrations
- A 5.5 Emissions to water
- A 5.6 Emissions from accidents and incidents
- A 5.7 Material efficiency
- A 5.8 Energy efficiency
- A 5.9 Reuse of packaging

This section summarizes the best available techniques for the treatment of waste and control of its environmental impacts discussed in the *Best Available Techniques (BAT) Reference Document for Waste Treatment*.⁸² The suggested BATs are meant both for waste treating facilities and installations and for inspection bodies. For further detailed study of the BATs please see the referenced document. The BAT numbers below are the same as the ones used in the source document.

A5.1 Overall environmental performance

BAT 1 - In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features:

1. Commitment of the management, including senior management
2. Definition, by the management, of an environmental policy that includes the continuous improvement of the environmental performance of the installation
3. Planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment
4. Implementation of procedures and protocols
5. Checking performance and taking corrective action,
6. Review, by senior management, of the ems and its continuing suitability, adequacy, and effectiveness
7. Following the development of cleaner technologies
8. Consideration for the environmental impacts from the eventual decommissioning of the plant at the stage of designing a new plant, and throughout its operating life;
9. Application of sectoral benchmarking on a regular basis
10. Waste stream management (see BAT 2)
11. An inventory of waste water and waste gas streams (see BAT 3)
12. Residues management plan
13. Accident management plan

⁸² Antoine Pinasseau, Benoit Zerger, Joze Roth, Michele Canova, Serge Roudier; Best Available Techniques (BAT) Reference Document for Waste treatment Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control); EUR 29362 EN; Publications Office of the European Union, Luxembourg, 2018; ISBN 978-92-79-94038-5, doi:10.2760/407967, JRC113018

14. Odor management plan (see BAT 12)
15. Noise and vibration management plan (see BAT 17).

The scope (e.g. level of detail) and nature of the EMS (e.g. standardized or non-standardized) will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (determined by the type and amount of wastes processed).

BAT 2 - In order to improve the overall environmental performance of the plant, BAT is to use all of the techniques given below.

Technique		Description
a.	Set up and implement waste characterization and pre-acceptance procedures	These procedures aim to ensure the technical (and legal) suitability of waste treatment operations for a particular waste prior to the arrival of the waste at the plant. They include procedures to collect information about the waste input and may include waste sampling and characterization to achieve sufficient knowledge of the waste composition. Waste pre-acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety, and environmental impact, as well as the information provided by the previous waste holder(s).
b.	Set up and implement waste acceptance procedures	Acceptance procedures aim to confirm the characteristics of the waste, as identified in the pre-acceptance stage. These procedures define the elements to be verified upon the arrival of the waste at the plant as well as the waste acceptance and rejection criteria. They may include waste sampling, inspection, and analysis. Waste acceptance procedures are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety, and environmental impact, as well as the information provided by the previous waste holder(s).
c.	Set up and implement a waste tracking system and inventory	A waste tracking system and inventory aim to track the location and quantity of waste in the plant. It holds all the information generated during waste pre-acceptance procedures (e.g. date of arrival at the plant and unique reference number of the waste, information on the previous waste holder(s), pre-acceptance and acceptance analysis results, intended treatment route, nature and quantity of the waste held on site including all identified hazards), acceptance, storage, treatment and/or transfer off site. The waste tracking system is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety, and environmental impact, as well as the information provided by the previous waste holder(s).
d.	Set up and implement an output quality management system	This technique involves setting up and implementing an output quality management system, so as to ensure that the output of the waste treatment is in line with the expectations, using for example existing EN standards. This management system also allows the performance of the waste treatment to be monitored and optimized, and for this purpose may include a material flow analysis of relevant components throughout the waste treatment. The use of a material flow analysis is risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process

		safety, occupational safety, and environmental impact, as well as the information provided by the previous waste holder(s).
e.	Ensure waste segregation	Waste is kept separated depending on its properties in order to enable easier and environmentally safer storage and treatment. Waste segregation relies on the physical separation of waste and on procedures that identify when and where wastes are stored.
f.	Ensure waste compatibility prior to mixing or blending of waste	Compatibility is ensured by a set of verification measures and tests in order to detect any unwanted and/or potentially dangerous chemical reactions between wastes (e.g. polymerization, gas evolution, exothermal reaction, decomposition, crystallization, precipitation) when mixing, blending, or carrying out other treatment operations. The compatibility tests are risk-based considering, for example, the hazardous properties of the waste, the risks posed by the waste in terms of process safety, occupational safety, and environmental impact, as well as the information provided by the previous waste holder(s).
g.	Sort incoming solid waste	Sorting of incoming solid waste (1) aims to prevent unwanted material from entering subsequent waste treatment process(es). It may include: <ul style="list-style-type: none"> ● manual separation by means of visual examinations; ● ferrous metals, non-ferrous metals, or all-metals separation; ● optical separation, e.g. by near-infrared spectroscopy or X-ray systems; ● density separation, e.g. by air classification, sink-float tanks, vibration tables; ● size separation by screening/sieving.

BAT 3 - In order to facilitate the reduction of emissions to water and air, BAT is to establish and to maintain an inventory of waste water and waste gas streams, as part of the environmental management system (see BAT 1), that incorporates all of the following features:

1. information about the characteristics of the waste to be treated and the waste treatment processes, including:
 - a) Simplified process flow sheets that show the origin of the emissions;
 - b) Descriptions of process-integrated techniques and waste water/waste gas treatment at source including their performances;
2. information about the characteristics of the waste water streams, such as:
 - a) Average values and variability of flow, pH, temperature, and conductivity;
 - b) Average concentration and load values of relevant substances and their variability (e.g. COD/TOC, nitrogen species, phosphorus, metals, priority substances /micropollutants);
 - c) Data on bio-eliminability (e.g. BOD, BOD to COD ratio, Zahn-Wellens test, biological inhibition potential (e.g. inhibition of activated sludge)) (see BAT 52);
3. information about the characteristics of the waste gas streams, such as:
 - a) Average values and variability of flow and temperature;
 - b) Average concentration and load values of relevant substances and their variability (e.g. organic compounds, POPs such as PCBs);
 - c) Flammability, lower and higher explosive limits, reactivity;
 - d) Presence of other substances that may affect the waste gas treatment system or plant safety (e.g. oxygen, nitrogen, water vapor, dust).

The scope (e.g. level of detail) and nature of the inventory will generally be related to the nature, scale and complexity of the installation, and the range of environmental impacts it may have (also determined by the type and amount of wastes processed).

BAT 4 - In order to reduce the environmental risk associated with the storage of waste, BAT is to use all of the techniques given below.

Technique		Description
a.	Optimized storage location	This includes techniques such as: <ul style="list-style-type: none"> • The storage is located as far as technically and economically possible from sensitive receptors, watercourses, etc.; • The storage is located in such a way so as to eliminate or minimize the unnecessary handling of wastes within the plant (e.g. the same wastes are handled twice or more or the transport distances on site are unnecessarily long).
b.	Adequate storage capacity	Measures are taken to avoid accumulation of waste, such as: <ul style="list-style-type: none"> • The maximum waste storage capacity is clearly established and not exceeded considering the characteristics of the wastes (e.g. regarding the risk of fire) and the treatment capacity; • The quantity of waste stored is regularly monitored against the maximum allowed storage capacity; • The maximum residence time of waste is clearly established.
c.	Safe storage operation	This includes measures such as: <ul style="list-style-type: none"> • Equipment used for loading, unloading, and storing waste is clearly documented and labelled; • wastes known to be sensitive to heat, light, air, water, etc. are protected from such ambient conditions; • Containers and drums are fit for purpose and stored securely.
d.	Separate area for storage and handling of packaged hazardous waste	When relevant, a dedicated area is used for storage and handling of packaged hazardous waste.

BAT 5 - In order to reduce the environmental risk associated with the handling and transfer of waste, BAT is to set up and implement handling and transfer procedures.

Handling and transfer procedures aim to ensure that wastes are safely handled and transferred to the respective storage or treatment. They include the following elements:

- Handling and transfer of waste are carried out by competent staff
- Handling and transfer of waste are duly documented, validated prior to execution and verified after execution
- Measures are taken to prevent, detect and mitigate spills
- Operation and design precautions are taken when mixing or blending wastes (e.g. vacuuming dusty/powdery wastes).

Handling and transfer procedures are risk-based considering the likelihood of accidents and incidents and their environmental impact.

A5.2 Monitoring

BAT 6 - For relevant emissions to water as identified by the inventory of waste water streams (see BAT 3), BAT is to monitor key process parameters (e.g. waste water flow, pH, temperature, conductivity, BOD) at key locations (e.g. at the inlet and/or outlet of the pretreatment, at the inlet to the final treatment, at the point where the emission leaves the installation).

BAT 7 - BAT is to monitor emissions to water with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

For more details please see Best Available Techniques (BAT) Reference Document for Waste Treatment, p. 722.

BAT 8 - BAT is to monitor channeled emissions to air with at least the frequency given below, and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

For more details please see Best Available Techniques (BAT) Reference Document for Waste Treatment, p. 726.

BAT 9 - BAT is to monitor diffuse emissions of organic compounds to air from the regeneration of spent solvents, the decontamination of equipment containing POPs with solvents, and the physico-chemical treatment of solvents for the recovery of their calorific value, at least once per year using one or a combination of the techniques given below.

Technique		Description
a	Measurement	Sniffing methods, optical gas imaging, solar occultation flux or differential absorption. See descriptions in Section A6.2.
b	Emissions factors	Calculation of emissions based on emissions factors, periodically validated (e.g. once every two years) by measurements.
c	Mass balance	Calculation of diffuse emissions using a mass balance considering the solvent input, channeled emissions to air, emissions to water, the solvent in the process output, and process (e.g. distillation) residues.

