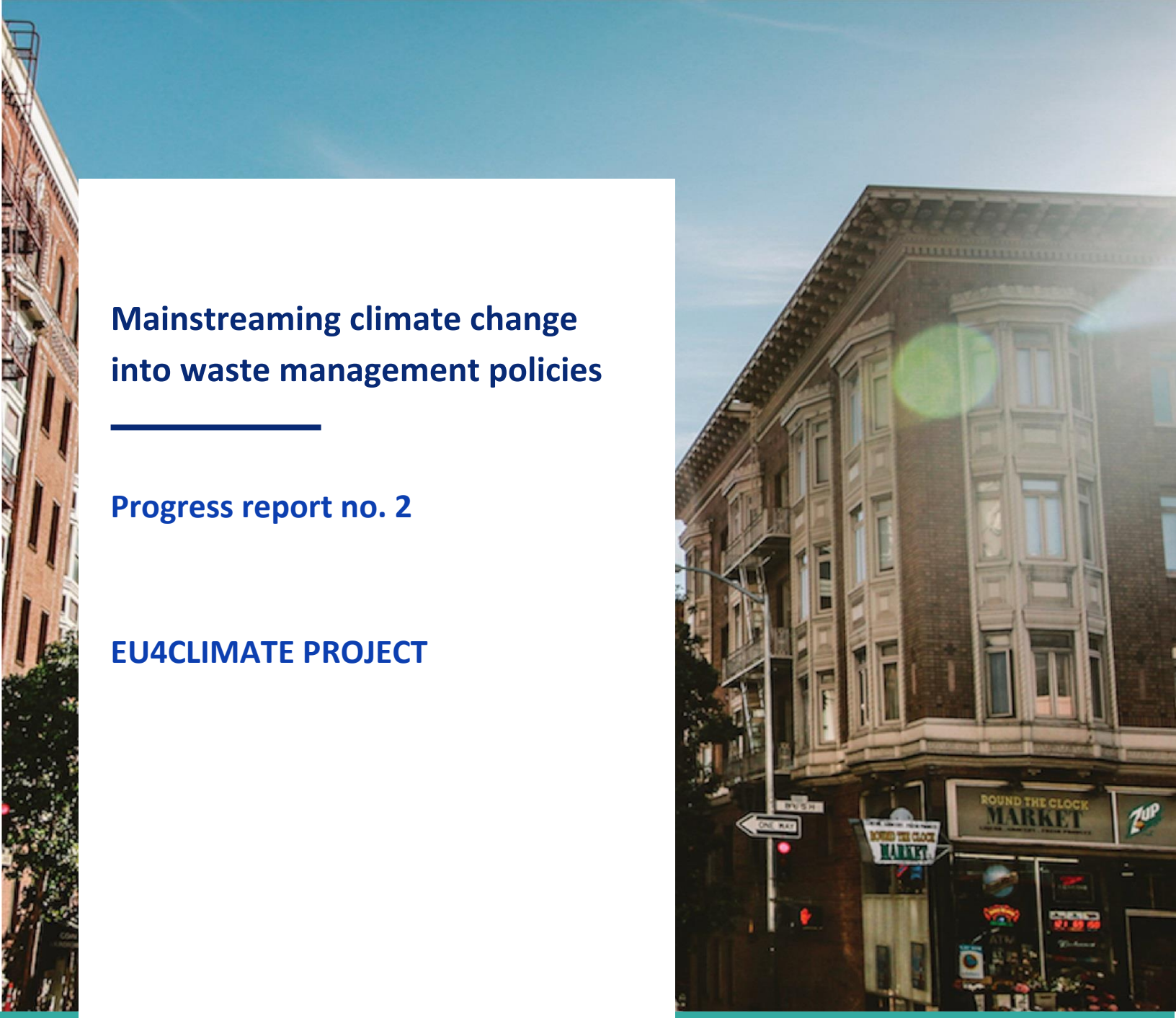

Mainstreaming climate change into waste management policies

Progress report no. 2

EU4CLIMATE PROJECT

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1. Mitigation of GHG emissions from landfills

Landfills, considered to be the last resort in the waste hierarchy, release methane, a very powerful greenhouse gas, that is associated with climate change. When waste is first disposed of in a landfill, it goes through the stage of aerobic (in the presence of oxygen) decomposition, when small amounts of methane are generated. Then, usually in less than a year, anaerobic conditions set in and methane-producing bacteria begin to decompose waste and generate methane.