BAT 10 - BAT is to periodically monitor odor emissions. Odor emissions can be monitored using:

- EN standards (e.g. Dynamic olfactometry according to EN 13725 in order to determine the odor concentration or EN 16841-1 or -2 in order to determine the odor exposure)
- When applying alternative methods for which no EN standards are available (e.g. Estimation of odor impact), ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

The monitoring frequency is determined in the odor management plan (see BAT 12). The applicability of this BAT is restricted to cases where an odor nuisance at sensitive receptors is expected and/or has been substantiated.

BAT 11 - BAT is to monitor the annual consumption of water, energy, and raw materials as well as the annual generation of residues and waste water, with a frequency of at least once per year.

Monitoring includes direct measurements, calculation or recording, e.g. using suitable meters or invoices. The monitoring is broken down at the most appropriate level (e.g. at process or plant/installation level) and considers any significant changes in the plant/installation.

A5.3 Emissions to air

BAT 12 - In order to prevent or, where that is not practicable, to reduce odor emissions, BAT is to set up, implement and regularly review an odor management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:

1. A protocol containing actions and timelines
2. A protocol for conducting odor monitoring as set out in BAT 10
3. A protocol for response to identified odor incidents, e.g. Complaints
4. An odor prevention and reduction program designed
 - to identify the source(s)
 - to characterize the contributions of the sources, and
 - to implement prevention and/or reduction measures.

BAT 13 - In order to prevent or, where that is not practicable, to reduce odor emissions, BAT is to use one or a combination of the techniques given below.

Technique		Description
a.	Minimizing residence times	Minimizing the residence time of (potentially) odorous waste in storage or in handling systems (e.g. pipes, tanks, containers), in particular under anaerobic conditions. When relevant, adequate provisions are made for the acceptance of seasonal peak volumes of waste. Only applicable to open systems.
b.	Using chemical treatment	Using chemicals to destroy or to reduce the formation of odorous compounds (e.g. to oxidize or to precipitate hydrogen sulfide). Not applicable if it may hamper the desired output quality.
c.	Optimizing aerobic treatment	In the case of aerobic treatment of water-based liquid waste, it may include: <ul style="list-style-type: none"> ● Use of pure oxygen ● Removal of scum in tanks ● Frequent maintenance of the aeration system. <p>This BAT is generally applicable. In the case of aerobic treatment of waste other than water-based liquid waste, see BAT 36.</p>

BAT 14 - In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odor, BAT is to use an appropriate combination of the techniques given below. For more details please see Best Available Techniques (BAT) Reference Document for Waste Treatment, p. 730.

BAT 15 - BAT is to use flaring only for safety reasons or for non-routine operating conditions (e.g. start-ups, shutdowns) by using both of the techniques given below.

Technique		Description
a.	Correct plant design	This includes the provision of a gas recovery system with sufficient capacity and the use of high-integrity relief valves. This BAT is generally applicable to new plants. A gas recovery system may be retrofitted in existing plants.
b.	Plant management	This includes balancing the gas system and using advanced process control. This BAT is generally applicable.

BAT 16 - In order to reduce emissions to air from flares when flaring is unavoidable, BAT is to use both of the techniques given below.

Technique		Description
a.	Correct design of flaring devices	Optimization of height and pressure, assistance by steam, air or gas, type of flare tips, etc., to enable smokeless and reliable operation and to ensure the efficient combustion of excess gases. This BAT is generally applicable to new flares. In existing plants, applicability may be restricted, e.g. due to maintenance time availability.
b.	Monitoring and recording as part of flare management	This includes continuous monitoring of the quantity of gas sent to flaring. It may include estimations of other parameters (e.g. composition of gas flow, heat content, ratio of assistance, velocity, purge gas flow rate, pollutant emissions (e.g. NO _x , CO, hydrocarbons), noise). The recording of flaring events usually includes the duration and number of events and allows for the quantification of emissions and the potential prevention of future flaring events. This BAT is generally applicable.

A5.4 Noise and vibrations

BAT 17 - In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes all of the following elements:

1. A protocol containing appropriate actions and timelines;
2. A protocol for conducting noise and vibration monitoring;
3. A protocol for response to identified noise and vibration events, e.g. Complaints;
4. A noise and vibration reduction program designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterize the contributions of the sources and to implement prevention and/or reduction measures.

The applicability is restricted to cases where a noise or vibration nuisance at sensitive receptors is expected and/or has been substantiated.

BAT 18 - In order to prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given below.

For more details please see Best Available Techniques (BAT) Reference Document for Waste Treatment, p. 733.

A5.5 Emissions to water

BAT 19 - In order to optimize water consumption, to reduce the volume of wastewater generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below.

Technique		Description
a.	Water management	<p>Water consumption is optimized by using measures which may include:</p> <ul style="list-style-type: none"> • Water-saving plans (e.g. establishment of water efficiency objectives, flow diagrams and water mass balances) • Optimizing the use of washing water (e.g. dry cleaning instead of hosing down, using trigger control on all washing equipment) • Reducing the use of water for vacuum generation (e.g. use of liquid ring pumps with high boiling point liquids). <p>This BAT is generally applicable.</p>
b.	Water recirculation	<p>Water streams are recirculated within the plant, if necessary, after treatment. The degree of recirculation is limited by the water balance of the plant, the content of impurities (e.g. odorous compounds) and/or the characteristics of the water streams (e.g. nutrient content).</p> <p>This BAT is generally applicable</p>
c.	Impermeable surface	<p>Depending on the risks posed by the waste in terms of soil and/or water contamination, the surface of the whole waste treatment area (e.g. waste reception, handling, storage, treatment, and dispatch areas) is made impermeable to liquids concerned.</p> <p>This BAT is generally applicable</p>
d.	Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels	<p>Depending on the risks posed by the liquids contained in tanks and vessels in terms of soil and/or water contamination, this includes techniques such as:</p> <ul style="list-style-type: none"> • Overflow detectors • Overflow pipes that are directed to a contained drainage system (i.e. the relevant secondary containment or another vessel) • Tanks for liquids that are located in a suitable secondary containment; the volume is normally sized to accommodate the loss of containment of the largest tank within the secondary containment • Isolation of tanks, vessels, and secondary containment (e.g. closing of valves). <p>This BAT is generally applicable</p>
e.	Roofing of waste storage and treatment areas	<p>Depending on the risks posed by the waste in terms of soil and/or water contamination, waste is stored and treated in covered areas to prevent contact with rainwater and thus minimize the volume of contaminated run-off water.</p> <p>Applicability may be constrained when high volumes of waste are stored or treated (e.g. mechanical treatment in shredders of metal waste).</p>

f.	Segregation of water streams	Each water stream (e.g. surface run-off water, process water) is collected and treated separately, based on the pollutant content and on the combination of treatment techniques. In particular, uncontaminated waste water streams are segregated from wastewater streams that require treatment. Generally applicable to new plants and existing plants within the constraints associated with the layout of the water collection system.
g.	Adequate drainage infrastructure	The waste treatment area is connected to drainage infrastructure. Rainwater falling on the treatment and storage areas is collected in the drainage infrastructure along with washing water, occasional spillages, etc. and, depending on the pollutant content, recirculated or sent for further treatment.
h.	Design and maintenance provisions to allow detection and repair of leaks	Regular monitoring for potential leakages is risk-based, and, when necessary, equipment is repaired. The use of underground components is minimized. When underground components are used, and depending on the risks posed by the waste contained in those components in terms of soil and/or water contamination, secondary containment of underground components is put in place.
i.	Appropriate buffer storage capacity	Appropriate buffer storage capacity is provided for waste water generated during other than normal operating conditions using a risk-based approach (e.g. taking into account the nature of the pollutants, the effects of downstream wastewater treatment, and the receiving environment). The discharge of waste water from this buffer storage is only possible after appropriate measures are taken (e.g. monitor, treat, reuse).

BAT 20 - In order to reduce emissions to water, BAT is to treat waste water using an appropriate combination of the techniques given below.

For more details please see Best Available Techniques (BAT) Reference Document for Waste Treatment, p. 736.

A5.6 Emissions from accidents and incidents

BAT 21 - In order to prevent or limit the environmental consequences of accidents and incidents, BAT is to use all techniques given below, as part of the accident management plan (see BAT 1).

Technique		Description
a.	Protection measures	These include measures such as: <ul style="list-style-type: none"> ● Protection of the plant against malevolent acts ● Fire and explosion protection system, containing equipment for prevention, detection, and extinction ● Accessibility and operability of relevant control equipment in emergency situations.
b.	Management of incidental/accidental emissions	Procedures are established and technical provisions are in place to manage (in terms of possible containment) emissions from accidents and incidents such as emissions from spillages, firefighting water, or safety valves.

c.	Incident/accident registration and assessment system	<p>This includes techniques such as:</p> <ul style="list-style-type: none"> • A log/diary to record all accidents, incidents, changes to procedures and the findings of inspections • Procedures to identify, respond to and learn from such incidents and accidents.
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A5.7 Material efficiency

BAT 22 - In order to use materials efficiently, BAT is to substitute materials with waste.

Waste is used instead of other materials for the treatment of wastes (e.g. waste alkalis or waste acids are used for pH adjustment, fly ashes are used as binders).

Some applicability limitations derive from the risk of contamination posed by the presence of impurities (e.g. heavy metals, POPs, salts, pathogens) in the waste that substitutes other materials. Another limitation is the compatibility of the waste substituting other materials with the waste input (see BAT 2).

A5.8 Energy efficiency

BAT 23 - In order to use energy efficiently, BAT is to use both of the techniques given below.

Technique		Description
a.	Energy efficiency plan	An energy efficiency plan entails defining and calculating the specific energy consumption of the activity (or activities), setting key performance indicators on an annual basis (for example, specific energy consumption expressed in kWh/tonne of waste processed) and planning periodic improvement targets and related actions. The plan is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc.
b.	Energy balance record	An energy balance record provides a breakdown of the energy consumption and generation (including exportation) by the type of source (i.e. electricity, gas, conventional liquid fuels, conventional solid fuels, and waste). This includes: <ul style="list-style-type: none"> • Information on energy consumption in terms of delivered energy; • Information on energy exported from the installation; • Energy flow information (e.g. Sankey diagrams or energy balances) showing how the energy is used throughout the process. The energy balance record is adapted to the specificities of the waste treatment in terms of process(es) carried out, waste stream(s) treated, etc.

A5.9 Reuse of packaging

BAT 24 - In order to reduce the quantity of waste sent for disposal, BAT is to maximize the reuse of packaging, as part of the residues management plan (see BAT 1)

Packaging (drums, containers, IBCs, pallets, etc.) is reused for containing waste, when it is in good condition and sufficiently clean, depending on a compatibility check between the substances contained (in consecutive uses). If necessary, packaging is sent for appropriate treatment prior to reuse (e.g. reconditioning, cleaning). Some applicability restrictions derive from the risk of contamination of the waste posed by the reused packaging.

APPENDIX B – List of legislative acts discussed in this report

RA Laws

#	Act title	Act number	Date
1	RA Constitution		
2	Law on Waste	ՀՕ-159-Ն	24-Nov-2004
3	Law on Waste Disposal and Sanitary Cleaning	ՀՕ-237-Ն	23-June-2011
4	Law on Environmental Impact Assessment	ՀՕ-110-Ն	21-June-2014
5	Law on Sanitary-epidemic safety	ՀՕ-43	12-Dec-1992
6	Law on Licensing	ՀՕ-193	30-May-2001
7	RA Law on Local Governance	ՀՕ-337	07-May-2002
8	RA Law on Environmental Control	ՀՕ-82-Ն	11-Apr-2005
9	Law on Local Governance in the City of Yerevan	ՀՕ-5-Ն	26-Dec-2008
10	Tax Code	ՀՕ-165-Ն	01-Jan-2018
11	Administrative Offences Code	ՀՄՄՀԳՄՏ 1985/23	06-Dec-1985
12	Criminal Code	ՀՕ-528-Ն	18-Apr-2003

RA sub-legislative acts

#	Act title	Act number	Date
1	List of Waste Classified by the Level of Hazard	N 430-Ն	25-Dec-2006
2	“Hygienic and anti-epidemic requirements for medical waste disposal” N 2.1.1.3-3 Sanitary Rules and Norms	N 03-Ն	4-March-2008
3	Hygiene Requirements N 2.1.7.002-09 Sanitary Rules and Norms for occupational safety of personnel performing work in the field of sanitary maintenance of settlements, collection, storage, transportation, processing, recycling, utilization, clearance and burial of waste, as well as sanitary protection of residential areas.	N 25-Ն	22-Dec-2009
4	Mandatory Norms of Shared Property Maintenance of Multi-apartment Buildings.	N 1161-Ն	4-Oct-2017

5	The Decision of the RA Government on Confirmation of the Licensing Procedure for Hazardous Waste Management Activities in RA	N 121-Ն	30-Jan-2003
6	The Decree of the RA Minister of Nature Protection on Confirmation of the List of Consumer and Industrial waste (including Waste from Natural Resource Use) formed in the Area of the Republic of Armenia	N 342-Ն	26-Oct-2006
7	The Decision of the RA Government on Confirmation of the Norms on the assessment of the environmental regulation impact.	N 921-Ն	13-Aug-2009
8	Landfill Design and Operation Guidelines (the appendix to the December 29, 2009 Decision of the RA Minister of Urban Development.)	321-A	29-Dec-2009
9	The Decision of the RA Government on Confirmation of the Procurement Procedure Norms	N 526-Ն	4-May-2017
10	The Extract from the Protocol of the RA Government Session on the Approval of the Guidelines for Safe Installation and Neutralization of Consumer and Industrial Waste	N 16	26-Apr-2012
11	The Decree of the RA Minister of Nature Protection on Confirmation of the Exemplary Form of Waste Passport	N 19	2-Feb-2007
12	The Decree of the RA Minister of Healthcare on Establishment of Conduct of Registration in Pharmacies or Pharmacy Booths	05-Ն	1-Feb-2013
13	The Decision of the RA Government on Confirmation of Technical Regulations on Lubricants, Oils, and Special Liquids	546-Ն	14-May-2015
14	The Decision of the RA Government on Confirmation of Technical Regulations of Packaging Waste	1544-Ն	28-Sep-2006

APPENDIX C – List of waste recovery and treatment facilities in Armenia

#	Name	Recovered materials
1	“Saranist” LLC	Glass
2	“Osipyán” LLC	Glass (white)
3	“Ekologia V.K.H.” LLC	Hazardous (incinerating medical and recover metals)
4	“Ecoprotect” LLC	Hazardous (medical waste to incineration)
5	“Arm Plast” LLC	HDPE, PE, LDPE, PP
6	“Armenian Molybdenum Production” LLC	Metals
7	“Armavir Machining Factory” OJSC	Metals
8	“Dzulakentron” OJSC	Metals
9	“M.N.G. Trading” LLC	Metals
10	“Nikol Duman Smelter” LLC	Metals
11	“Edmet” LLC	Metals, Hazardous (batteries)
12	“Metexim” LLC	Metals, Hazardous (batteries)
13	“Rusal” CJSC	Metals, Hazardous (batteries)
14	“Shimizu” Corporation	Methane recovery from landfill
15	“ORWACO” CJSC	Organic (caw manure and straws to vermicompost)
16	“Areguni biogas”	Organic (caw manure to biogas)
17	“Geghamasar biogas”	Organic (caw manure to biogas)
18	“Pambak biogas”	Organic (caw manure to biogas)
19	“Mirhav” LLC	Organic (manure, straws, cardboard to fuel)
20	“Healthy Mushroom” LLC	Organic (poultry manure to biogas)
21	“Lusakert biogas”	Organic (poultry manure to biogas)
22	“Euroterm” CJSC (Noyan)	Organic (vegetable and fruit waste to compost)
23	“JB Technologies” LLC	Organic (waste cooking oil to fuel)
24	“H-Groups” LLC	Paper
25	“Ishkhan&Andranik” LLC	Paper
26	“Maxis” LLC	Paper
27	“Stalactite” LLC	Paper
28	“Vahag” S/P	Paper
29	“Vazgen Abgaryan” LLC	Paper
30	“Vladimir Avagyan” S/P	Paper
31	“Karton-Tara” LLC	Paper, Cardboard
32	“Softex” LLC	Paper, Cardboard
33	“Clean Land” LLC	PET, Cardboard
34	“Plast Shin” CJSC	Plastics (to create building components)
35	“Eco Plast” LLC	Polyethylene, PP
36	“Oval Plast” LLC	Polymers
37	“Plastic” OJSC	Polymers
38	“Poly-Serv” LLC	Polymers
39	“AM-ESKA” LLC	Rubber, Tires, Oils
40	“Graphene-Shin” LLC	Ruber scrap

The up to date list is available at the AUA Waste Resource Library: <https://wrl-ace.aua.am/institutions/#private>

APPENDIX D – Stakeholder interviews and consultations

For the present analysis, the project experts held a number of individual interviews, two meetings with the Interagency Working Group Coordinating Country’s Waste Management Activities, and two multi-stakeholder consultations. Stakeholder engagement is presented below.

Individual interviews

- Anahit Aleksandryan, Head of the Hazardous Substances and Waste Policy Division of the Ministry of Environment
- Anahit Avanesyan Vardanyan, RA Deputy Minister of Health
- Ani Obosyan, Director of the “National Certification Body” SNCO
- Anzhela Manukyan, Director of Lusakert Biogas CJSC
- Arsen Gasparyan, formerly Senior adviser to RA Prime Minister
- Artur Grigoryan, formerly Head of the State Inspectorate for Nature Protection and Mineral Resources
- Emma Anakhasyan, Armenian Women for Health and Healthy Environment NGO expert
- Garnik Petrosyan, RA Deputy Minister of Agriculture (interview was held in February 2019; since then this ministry has been dissolved and its functions are now carried out by the Ministry of Economy)
- Gohar Karapetyan, Manager of the Ecoprotect LLC (hazardous waste treatment plant)
- Gor Khachatryan, Director of the Economic Research Center at the Ministry of Economic Development and Investments
- Narine Mkrtchyan, Inspector at the Environmental Protection and Mining Inspection Body of the Republic of Armenia
- Nelli Baghdasaryan, Head of Division of Social Sphere and Environmental Statistics of the Personnel of the RA Statistical Committee
- Nune Bakunts, Deputy Director of the National Center for Disease Control and Prevention of the Ministry of Health
- Nvard Shahmuradyan, Shen NGO, Organic Agriculture Project Coordinator

Meetings with the Interagency Working Group Coordinating Country’s Waste Management Activities