Methane emissions from landfills are an opportunity to capture and use a significant energy resource. The quantity of greenhouse gas emissions can be reduced by applying construction standards and by closing the landfills.

Disposal in a landfill is most frequently used for household waste treatment in Moldova, often being a significant source of air, soil and underground water pollution. In this context, sanitation of human establishments and urban waste management, is an important objective of the central and local government. The data on the number and area of the landfills is uncertain, as there are no track keeping forms. Information sources share that around 1,224 ha are used by the so-called "waste dump sites", including in the rural areas of the country (IMP, 2018)[1]. There are currently 1,139 landfills in operation, and their largest majority do not meet the environmental requirements regarding their construction and operation.

a. Standards of construction and closure of landfills

Normative act	Noncompliance
Law No. 209/29.07.2016 on waste	Art. 16 indicates references to landfills construction standards, which should be regulated by a separate GD, but which are being drafted (Regulation on waste disposal), or haven't been yet drafted (Standards for the construction of landfills and the National list of waste accepted for disposal) - Despite the fact that art. 68 of the law provides for a period of 12 months from the publication, during which the Government should draft the regulatory framework related to the Law on

1 http://ipm.gov.md/sites/default/files/2019-07/ANUAR%20-%202018.pdf

	waste, there regulations had not been drafted yet, resulting in a legal gap, which allows for an inappropriate waste management, as well as a delay in closing down noncompliant landfills

Recommendations:

- Art. 16 - para. 2 and para. 5, letter e, which makes reference to the Regulation on waste disposal, do not apply as there is no secondary legislation, which is yet being drafted. The provisions are good, in principle, but the Regulation needs to be approved to take effect.
- It is recommended that government decisions be drawn up and adopted to determine how the provisions of the waste law will be effectively implemented and to determine the implementation of standards and regulations in the field of waste disposal. For consistency between the waste legislation of Moldova and climate change mitigation good practices, it is necessary to approve: *the Regulation on waste disposal, Construction standards on waste disposal* and the *National list of accepted waste for each class of landfill.*
- Art. 16 para. 3 does not refer to a specific normative act which would regulate the design, construction and operation. The article neither regulates the closure of the landfills. It is recommended to move away from non-compliant landfills (waste dumps) to compliant ones. It is important that the *Construction standards on waste disposal* also provide for measures to close and mitigate GHG emissions, which result from non-compliant landfills, as well as to seal the landfill, collect biogas and conduct post-closure monitoring.
- The recommendation to amend para. 3 reads the following: (3) *Design, construction and closure of landfills, as well as the operation of landfills enginering systems, shall be conducted in line with the construction standards, environmental permissive acts and the Construction standards on waste disposal, approved by the Government.*
- The construction standards on waste disposal are drafted on the basis of the provisions of the Law 209, art. 16, para. 3 on waste and the Waste disposal regulation, art. 14, Annex 1, art. 6, letter b, point vi. This normative act needs to provide for general requirements on the design and construction of a landfill and on the existence of biogas collection and recovery system, an important element for GHG. An example of a technical standard and its content is the "Technical standard of 2004 on waste disposal" (Annex 1) of Romania, issued by the Ministry of Environment and Water Management, drafted on the basis of the provisions of Government Decision no. 162/2002 on waste disposal, which sets out standards applicable in the area of waste disposal (Annex 2).
- Art. 14 of the Waste disposal regulation sets out the authority which approves the Standards, but it is necessary to establish the authority responsible for drafting the Standard and the deadline for drafting it.
- It is recommended that art. 14 of the Waste disposal regulation defines the scope of the Standard. Below is a suggestion of completing the article with a new paragraph: "The

provisions of the technical standards apply to inert, non-dangerous and dangerous landfills at all stages of design, construction, operation, closure and post-closure monitoring of a landfill".

b. Waste disposal regime

The regulation of the waste disposal regime can reduce or eliminate the amount of waste, which has potential of releasing greenhouse gases. Thus, the elimination of the acceptance of biodegradable waste for disposal in a landfill and its recovery by other means, would have the effect of cutting the GHG emissions.