Meeting on July 2, 2019

1. Aharon Khachatryan, Deputy Head of the Legal Acts Expertise Agency
2. Alen Amirkhanian, Director of the AUA Acopian Center for the Environment, Armenia
3. Anahit Aleksandryan, Head of the Hazardous Substances and Waste Policy Division
4. Aneta Babayan, Head of the Strategic Programming Department of the Strategic Planning and Monitoring Department
5. Anush Sargsyan, NGO
6. Ararat Khachikyan, Head of Communal Services Department at the Yerevan Municipality
7. Arman Hovhannisyan, Acting Head of the UN Department of the Ministry of Foreign Affairs

8. Armen Gevorgyan, Deputy Head of the Department of Building, Building Maintenance and Economic Affairs
9. Arsen Gasparyan, Chief Adviser to RA Prime Minister, Head of the Working Group
10. Davit Manukyan, Acting Chief Specialist of the Foreign Relations Department of the RA Prime Minister's Office
11. Dmitry Mariyasin, UNDP Resident Representative in Armenia
12. G. Aleksanyan, Head of the Legal Acts Expertise Agency at the RA Ministry of Justice
13. Gohar Mamikonyan, Advisor to the RA Minister of Education and Science
14. Goharik Hovhannisyan, Deputy Head of the Legal Department
15. Harutyun Alpetyan, Expert at the AUA Acopian Center for the Environment, Armenia
16. Hovhannes Aharonyan, Head of the Department of Garbage Collection and Sanitation of the Department of Municipal Economy (by consent)
17. Iva Marutyuan, NGO
18. Lilia Afrikyan, Acting Chief Specialist of the Foreign Relations Department of the RA Prime Minister's Office
19. Lilit Banduryan, Acting Chief Specialist of the Foreign Relations Department of the RA Prime Minister, Secretary of the Working Group
20. Lusine Mikaelyan, Deputy Head of the Department for Territorial Development and Environmental Issues
21. Marina Minasyan, Head of Investment Programs and Private-Public Partnership Division of the Investments and Investments Department
22. Mekhak Ghazaryan, Head of the Waste and Atmosphere Emissions Management Agency
23. Narine Avetyan, Head of the Department of Territorial Investment Policy and Infrastructure Development
24. Nune Bakunts, Deputy General Director of "National Center for Disease Control and Prevention" SNCO
25. Sergey Shahnazaryan, Head of Public Finance Management Methodology Department
26. Suren Shakaryan, Head of the Department for the Protection and Use of Monuments and Historical Environment of the Agency for Historical and Cultural Monuments Protection
27. Tigran Manukyan, Acting Head of the Department of Architecture and Urban Development
28. Vahagn Lalayan, Head of the Investment Policy Department at the RA Ministry of Economic Development and Investments
29. Zaruhi Matevosyan, Adviser to RA Deputy Prime Minister Tigran Avinyan

Meeting on December 18, 2019

1. Alen Amirkhanian, Director of the AUA Acopian Center for the Environment, Armenia
2. Anahit Aleksandryan, Head of the Hazardous Substances and Waste Policy Division
3. Ararat Khachikyan, Head of Communal Services Department at the Yerevan Municipality
4. Davit Shindyan, Expert at the Department of territorial (capital) programs support and waste management of the Ministry of Territorial Administration and Infrastructure
5. Gohar Mamikonyan, Adviser to the RA Minister of Education and Science
6. Harutyun Alpetyan, Expert at the AUA Acopian Center for the Environment, Armenia
7. Narine Avetyan, Head of Department of territorial (capital) programs support and waste management of the RA Ministry of Territorial Administration and Infrastructure

8. N. Sahakov, Adviser at the Department of Multilateral Policy and Development Cooperation of the RA Ministry of Foreign Affairs
9. Sergey Shahnazaryan, Head of Public Finance Management Methodology Department
10. Srбуhi Ghazaryan, Adviser to RA Prime Minister, Head of the Working Group
11. Vahagn Lalayan, Adviser to RA Minister of Economy

Multi-stakeholder consultation

Kick-off workshop on December 5-7, 2018

Hosted over 50 participants including:

- Swedish Experts (Milav, LIFE)
- Government policy developers and decision makers
- Civil Society Organizations
- Private sector
- Academia
- Media

Draft report review on December 5, 2019

Hosted over 20 participants including:

- Civil Society Organizations
- Private sector
- Academia

APPENDIX E – Communications with state agencies

Communications with the RA Ministry of Environment on the status of the EPR adoption process in Armenia

Inquiry and follow-up (in Armenian)

Բարև Ձեզ,

Հայաստանի ամերիկյան համալսարանի Յակոբեան բնապահպանական կենտրոնը ներկայումս իրականացնում է Թափոնների կառավարումը Հայաստանում (ԹԿՀ) ծրագիրը (wga-ace.aua.am), որի նպատակն է Հայաստանի կառավարությանը տրամադրել անկախ խորհրդատվություն կոշտ թափոնների կառավարման ազգային քաղաքականության, ռազմավարության և ճանապարհային քարտեզի մշակման հարցում:

Ուսումնասիրության մաս կազմող՝ երկրում կոշտ թափոնների կառավարման առկա իրավիճակի վերլուծության շրջանակներում անդրադարձ է արվում Հայաստանում Արտադրողի պատասխանատվության ընդլայնման մոտեցումների և ռազմավարության մշակման գործընթացին:

2018 թ. ապրիլի 12-ի նիստում ՀՀ Կառավարությունը հավանություն է տվել Արտադրատեսակների համար արտադրողի (ներմուծողի) պատասխանատվության ընդլայնման համակարգի ներդրման ռազմավարությանը և դրանից բխող 2018-2021 թվականների միջոցառումների ծրագրին: Ռազմավարությունը նախատեսում է երկու փուլ, որոնց շրջանակներում սահմանված է որոշ օրենքներում և ենթաօրենսդրական ակտերում փոփոխությունների և լրացումների կատարում, նոր ենթաօրենսդրական ակտերի ընդունում, հավաստագրերի տրամադրման համակարգի ներդրում, անհրաժեշտ մեթոդական ցուցումների, ձևաչափերի, ընթացակարգերի մշակում և հաստատում և այլն:

Խնդրում ենք տեղեկատվություն տրամադրել այս գործընթացների մասին, մասնավորապես նախատեսված միջոցառումների կատարման ընթացքի մասին: Շնորհակալ կլինենք ցանկացած տեղեկատվության համար:

Հարգանքով՝

ՀԱՀ Յակոբեան բնապահպանական կենտրոնի փորձագետ
ԹԿՀ նախագծի ղեկավար
Հարություն Ալպետյան



ՀԱՅԱՍՏԱՆԻ ՀԱՆՐԱՊԵՏՈՒԹՅԱՆ
ՇՐՋԱԿԱ ՄԻՋԱՎԱՅՐԻ ՆԱԽԱՐԱՐՈՒԹՅԱՆ
ԳԼԽԱՎՈՐ ԶԱՐՏՈՒՐԱՐ

№ 5/01.2/53030
«08» «10» 2019թ.

Հայաստանի Ամերիկյան Համալսարանի Յակոբեան
բնապահպանական կենտրոնի փորձագետ,
Թափոնների կառավարումը Հայաստանում
նախագծի ղեկավար պարոն Հ. Ալպետյանին

Հարգելի պարոն Ալպետյան

Ի պատասխան Ձեր 2019 թվականի հոկտեմբերի 3-ի առցանց հարցման, տրամադրում եմ տեղեկատվություն ՀՀ կառավարության 2018թ. ապրիլի 12-ի նիստի N14 արձանագրությունով հավանության արժանացած «11. Արտադրատեսակների համար արտադրողի (ներմուծողի) պատասխանատվության ընդլայնման համակարգերի ներդրման ռազմավարությանը և դրանից բխող 2018-2021թթ. միջոցառումների ծրագրին հավանություն տալու մասին» արձանագրային որոշման 2-րդ հավելվածի 1-3-րդ կետերի կատարման վերաբերյալ:

Առդիր՝ 1 նիշք:

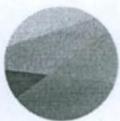
Հագանքով՝
պաշտոնակատար

Վ. Զիլավյան

10/8/2019


ՎԱՀԵ ԶԻԼԱՎՅԱՆ
Signed by JILAVYAN VAHE 4101750076

Բնապահպանական ռազմավարական ծրագրերի
ու մոնիթորինգի վարչություն
Մ.Հարությունյան
011818515



ՀԱՅԱՍՏԱՆԻ ՀԱՆՐԱՊԵՏՈՒԹՅՈՒՆ
ՇՐՋԱԿԱ ՄԻՋԱՎԱՅՐԻ
ՆԱԽԱՐԱՐՈՒԹՅՈՒՆ

0010, ք.Երևան, Հանրապետության հր., Կառավարական տուն 3
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Առդիք

Արտադրատեսակների համար արտադրողի (ներմուծողի) պատասխանատվության ընդլայնման համակարգերի ներդրման ռազմավարության կարգավիճակի և նախատեսված միջոցառումների կատարման ընթացքի վերաբերյալ

Համաձայն ՀՀ կառավարության 2018 թվականի ապրիլի 12-ի նիստի N14 արձանագրությունով հավանության արժանացած «11. Արտադրատեսակների համար արտադրողի (ներմուծողի) պատասխանատվության ընդլայնման համակարգերի ներդրման ռազմավարությանը և դրանից բխող 2018-2021 թվականների միջոցառումների ծրագրին հավանություն տալու մասին» արձանագրային որոշման 2-րդ հավելվածի նախատեսվում էր իրականացնել հետևյալ միջոցառումները՝

1. «Թափոնների մասին» ՀՀ օրենքում փոփոխություններ և լրացումներ նախատեսող օրենքի նախագծի ՀՀ կառավարության աշխատակազմ ներկայացում»՝ մինչև 2018 թվականի ավարտը,
2. «ՀՀ հարկային օրենսգրքում փոփոխություններ և լրացումներ նախատեսող օրենքի նախագծի ՀՀ կառավարության աշխատակազմ ներկայացում»՝ մինչև 2019 թվականի ավարտը,
3. «Օգտահանման ենթակա, շահագործման համար ոչ պիտանի ապրանքների (ներառյալ փաթեթվածքների) ցանկը սահմանելու մասին» ՀՀ կառավարության որոշման նախագծի ՀՀ կառավարության աշխատակազմ ներկայացում»՝ մինչև 2020 թվականի ավարտը:

Սակայն վերոնշյալ միջոցառումների իրականացումը համարվել է ժամանակավրեպ և ոչ նպատակահարմար (ինչի վերաբերյալ 08.01.2019թ. N 02/24.10/8 հանձնարարականով ստացվել է Վարչապետի համաձայնությունը) հաշվի առնելով հետևյալ հիմնավորումները.