Normative act	Noncompliance
Law No. 209/29.07.2016 on waste	Art. 16 is not sufficiently detailed with regard to accepted waste regimes

Recommendations:

- Art. 16 para. 5, letter e on waste accepted for disposal refers only to the Disposal regulation. The recommendation is that it also included the National List of waste accepted for disposal in order to establish the legal obligation to develop and approve this normative act.
- The recommendation is that art. 16 para. 5, of the Law no. 209/2016 on waste is completed with "f) any other type of waste that is not included in the National List of waste accepted for each class of landfill". The classes of landfills are specified in the Law no. 209/2016 in art.16 para.4 and in the draft Regulation on waste disposal in art. 6.
- It is recommended that the National List of accepted waste for each class of landfill be drawn up as a separate document from the Construction standards on waste disposal. An example of the National list of waste accepted for disposal is that of Romania, from the annex *to the Order no. 95/2005 on setting acceptance criteria and preliminary procedures for accepting waste for disposal and the national list of waste accepted for each class of landfill* (Annex 3). Order no. 95/2005 of Romania transposes the Council Decision 2003/33/EC, establishing criteria and procedures for accepting waste at landfills, pursuant to art. 16 and annex II to the Directive 1999/31/EC, published in the Official Journal of the European Communities (OJEC) no. L11 of 16 January 2003. In the Moldovan legislation there is a List of waste approved by GD no. 99/2019, but this list is a classifier of waste and makes no reference to types of waste accepted for each class of landfill.
- The criteria for accepting waste at a certain class of landfills must in particular take into account:
    1. environment protection factors, especially underground and surface water;
    2. landfills sealing systems, leachate collection and treatment systems, landfill gas collection and evacuation systems;
    3. ensuring normal conduct of stabilization processes of waste in the landfill;

4. human health protection.

- Accepting waste at a certain class of landfill is based on:
    1. list of accepted waste, defined by nature and origin;
    2. characteristics of waste determined by standardized analysis methods, except for household waste.
- The criteria of accepting waste at a certain class of landfill, based on the characteristics of the waste, shall refer to the following:
    1. physical-chemical composition;
    2. organic matter content;
    3. biodegradability of organic compounds in waste;
    4. concentration of potentially hazardous/toxic compounds in relation to the above criteria;
    5. predicted or tested leachability of potentially hazardous/toxic compounds in relation to the above criteria;
    6. ecotoxicological properties of the waste and the resulting leachate.
- To achieve the objectives of reducing the quantities of disposed biodegradable waste, the disposal of unstabilised sewage sludge on non-hazardous landfills will no longer be allowed in the future.
- There are cases when disposal of sludge can be accepted at landfills, namely:
    1. where the degree of contamination of the sludge does not permit its use in agriculture, forestry or for spreading in the field, or where local conditions of the setting and topography involve costs beyond an acceptable threshold;
    2. where there are no incineration or co-incineration plants in the area where the sludge is generated, that can take it over;

2. Mitigating GHG emissions by treating biodegradable waste

Biodegradable waste, sent to landfills, produces methane when the organic matter decomposes anaerobically. Despite the fact that this greenhouse gas can be recovered and used to generate energy, much of it escapes into the atmosphere, where it has a strong effect on climate change. Reducing the amount of waste that will go to landfill is, therefore, an important objective of EU waste policies.