- Ներկայումս Հայաստանում գրեթե բացակայում են արտադրատեսակների համար արտադրողի (ներմուծողի) պատասխանատվության ընդլայնման համակարգերի ներդրման համար անհրաժեշտ՝ թափոնների մշակում, վերամշակում, օգտահանում և վնասազերծում իրականացնող կազմակերպությունների, համապատասխան ենթակառուցվածքների, ինչպես նաև թափոնների տեսակավորված հավաքման, վերամշակման կետ տեղափոխման համակարգերը.
- 2018թ. ապրիլի 12-ին վավերացված «Հայաստանի Հանրապետության՝ մի կողմից, և Եվրոպական միության և Ատոմային էներգիայի եվրոպական համայնքի ու դրանց անդամ պետությունների՝ մյուս կողմից, միջև համապարփակ և ընդլայնված գործընկերության» համաձայնագրի (ՀԳԸՀ) 3-րդ հավելվածի՝ հայկական կողմը պարտավորություն է ստանձնել մինչև 2026 թվականը ներդնել արտադրողների ընդլայնված պատասխանատվության սկզբունքներին համապատասխան՝ ծախսերի ամբողջական փոխհատուցման մեխանիզմը՝ իրականացնելով համապատասխան օրենսդրական մոտարկումներ՝ Եվրոպական խորհրդարանի և Խորհրդի 2008 թվականի նոյեմբերի 19-ի 2008/98/ԵՀ թափոնների մասին հրահանգի պահանջներին համապատասխան: Տվյալ պարտավորությունը ամրագրված է նաև վարչապետի կողմից 2019թ. հունիսի 1-ի N666-Ն որոշմամբ հաստատված ճանապարհային քարտեզի բնապահպանության բաժնում: Վերոնշյալ միջոցառման իրականացումը նախատեսվում է իրականացնել ԵՄ աջակցությամբ և հիմք ընդունելով եվրոպական փորձը:

Ելնելով վերոգրյալից՝ ոլորտում իրականացվող գործընթացների իրավական կարգավորման տեսանկյունից միասնական մոտեցման ապահովման նպատակով Շրջակա միջավայրի նախարարությունը նախատեսում է արտադրողի (ներմուծողի) պատասխանատվության ընդլայնման համակարգերի ներդրման համար անհրաժեշտ միջոցառումները իրականացնել վերոնշյալ ճանապարհային քարտեզի իրականացման շրջանակներում և ժամկետներում:

Communications with the RA Ministry of Education, Science, Culture and Sport on the programs and curriculum which involve topics on waste management in the education system in Armenia

Inquiry and follow-up (in Armenian)

Բարև Ձեզ,

Հայաստանի ամերիկյան համալսարանի Յակոբեան բնապահպանական կենտրոնը ներկայումս իրականացնում է թափոնների կառավարմանն առնչվող տարբեր հետազոտական նախագծեր: Դրանցից մեկն է Թափոնների կառավարումը Հայաստանում ծրագիրը (wga-ace.aua.am), որի նպատակն է Հայաստանի կառավարությանը տրամադրել անկախ խորհրդատվություն կոշտ թափոնների կառավարման ազգային քաղաքականության, ռազմավարության և ճանապարհային քարտեզի մշակման հարցում:

Ուսումնասիրության մի մասը կազմում է «Երկրում կոշտ թափոնների կառավարման առկա իրավիճակը» գլուխը, որն անդրադառնում նաև իրազեկվածության մակարդակին: Այս հարցի շուրջ է, որ ակնկալում ենք օգնություն Ձեր նախարարության կողմից:

Շնորհակալ կլինենք եթե տրամադրեք տեղեկություն հետևյալ հարցերի շուրջ.

Ներառված է արդյոք դպրոցական ծրագրերում կոշտ թափոնների կառավարմանը վերաբերող որևէ թեմա:

- Եթե այո, ապա
- ո՞ր առարկայում (առականերում)
- ի՞նչ թեմա(ներ)
- բոլոր դպրոցներում, թե ոչ (նշել դպրոցները)
- ո՞ր դասարանի ծրագրում
- պարտադիր առարկա է, թե ոչ
- առցանց հասանելի է, թե ոչ (հասանելիության դեպքում խնդրում ենք տրամադրել հղում կայքէջին)

Ներառված է արդյոք ԲՈՒՀ-երի ծրագրերում կոշտ թափոնների կառավարմանը վերաբերող որևէ թեմա:

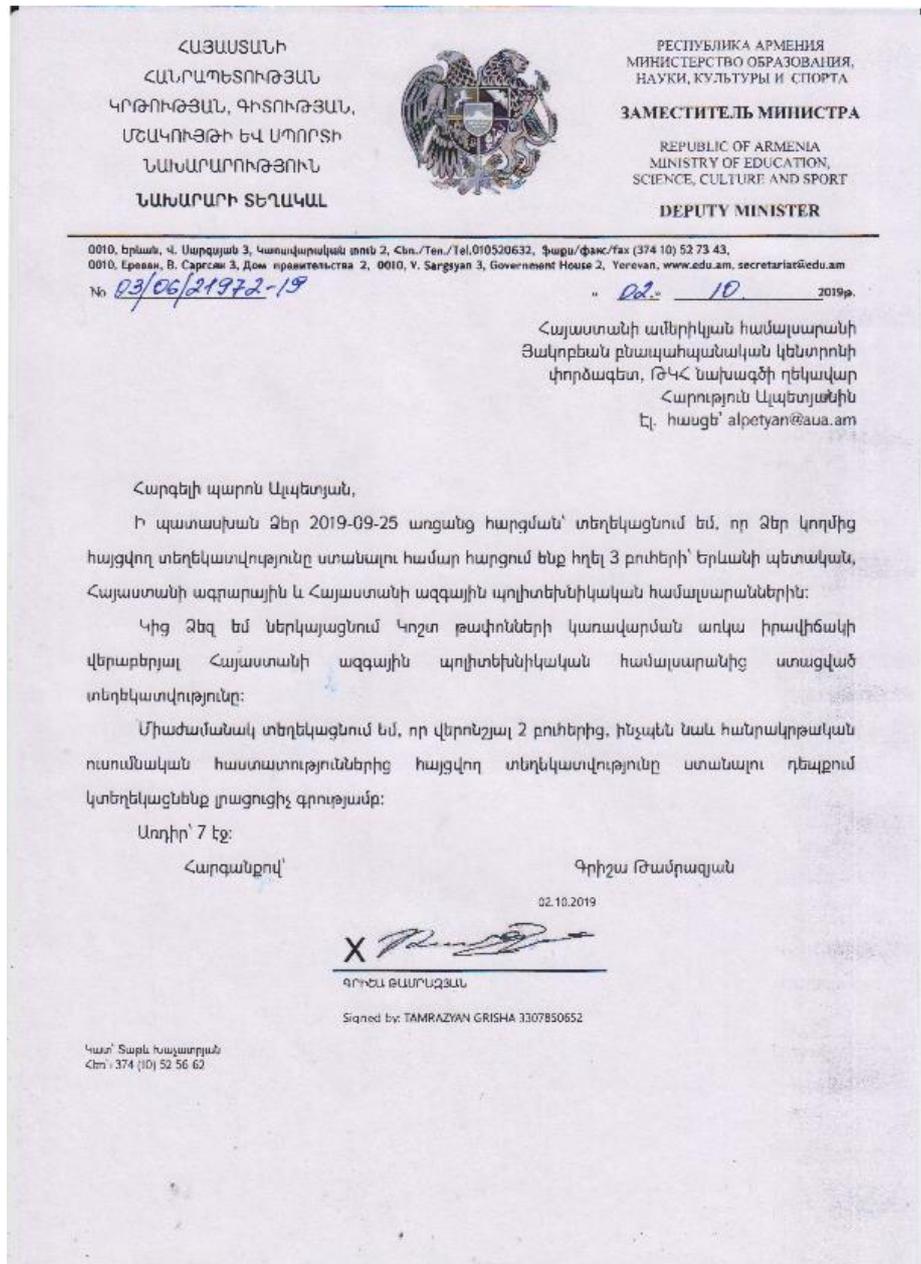
- Եթե այո, ապա
- ո՞ր առարկայում (առականերում)
- ի՞նչ թեմա(ներ)
- բոլոր ԲՈՒՀ-երում, թե ոչ (նշել ԲՈՒՀ-երը)
- ո՞ր կուրսերի ծրագրում
- պարտադիր առարկա է, թե ոչ
- առցանց հասանելի է, թե ոչ (հասանելիության դեպքում խնդրում ենք տրամադրել հղում կայքէջին)