Normative act	Noncompliance

Law No. 209/29.07.2016 on waste	The law does not define targets to reduce the amount of biodegradable waste in landfills
	The provisions of Art. 56 - separate collection of biodegradable waste for composting - are vague
National Waste Management Strategy	Treatment of accumulated waste oils by incineration is not recommended to mitigate GHG emissions

Recommendations:

- It is recommended to amend article 56 of the Law no. 209 to introduce targets to reduce the amount of biodegradable waste that is disposed of in a landfill. Example targets, pursuant to the model of the European Commission from the Directive on waste disposal, taken over by Romania too:
    1. reduce the amount of disposed of biodegradable waste to 75% of the total amount, expressed in gravimetric terms, produced in the year ....., within a maximum of 5 years from the date .....
    2. reduce the amount of disposed of biodegradable waste to 50% of the total amount, expressed in gravimetric terms, produced in the year ....., within a maximum of 8 years from the date .....
    3. reduce the amount of disposed of biodegradable waste to 35% of the total amount, expressed in gravimetric terms, produced in the year ....., within a maximum of 15 years from the date .....
- It is recommended that the Waste law no. 209, art. 56, para.1, letter b, to be completed with the type of waste treatment. A suggestion of completion would be: " *b) treating bio-waste in a way that would assure a high level of environmental protection, by composting (aerobic degradation) - producing usable compost, by anaerobic degradation producing usable gas, or by mechanical biological treatment (aerobic degradation) - producing stabilized waste, so that it leads to achieving the targets of reducing the disposal of untreated biodegradable waste, set by the Government*."
- In the Waste law no. 209, art. 2 para.2, which defines biological waste, it is recommended to introduce the sludge resulting from wastewater treatment, the biodegradable component of the street waste and biodegradable waste from marketplaces. A suggested addition may be "(2) biological waste – biodegradable waste from gardens and parks, food waste or waste from private households' kitchens, restaurants, catering firms or retail stores and which is compatible with waste from food processing companies, *biodegradable component from street waste, biodegradable waste from marketplaces, sludge from wastewater treatment*;". Depending on the content of hazardous substances, the sludge resulting from wastewater treatment can be sometimes classified as hazardous waste. In this case the provisions of the Law no. 209/2016, art. 56, para.1, letter b) and para. 3 shall apply.
- Article 8 of the Waste disposal regulation is recommended to be amended as follows: *"The local or regional public administration authority, as appropriate, shall draft, as part of their*

waste management plan, measures by means of which the objectives set out by the law for reducing the disposal of biological waste shall be achieved".

- As for the recovery of waste oils, it is recommended that the Chapter on Strategic general and specific principles and objectives, section 2, para. 7, letter c of the the Waste Management Strategy be replaced by: *"c) encouraging the use of waste oils in an environmentally rational manner, with priority given to regeneration. Should the technical and economic conditions make regeneration non-viable, the recovery of waste oils shall be done by combustion (the use of waste oils as fuel, with appropriate generated heat recovery) or anaerobic digestion with biogas collection. Should the above mentioned not apply, incineration shall be the last resort for the disposal".* An example of such regulation is found in Romanian law in *the Decision no. 235/2007 on the management of waste oils, art. 11* (Annex 4).

3. Mitigation of GHG emissions through recycling

Recycling can help reduce greenhouse gas emissions and other emissions. When recycled materials replace new materials, the need for extraction or production of new materials decreases. Recycling ensures the decrease of the amount of waste to be disposed of or incinerated, methods with a significant impact on climate change.

Normative act	Noncompliance
Law No. 209/29.07.2016 on waste	The targets set for recycling are not ambitious enough. For packaging, according to art. 14. Reuse and recycling, the recycling target for paper, glass, metals and plastics is set at a minimum of 30% of the total mass
Packaging management regulation	The packaging management regulation is still being drafted. It provides for the recycling of at least 45% of packaging by 2027
National Waste Management Strategy	Inconsistent in waste legislation, particularly as regards recycling targets. Annex no. 249 to the Waste management strategy in the Republic of Moldova for 2013-2027, Section II lays down a target for reuse and recovery of packaging of 20% (without specifying the base level) by 2027, while the packaging regulation lays down a target of 45%.

Decision no. 212/2018 - Regulation on electrical and electronic equipments	Decision no. 212.2018 on WEEE management is being currently implemented.

At present, there is an inconsistency in the waste legislation, in particular as regards the recycling targets. This can be seen both in the case of packaging waste management legislation and in the case of electrical and electronic equipment. In Moldovan legislation there is a draft Government Decision on approving the Packaging and packaging waste regulation (single number 420/MADRM/2019), but which is still at the stage of review/expertisation.

By implementing the Extended producer responsibility (EPR) scheme, one ensures the fact that the producer bears responsibility for managing the waste stage of a product. This scheme has been applied in Romania since 2002 via Responsibility transfer organizations. In general, in the countries where it has been applied, this scheme has proven to be very effective in increasing the recycling/recovery rate of packaging waste. According to a JASPERS study conducted in 2016 for Romania, the proper application of EPR depends on 8 principles:

- Clear definition of the EPR and the objectives related to EPR schemes in the domestic legislation.
- Clear definition of responsibility and roles specific to each participant in the scheme (consumers, waste management authorities or companies),
- Full coverage of net costs: the scheme should cover at least the total net costs for separate collection/treatment of waste,
- Correct cost determination at the end of the useful life: fees paid by producers under a scheme must correctly reflect the costs of managing the products until the end of their useful life,
- Fair competition: ensure a clear and stable framework that would ensure fair competition with equal rules for all. These may include penalties
- Transparency on recycling/collection rates/costs (fees paid by producers, collection costs, transportation, sorting, etc.)
- Reporting harmonization: main definitions and reporting procedures should be harmonized at national and European level,
- Existence of means to monitor and implement the scheme.

Recommendations:

- It is recommended to introduce a separate article in the Law no. 209/2016, which would deal with the Extended producer responsibility scheme. This chapter could cover aspects related to the application of the scheme, envisaged measures, powers of the central public authority on environmental protection and organizations implementing the extended responsibility obligations. An example of such regulation is found in the Law no. 211/2011 on waste regime in Romania, in Chapter 8, art. 12 (Annex 5).

- According to the MARDE in the Republic of Moldova, the process of collecting proposals for drafting a new Action Plan on Waste Management Strategy had been started at the moment. It is recommended to detail the Action Plan on the implementation of the Waste Management Strategy in the Republic of Moldova for 2013-2027 and introduce the following sections:
  - **Information on the general framework** (planning, waste management issues, European and domestic legislation, National Waste Policy)
  - **Current situation** (data sources and methodology applied, data/type of waste included in the analysis: municipal, food, packaging, WEEE, batteries and accumulators, end-of-life vehicles, used tyres, used oils, etc.)
  - **Waste management planning** (objectives and targets, analysis of waste management alternatives and chosen alternative, governance measures, Action Plan)
  - **Waste policy instruments** (current situation on waste policy instruments – economic, regulatory, administrative, information-measures to improve the effectiveness of existing instruments, description of new waste policy instruments)
  - **National Waste Prevention Programme (NWPP)** (current situation, priorities and strategic directions, waste prevention measures, Action Plan on waste prevention, verification of the implementation of measures)
  - **Monitoring indicators** (general provisions on the monitoring of the NWPP, monitoring indicators for governance measures, monitoring indicators for the NWPP Action Plan, monitoring indicators for economic instruments, monitoring indicators for the NWPP).
- An example that could be followed is the 2017 National Waste Management Plan (NWMP) of Romania (Annex 6).
- It is recommended that the Action Plan includes a section containing the applicable penalties for non-compliance with the legal obligations for certain waste streams. In the 2017 NWMP for Romania these issues are regulated in Chapter II, Section 2, Subsection 1 and provide for penalties for non-compliance with legislative obligations for certain waste streams with extended producer responsibility (EPR): packaging waste, WEEE, waste batteries and portable batteries. For these special streams, operators pay a contribution (penalty) to the administration of the Environment Fund (AEF) for the difference between the quantities declared to be placed on the market and the quantities found by the AEF; penalties for ATU-s in the event of failure to meet the target for reducing the amount of disposed waste; fines for the violations;
- The Action Plan could also include a description of the applicability and functionality of other applicable economic instruments such as: **deposit-return system, WEEE management fee, Rabla programmes, etc.** They are defined below by applicable waste type.
- It is recommended to introduce a mechanism that, in addition to financial support for the implementation of projects and programmes for environmental protection, could also have the task of collecting contributions (penalties) in case of non-compliance with recycling targets. In Romania, for special waste streams such as packaging waste, WEEE, waste batteries and accumulators, waste oils and used tires, operators report monthly to the Administration of the Environment Fund (AEF) the data related to these streams. AEF manages separate databases for these waste streams.