Դաստիարակներն ու ուսուցիչները ներգրավված են արդյոք վերապատրաստման ծրագրերում, ուր քննարկվում է թափոնների կառավարումը (եթե այո, նշել ծրագիրը)
Եթե առկա է կոշտ թափոնների կառավարման վերաբերյալ Հայաստանում իրականացվող իրազեկման ծրագրերի մասին տեղեկություն խնդրում ենք տրամադրել:

Կանխավ շնորհակալ ենք հարցմանը արձագանքելու համար:

Հարգանքով՝

ՀԱՀ Յակոբեան բնապահպանական կենտրոնի փորձագետ
ԹԿՀ նախագծի ղեկավար
Հարություն Ալպետյան



Առդիր

Բուհի անվանումը	Բուհում դասավանդվող առարկան, որում ներառված է կոշտ թափոնների կառավարմանը վերաբերող որևէ թեմա	Թեմաները	Ուսումնառության ո՞ր մակարդակում և որերորդ կուրսում է դասավանդվում առարկան	Պարտադիր թե՞ կամընտրական առարկա է	Առցանց հասանելի է թե՞ ոչ (հասանելիության դեպքում խնդրում ենք տրամադրել հղում կայքէջին)
<p>Հայաստանի ազգային պոլիտեխնիկական համալսարան</p>	<p>1. Փոքրաթափոն հումքախնայող և էկոլոգիապես անվտանգ տեխնոլոգիաների մշակման սկզբունքները</p>	<p>1.1. Կոշտ արդյունաբերական թափոնների վերաօգտագործման խնդիրները 1.2. Կոշտ կենցաղային թափոնների հավաքում, դասակարգում, վերաօգտագործում</p>	<p>բակալավր, 4-րդ կուրս</p>	<p>պարտադիր առարկա</p>	<p>առցանց հասանելի չէ</p>
	<p>2. Ռադիոակտիվ թափոնների պահպանման հիմնախնդիրները</p>	<p>2.1. Ռադիոակտիվ թափոնների վերամշակում և պահպանում 2.2. Ռադիոակտիվ թափոնների պահպանման միջոցներ</p>	<p>բակալավր, 4-րդ կուրս</p>	<p>պարտադիր առարկա</p>	<p>առցանց հասանելի չէ</p>
	<p>3. Թունավոր թափոնների բնապահպանական հիմնախնդիրները</p>	<p>3.1. Կոշտ արդյունաբերական թափոնների դասակարգում 3.2. Թափոնակույտեր, կառուցվածքը և աշխատանքի սկզբունքները</p>	<p>մագիստրատուրա, 2-րդ կուրս</p>	<p>ընտրովի առարկա</p>	<p>առցանց հասանելի չէ</p>
	<p>4. ԱԷԿ-ների ռադիոակտիվ թափոնների և աշխատած միջուկային վառելիքի պահպանման ժամանակակից տեխնոլոգիաները</p>	<p>4.1. Ռադիոակտիվ թափոնների տեսակները և դասակարգումը, 4.2. Աշխատած միջուկային վառելիքի բնութագրերը, 4.3. Ռադիոակտիվ թափոնների և աշխատած միջուկային վառելիքի անվտանգության ապահովման ՀՀ նորմերը, 4.4. ԱԷԿ-ի շահագործման և շահագործումից դուրսբերման ընթացքում առաջացող ռադիոակտիվ թափոնների և աշխատած միջուկային վառելիքի հավաքումը, տեսակավորումը և վերամշակումը, 4.5. Հեղուկ ռադիոակտիվ թափոնների՝ տարողություններում պահման հիմնախնդիրները, դրանց ապակեցման, բիտումացման, ցեմենտացման տեխնոլոգիաները, կիրառման համաշխարհային փորձը և հիմնախնդիրները, 4.6. Պինդ ռադիոակտիվ թափոնների և աշխատած միջուկային վառելիքի պահման «թաց» և «չոր» եղանակները, դրանց առավելությունները և թերությունները, 4.7. Չոր պահեստարանների և կոնտեյնիւրների տեսակները,</p>	<p>մագիստրատուրա, 1-ին կուրս</p>	<p>ընտրովի առարկա</p>	<p>առցանց հասանելի չէ</p>

	<p>4.8. Ռադիոակտիվ թափոնների պահումից թաղման անցման ժամանակահատվածի գնահատման սկզբունքները,</p> <p>4.9. Թափոնների թաղման հիմնական և այլընտրանքային տարբերակները,</p> <p>4.10. Թաղման տարբերակի ընտրման տեխնիկատեսական և էկոլոգիական հիմնախնդիրները,</p> <p>4.11. Աշխատած միջուկային վառելիքի վերամշակման արտասահմանյան փորձը,</p> <p>4.12. Վերամշակման պարագայում առաջող հիմնախնդիրները:</p>			
5. Ակտիվազերծման պրոցեսները ԱԷԿ-ներում	<p>5.1. ԱԷԿ-ների շահագործման պայմաններում առաջացող ճառագայթաակտիվ պինդ, հեղուկ և գազային թափոնները, դրանց դասակարգումը, բնութագրերը, վնասազերծման պահանջները և առանձնահատկությունները,</p> <p>5.2. Ճառագայթաակտիվ մակերևույթների ակտիվազերծման մեթոդները, սարքավորումները և համակարգերը:</p>	մագիստրատուրա, 2-րդ կուրս	ընտրովի առարկա	առցանց հասանելի չէ
6. ԱԷԿ-ների շահագործումից դուրս բերման տեխնոլոգիաները	<p>6.1. ԱԷԿ-ների շահագործումից դուրսբերման պրոցեսի առանձնահատկությունները, տարբերակները, փուլերը, տարբերակների տեխնոլոգիական և ֆինանսական համեմատությունը,</p> <p>6.2. Շահագործումից դուրսբերման ընթացքում ձևավորվող պինդ և հեղուկ ճառագայթաակտիվ թափոնների հիմնախնդիրները և դրանց լուծման հնարավոր ուղիները,</p> <p>6.3. Ճառագայթաակտիվ գրաֆիտի վնասազերծման հիմնախնդիրները,</p> <p>6.4. Հայկական ԱԷԿ-ի շահագործումից դուրսբերման պլանը:</p>	մագիստրատուրա, 2-րդ կուրս	ընտրովի առարկա	առցանց հասանելի չէ
7. Արտադրական և կենցաղային թափոնների կառավարում	<p>7.1. Թափոնների կառավարում</p> <p>7.2. Կոշտ կենցաղային թափոններ</p> <p>7.3. Հանքագործության կոշտ թափոնների կառավարում</p>	բակալավր, 4-րդ կուրս	պարտադիր առարկա	առցանց հասանելի չէ
8. Հանքահարստացման արտադրության լցակայանների պոչամբարների ձևավորում	<p>8.1. Լցակայանների ձևավորման եղանակները:</p> <p>8.2. Լցակայանաձևավորում մեխանիկական թիակներով:</p> <p>8.3. Լցակայանաձևավորում դրագլայներով:</p> <p>8.4. Լցակայանաձևավորում բազմաշերտաձևի էքսկավատորներով:</p> <p>8.5. Լցակայանաձևավորում կոնվեյերներով:</p>	բակալավր, 4-րդ կուրս	պարտադիր առարկա	առցանց հասանելի չէ

		<p>8.6. Պոչամբարներ և դրանց դասակարգումը:</p> <p>8.7. Պոչամբարների բնակլիմայական, ճարտարագիտակրթաբանական ու հիդրոլոգիական բնութագրերը:</p> <p>8.8. Պոչամբարների տեղակայման սեյսմատեկտոնական պայմանները:</p> <p>8.9. Պոչամբարների տիպերը և հիմնական կառուցվածքային յուրահատկությունները:</p> <p>8.10. Պոչամբարների տեղադրման վայրի ընտրումը:</p> <p>8.11. Պոչամբարների նախագծման մեթոդները:</p> <p>8.12. Պոչամբարներին ներկայացվող հիմնական պահանջները:</p> <p>8.13. Հիդրոտրանսպորտ:</p> <p>8.14. Պոչամբարների կայունությունը:</p> <p>8.15. Պոչամբարների շահագործումը:</p> <p>8.16. Բնապահպանական միջոցառումները պոչամբարների շահագործման ժամանակ:</p>			
	<p>9. Ռեկուլտիվացիա և կոնսերվացում</p>	<p>9.1. Ռեկուլտիվացիոն և խախտված հողերի վերականգնման աշխատանքների կազմակերպման ընդհանուր հարցերը:</p> <p>9.2. Բնական և տեխնածին լանդշաֆտների տեսակները:</p> <p>9.3. Բնական և տեխնածին լանդշաֆտների ռեկուլտիվացիայի փուլերը:</p> <p>9.4. Բնական և տեխնածին լանդշաֆտների ռեկուլտիվացիայի դասերը:</p> <p>9.5. Մակաբացման ապարների դասակարգումը ըստ բիոլոգիական ռեկուլտիվացիայի հնարավորության:</p> <p>9.6. Լցվածքների ռեկուլտիվացիա:</p> <p>9.7. Լցակույտերի ռեկուլտիվացիա:</p> <p>9.8. Լցվածքների բարեկարգում:</p> <p>9.9. Լցակույտերի բարեկարգում:</p> <p>9.10. Աղբանոցներով և պոլիգոններով խախտված հողերի ռեկուլտիվացիան և բարեկարգումը:</p>	<p>մագիստրատուրա, 2-րդ կուրս</p>	<p>ընտրովի առարկա</p>	<p>առցանց հասանելի է</p>