- It is recommended to develop and implement regulations for the rest of the specific waste streams falling under the extended producer responsibility (EPR) systems, i.e. batteries and accumulators - for this stream the existing Regulation should be implemented, tyres, end-of-life vehicles and waste oil.
- **Management of packaging waste** The revision of the following is recommended: *art. 14 of the Law no. 209/2016*, *Section 6. Forecast in the field of waste generation from the National Waste Management Strategy* and *Chapter IV Recovery and recycling of the draft Decision for approving the regulation on packaging and packaging waste,* in order to align the recycling objectives/targets in these two normative acts.
- The targets for the recovery of packaging waste, set out in the draft Regulation on packaging management, are recommended to be changed to more ambitious targets and detailed into stages (periods/years). For example, Romania in Annex 5 to the Law no. 249/2015 on the management of packaging and packaging waste (Annex 7) sets the minimum values of the recovery objectives, respectively recycling of different types of packaging waste, for the pre/post 2025 period:

Objective	For 2019-2022 (%)	Year 2023 (%)	Year 2024 (%)	From 2025 (%)
Overall recovery objective	60	65	65	70
Overall recycling objective	55	60	60	65
Paper-cardboard recycling target	60	65	70	75
Plastics (PET) recycling target	22.5	35	40	50
Glass recycling target	60	65	65	70
Metal recycling target	50	60	65	70
Aluminum recycling target	20	30	40	50
Wood recycling target	15	20	20	25

- Establish a mechanism for implementing the **deposit-return system**, as provided for in the draft Government Decision approving the Regulation on packaging and packaging waste. In Romania, this is provided for in the Emergency Order no. 38/2016, amending and completing the Law no. 249/2015 on the management of packaging and packaging waste. This system is a way of implementing the EPR for certain packaging waste (e.g. glass, plastic or metal - in general containers from drinks). When purchasing a packaged product, the buyer pays the seller an amount of money that is refunded to him when returning the package. One condition is that the packaging is in an appropriate shape to be reused.
  As an example, in Romania this system is applied according to art. 10 of the Law no. 249/2015 (Annex 7) for non-usable primary packaging of glass, plastic or metal, with volumes between 0,1 l and 3 l including, used for beer, beer mixtures, mixtures of alcoholic beverages, cider, other fermented beverages, juices, nectars, soft drinks, mineral waters and drinking waters of any kind. This guarantee is set at the value of 0.5 lei / pack.
  Also in the Law no. 249/2015 it is established that until January 1, 2021, based on the assessment of economic, social and environmental efficiency, as well as the impact on small and medium-sized enterprises, by a Government Decision, a guarantee-return system shall be

established to apply for non-reusable primary packaging. The elements of the deposit-return system covered by GD must cover at least the following elements:

- how the packages, object of the deposit-return system, circulate;
- the definition of the components of the collection system;
- the definition of how the deposit-guarantee system operates;
- the mechanism of deposit reimbursement;
- value of the deposit;
- sistem administrator;
- marking of packages, indicating their participation in the deposit-return system;
- monitoring and control of the deposit-return system

The system shall apply gradually, starting with glass packaging. Traders are obliged to mark or indicate on the immediate packaging/product label the phrase "reusable packaging".
The deposit will be returned based on the tax receipt. According to the methodological law enforcement norms of the Law no. 227/2015 on the Romanian tax code, the amount of the cash deposit collected for packaging is shown separately on the tax receipts, without tax. The return of the monetary deposits is not reflected in tax documents.