Communications with the RA Ministry of Labor and Social Affairs on the programs related to assisting needy individuals and families through collecting second-hand commodities

Inquiry and follow-up (in Armenian)

Բարև Ձեզ,

Հայաստանի ամերիկյան համալսարանի Յակոբեան բնապահպանական կենտրոնը ներկայումս իրականացնում է Թափոնների կառավարումը Հայաստանում (ԹԿՀ) ծրագիրը (wga-ace.aua.am), որի նպատակն է Հայաստանի կառավարությանը տրամադրել անկախ խորհրդատվություն կոշտ թափոնների կառավարման ազգային քաղաքականության, ռազմավարության և ճանապարհային քարտեզի մշակման հարցում:

Ուսումնասիրության մաս կազմող՝ երկրում կոշտ թափոնների կառավարման առկա իրավիճակի վերլուծության շրջանակներում անդրադարձ է արվում Հայաստանում ապրանքների կրկնակի օգտագործման պրակտիկաներին:

Հայտնի է, որ Սոցապ նախարարությունը իրականացնում է տարբեր մարզերում օգտագործված իրերի հավաքագրման ծրագրեր անապահով ընտանիքների օգնելու համար:

Խնդրում ենք տեղեկատվություն տրամադրել այս գործընթացների մասին:

Շնորհակալ կլինենք ցանկացած տեղեկատվության համար:

Հարգանքով՝
ՀԱՀ Յակոբեան բնապահպանական կենտրոնի փորձագետ
ԹԿՀ նախագծի ղեկավար
Հարություն Ալպետյան



**ՀԱՅԱՍՏԱՆԻ ՀԱՆՐԱՊԵՏՈՒԹՅԱՆ ԱՇԽԱՏԱՆՔԻ ԵՎ ՍՈՑԻԱԼԱԿԱՆ ՀԱՐՑԵՐԻ
ՆԱԽԱՐԱՐՈՒԹՅՈՒՆ**

« 30 » 09 2019 թ.

N 44/20239-2019

Ձեր Մ/51812-2019

25.09.2019

**«ՀԱՏ ՅԱԿՈՐԵԱՆ ԲՆԱՊԱՀՊԱՆԱԿԱՆ ԿԵՆՏՐՈՆԻ»
ՓՈՐՁԱԳԵՏ ՀԱՐՈՒԹՅՈՒՆ ԱԼՊԵՏՅԱՆԻՆ**

Հարգելի պարոն Ալպետյան,

Ի պատասխան Ձեր հարցման, տեղեկացնում եմ, որ աշխատանքի և սոցիալական հարցերի նախարարի 05.06.2019թ. N 71-Ա/1 հրամանով (կցվում է) հաստատվել է սոցիալական շտապ օգնության համակարգի ձևավորման ծրագիրը, որի նպատակը կյանքին և առողջությանը վտանգ սպառնացող իրավիճակում հայտնված անձանց(ընտանիքներին) արագ և արդյունավետ օգնության կազմակերպումն է, ինչպես նաև փոխօգնության հանրային վարվելակերպի տարածման խրախուսումը:

Հայտնում եմ նաև, որ նախարարությունը նախաձեռնել է սոցիալական շտապ օգնության համակարգի միասնական հարթակի ձևավորման գործընթաց:

Ընտրակալ կլինենք ցանկացած համագործակցության համար:

Առդիր՝ 10 էջ:

Մամուլի քարտուղար՝

Ա. Մարտիրոսյան

0010, ք. Երևան, Կառավարական ստն 3 հևռ. (374 10) 56 53 83, ֆաքս (374 10) 52 08 30
<http://www.mlsa.am> info@mlsa.am

Առդիր

[374807]



ՀԱՅԱՍՏԱՆԻ ՀԱՆՐԱՊԵՏՈՒԹՅԱՆ
ԱՇԽԱՏԱՆՔԻ ԵՎ ՍՈՑԻԱԼԱԿԱՆ ՀԱՐՑԵՐԻ
ՆԱԽԱՐԱՐ

Հ Ր Ա Մ Ա Ն

05. հունիս 2019 թ.

N 71-ՇԱ/1

ՍՈՑԻԱԼԱԿԱՆ ԾՏԱՊ ՕԳՆՈՒԹՅԱՆ ՀԱՄԱԿԱՐԳԻ
ԶԵՎԱԿՈՐՄԱՆ ԾՐԱԳԻՐԸ ՀԱՍՏԱՏԵԼՈՒ ՄԱՍԻՆ

Ղեկավարվելով Հայաստանի Հանրապետության Վարչապետի 2018 թվականի հունիսի 11-ի N700-Լ որոշմամբ հաստատված Հայաստանի Հանրապետության աշխատանքի և սոցիալական հարցերի նախարարության կանոնադրության 18-րդ կետի 20-րդ ենթակետով, հաշվի առնելով նախարարությունում ստացված բանավոր, գրավոր դիմումներում, ահազանգերում, զանգվածային լրատվության միջոցների հրապարակումներում, ինչպես նաև այլ աղբյուրներից ստացված՝ կյանքին և առողջությանը վտանգ սպառնացող հանգամանքների մասին վկայող տվյալները, դրանց արագ արձագանքման, այդ իրավիճակում հայտնված անձանց (ընտանիքներին) արագ և արդյունավետ օգնություն կազմակերպելու նպատակով, ինչպես նաև խրախուսելով փոխօգնության հանրային վարվելակերպի տարածումը

Հ Ր Ա Մ Ա Յ ՈՒ Մ Ե Մ

1. Հաստատել «Սոցիալական շտապ օգնության համակարգի ձևավորման ծրագիրը» (այսուհետ՝ Ծրագիր)՝ համաձայն հավելվածի:
2. Հայաստանի Հանրապետության աշխատանքի և սոցիալական հարցերի նախարարության (այսուհետ՝ նախարարություն).
- 1) միջազգային համագործակցության և զարգացման ծրագրերի վարչության պետին՝ ապահովել միջազգային և հասարակական կազմակերպությունների միջոցով անհրաժեշտ ապրանքատեսականու

Հավելված
ՀՀ աշխատանքի և սոցիալական
հարցերի նախարարի
2019թ. ի հունիսի «5»-ի N 41 - Ա/1 հրամանի

ԾՐԱԳԻՐ
ՍՈՑԻԱԼԱԿԱՆ ՇՏԱՊ ՕԳՆՈՒԹՅԱՆ ՀԱՄԱԿԱՐԳԻ
ՁԵՎԱՎՈՐՄԱՆ

1. Սոցիալական շտապ օգնության համակարգը ձևավորվում է Հայաստանի Հանրապետության աշխատանքի և սոցիալական հարցերի նախարարության նախաձեռնությամբ՝ միջազգային կառույցների, հասարակական սեկտորում գործառնող ակտիվ, ինչպես նաև մասնավոր սեկտորի այլ կազմակերպությունների հետ համագործակցության պայմաններում:

2. Սոցիալական շտապ օգնության համակարգի նպատակն արագ արձագանքն է արտակարգ՝ կյանքին և առողջությանը վտանգ սպառնացող իրավիճակներում հայտնված, անհետաձգելի օգնության կարիք ունեցող անձանց (ընտանիքներին, այսուհետ՝ շահառու) սոցիալական խնդիրների լուծման հարցում:

3. Սոցիալական շտապ օգնության համակարգի շրջանակներում տրամադրվում են սոցիալական ծառայություններ, այդ թվում բնաիրային:

4. Սոցիալական շտապ օգնության համակարգի շրջանակներում տրամադրվող հիմնական սոցիալական ծառայություններն են.

- 1) Հոգեբանական օգնություն.
- 2) Խնամքի ծառայությունների միանվագ տրամադրում.
- 3) Փաստաբանական օգնություն (քաղաքացիական գործերով).
- 4) Կացարանի տրամադրում.
- 5) Բնաիրային օգնություն:

5. Սոցիալական շտապ օգնության համակարգի արագ արձագանքման կենտրոնական և տարածքային պահուստները (այսուհետ՝ Պահուստ) կարող են ներառել

- 1) Մթերք և սնունդ.
- 2) Հագուստեղեն և կոշիկներ.

3) Գրքեր, գրենական պիտույքներ, դասագրքեր և դպրոցական պայուսակ և այլ գրասենյակային պարագաներ.

4) Անկողնային պարագաներ.

5) Կահույք.

6) Հաշմանդամություն ենոցող անձանց աջակցող միջոցներ.

7) Վառելիքային.

8) Առաջին անհրաժեշտության կենցաղային ապրանքներ՝ սառնարան, լվացքի մեքենա և այլ խոհանոցային պարագաներ:

6. Պահուստում սույն Ծրագրի 5-րդ կետով նախատեսված ապրանքատեսականին հավաքագրվում է անհատ քաղաքացիների մասհանումներից, հասարակական, բարեգործական կազմակերպությունների հատկացումներից, ինչպես նաև օրենքով չարգելված այլ աղբյուրներից:

7. Սույն Ծրագրի 5-րդ կետի 1-ին ենթակետով նախատեսված մթերքը և սնունդը պահուստի առանձին բաղադրիչ է (այսուհետ՝ մթերային բանկ), որի ձևավորումն ունի իր առանձնահատկությունները.

1) մթերային բանկը միանվագ կամ պարբերական ձևով ստանում է համապատասխան մթերքն արտադրողից (անհատ գյուղացիներից կամ գյուղացիական տնտեսություններից), խանութներից, սուպերմարկետներից և անհատ բարեգործներից.

2) Մթերքը հիմնականում դժվար վաճառվող է կամ պիտանելիության ժամկետի ավարտը մոտ է, ունի խաթարված փաթեթավորում (պիտանի է օգտագործման համար).

3) Մթերքի հատկացումները կատարվում են գնորդների կողմից կամավոր «մեծ առևտրի» (Նոր Տարվա, Սուրբ ծննդյան տոների, Սուրբ Զատիկի, Սուրբ Խաչի կամ այլ տոնակատարությունների նախօրյակ) օրերին՝ կամավորների կան հասարակական կազմակերպությունների աշխատողների կազմակերպած ակցիաների շրջանակներում.

4) Մթերքը հատուկ է, հեղուկ մթերքը գործարանային պայմաններում շապրված է, մթերքը փաթեթավորված է (թեկուզ խաթարված, բայց անվնաս), պահպանման հատուկ ջերմային պայմաններ (սառնարանային) պահանջող մթերքն ընդունվում է նման պայմանների առկայության կամ անմիջապես շահառուին տրամադրելու դեպքում.

REFERENCES

- i. *Republic of Armenia Government Program, 2019.*
Available at <https://www.gov.am/files/docs/3133.pdf>
- ii. *Republic of Armenia Territorial Development Strategy for 2016-2025.* Available at https://www.e-gov.am/u_files/file/decrees/arc_voroshum/2016/07/ardzanagravinNrq064.pdf
- iii. *Republic of Armenia Solid Waste Management Development Strategy for 2017-2036.*
Available at <http://www.mtad.am/files/docs/1552.pdf>
- iv. *Action plan for implementation of the Energy Security Strategy for years 2014-2020.* Available at https://www.e-gov.am/u_files/file/decrees/kar/2014/07/14_0836.pdf
- v. *Strategy for the Introduction of Extended Producer (Importer) Responsibility Systems, 2018-2021.*
Available at <http://www.irtek.am/views/act.aspx?aid=94848>
- vi. *Cleaner Production Concept.* One of the governing legal frameworks of the RA 2014-2025 Strategic Program of Prospective Development. Adopted in 2011 by RA Government Protocol Decision № 49.
Available at <http://www.irtek.am/views/act.aspx?aid=64672>
- vii. *Sustainable Agricultural Development Strategy for 2010-2020.*
Available at http://old.minagro.am/public/uploads/2014/02/agstrategy_arm3.pdf
- viii. *Strategy and 2018-2021 Action Plan for the Introduction of the Extended Producer (Importer) Responsibility Systems.* Approved by RA Government Protocol Decision N 14 of 12 April 2018. Available at <http://www.irtek.am/views/act.aspx?aid=94848>
- ix. *Comprehensive and Enhanced Partnership Agreement (CEPA) signed between the European Union and the Republic of Armenia.*
Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52017JC0037>
CEPA action plan is available at http://www.osf.am/wp-content/uploads/2018/06/CEPA-Roadmap_ENG-Draft_June-2018.pdf
- x. Dri M., Canfora P., Antonopoulos I. S., Gaudillat P., *Best Environmental Management Practice for the Waste Management Sector*, JRC Science for Policy Report, EUR 29136 EN, Publications Office of the EU, Luxembourg, 2018, ISBN 978-92-79-80361-1, doi:10.2760/50247, JRC111059; Available at https://publications.jrc.ec.europa.eu/repository/bitstream/JRC111059/jrc111059_bemp_waste_2018_final_04_2.pdf
- xi. Bernd Bilitewski, Jörg Wagner, Jan Reichenbach; *Best Practice Municipal Waste Management: Information pool on approaches towards a sustainable design of municipal waste management and supporting technologies and equipment*; German Environment Agency. Available at https://publications.jrc.ec.europa.eu/repository/bitstream/JRC111059/jrc111059_bemp_waste_2018_final_04_2.pdf
- xii. Antoine Pinasseau, Benoit Zerger, Joze Roth, Michele Canova, Serge Roudier; *Best Available Techniques (BAT) Reference Document for Waste treatment Industrial Emissions Directive 2010/75/EU (Integrated Pollution Prevention and Control)*; EUR 29362 EN; Publications Office of the European Union, Luxembourg, 2018; ISBN 978-92-79-94038-5, doi:10.2760/407967, JRC113018; Available at https://eippcb.jrc.ec.europa.eu/reference/BREF/WT/JRC113018_WTbref.pdf
- xiii. Mark Hyman, Brandon Turner, Ainhua Carpintero, *Guidelines for National Waste Management Strategies*, UNEP, 2013. Available at http://cwm.unitar.org/national-profiles/publications/cw/wm/UNEP_UNITAR_NWMS_English.pdf

- xiv. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS *Towards a circular economy: A zero waste program for Europe* /* COM/2014/0398 final */ Available at <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52014DC0398>
- xv. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS *Closing the loop - An EU action plan for the Circular Economy* COM/2015/0614 final Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52015DC0614>
- xvi. Camia A., Robert N., Jonsson R., Pilli R., García-Condado S., López-Lozano R., van der Velde M., Ronzon T., Gurría P., M'Barek R., Tamosiunas S., Fiore G., Araujo R., Hoepffner N., Marelli L., Giuntoli J., *Biomass production, supply, uses and flows in the European Union. First results from an integrated assessment*, EUR 28993 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-77237-5, doi:10.2760/539520, JRC109869. Available at https://publications.jrc.ec.europa.eu/repository/bitstream/JRC109869/jrc109869_biomass_report_final2pdf2.pdf
- xvii. EUROPEAN COMMISSION, EUROSTAT *Guidance on municipal waste data collection*. Available at <https://ec.europa.eu/eurostat/documents/342366/351811/Guidance+on+municipal+waste+reporting/0710f1a4-6b68-4d48-ac4c-75901bc0644b>
- xviii. Veeken, Adrie & Hamminga, P. & Mingshun, Zhang. *Improving sustainability of municipal solid waste management in China by source separated collection and biological treatment of the organic fraction. Innovative environmental management & sustainable development*, 2006. Available at <https://edepot.wur.nl/23061>
- xix. Jan Pavlík, *Feasibility assessment of Agricultural Waste to energy Potential and Opportunities for Armenia*, 2017. UNDP. Available at http://nature-ic.am/Content/announcements/10538/FS_Biogas%20Potential_final.pdf
- xx. Tim Elliott, *Landfill Tax in the United Kingdom*, 2017. Institute for European Environmental Policy. Available at <https://ieep.eu/uploads/articles/attachments/e48ad1c2-dfe4-42a9-b51c-8fa8f6c30b1e/UK%20Landfill%20Tax%20final.pdf?v=63680923242>
- xxi. Statistical Committee of the Republic of Armenia, *Environment and Natural Resources in the Republic of Armenia for 2017*. Available at <https://www.armstat.am/en/?nid=82&id=2202>
- xxii. UN, Economic Commission for Europe, Committee on Environmental Policy, *Environmental Performance Review – Armenia*, 2000. Available at https://www.unece.org/fileadmin/DAM/env/epr/epr_studies/armenia.pdf
- xxiii. Georgi Arzumanyan, *Municipal Solid Waste Management in Armenia: Current Trends and Steps Forward*, 2004. Available at <http://lup.lub.lu.se/luur/download?func=downloadFile&recordId=1329229&fileId=1329230>
- xxiv. Patricia Butler, *Composition of Solid Waste in the Berd Municipal Dump in Tavush Marz, Armenia*, 2007. Available at <https://files.peacecorps.gov/multimedia/pdf/learn/whyvol/masters/theses/Forestry/Butlerp.pdf>
- xxv. FICHTNER, *Advisory Study on the Municipal Solid Waste Management in Yerevan*, 2008. Available at http://s3.amazonaws.com/zanran_storage/www.mineconomy.am/ContentPages/17266642.pdf
- xxvi. Bundesumweltministerium, *Recycling of Household Waste in Armenia: Personnel training, data collection including waste analyses, recommendations for waste management actions*, 2010. Available at <https://www.umweltbundesamt.de/sites/default/files/medien/beratungshilfe/long/58-1-A-EN.pdf>

- xxvii. COWI A/S, RA MTAI, *Kotayk Solid Waste Management - Environmental and Social Due Diligence*, 2010. Available at <http://www.mtad.am/files/docs/923.pdf>
- xxviii. Enviroplan S.A, *Qualitative Analysis of Municipal Solid Waste in Armenia, Croatia, Cyprus, F.Y.R.O.M. and Ukraine – Methodology and Results*, 2015. Available at <http://www.enviroplan.gr/public/uploads/bbvkofllzf584a78d644d84.pdf>
- xxix. Yerevan Municipality, EIB, Enviroplan S.A, *Waste Diversion Concept Note (Yerevan Solid Waste Assignment)*, 2016.
- xxx. Bolagen, *Waste Quantity and Composition Study*, MTAI, AUA Acopian Center for the Environment, 2019. Available at <https://wqcs-ace.aua.am>
- xxxi. EU. *DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on waste and repealing certain Directives*. Available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32008L0098>
- xxxii. EU. *Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste*. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.1999.182.01.0001.01.ENG&toc=OJ:L:1999:182:TOC
- xxxiii. EU, Armenia. *Comprehensive and enhanced Partnership Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and the Republic of Armenia*. Available at [https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1584785265847&uri=CELEX:22018A0126\(01\)](https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1584785265847&uri=CELEX:22018A0126(01))