Management of Waste of Electrical and Electronic Equipment (WEEE)

It is recommended to align the objectives defined in Section 6. Forecast in the field of waste generation from the National Waste Management Strategy, to those set out in Annex 5 to GD no. 212/2018.

- It is also recommended to set more ambitious collection targets than those set out in Annex no. 5 of the Decision no. GD 212/2018. In Romania, as foreseen in the Republic of Moldova too, WEEE collection is carried out either individually or by transfer of responsibility to authorized economic operators. The target for collecting WEEE in Romania by 2020 was 45% and from 2021 it will increase to 65%. The management of WEEE is addressed in the National Waste Management Plan and the Emergency Order no. 5/2015 on Waste Electrical and electronic equipment.
- It is recommended to introduce a separate chapter in the GD no. 212/2018, addressing penalties for infringement. For example, in Romania, they are addressed in art.43, Chapter 20**,** Sanctions of the EO no. 5/2015 (Annex 8).
  Although there have been discussions about the implementation of the **WEEE management fee** (green tax/green stamp/eco tax), it is recommended to introduce this financial instrument because in addition to financing the collection and recycling process, this fee also ensures the achievement of the objectives/targets set out by European and domestic legislation. This instrument represents consumer contribution to the costs of collecting, treating and disposing of WEEE. In Romania, this green tax is subject to the regulations of art. 28-32 of the EO no. 5/2015 (Annex 8). The amount of the tax is included in the purchase price of the electronic or home appliance product and is shown separately on the invoice, and it bears VAT. It applies to household appliances of small and large sizes, IT equipment, office equipment, consumer small-sized and large-sized equipment, toys and sporting goods with electronic components, electrical and electronic tools, industrial measuring and control devices, vending machines, etc.). Producers are obliged to invest the sums collected from users in WEEE recycling

processes. The green stamp applies to each newly purchased electrical and electronic equipment and has a fixed price level per product category, determined independently of the brand, weight, volume or selling price and which depends on the recycling capacity of the respective equipment.

- It is recommended to introduce funding programs such as **Rabla for home appliances. In** Romania this is a program financed by the Ministry of Environment through AEF and regulated by *Order no. 1172/2018 for the approval of the Financing guidelines for the National program for replacing used electrical and electronic equipment with more energy efficient ones* (Annex 9). This instrument could significantly contribute to reducing the disposal of WEEE. The programme finances the purchase of washing machines, dishwashers, air conditioners, refrigerators/combined refrigerators/coolers/ freezers and energy-efficient TV sets. Vouchers are awarded by AEF for the purchase of household appliances in the category of washing machines, dishwashers, refrigerators, combined refrigerators, coolers, air conditioners and TV sets and have values between 200 and 500 lei, depending on the type of appliance purchased.

  Steps to follow:

  1. **Access the electronic app** on the AEF website and fill in the data
  2. **Present in stores and purchase** the desired equipment, based on the received voucher - the amount of the voucher is subtracted from the final value of the invoice
  3. **The old equipment** is handed over at the time when the new one is received.

4. Setting the tariff

The opportunities for improving the tariff system, establishing costs and financial mechanisms are multiple in Moldova, as shown by the analysis of convergences and inconsistencies. Tariffs and their differentiation can be efficiently used, so as to encourage the reduction of disposal, in particular of streams that lead to methane generation and/or are recyclable and thus can replace raw materials, whose extraction and processing consume more energy than recycling. These results are closely linked to GHG reduction in the waste sector.

Normative act	Noncompliance
Law No. 209/29.07.2016 on waste	There is no tariff differentiation for different types of waste, so there are no defined tools to discourage the disposal of biodegradable waste
	The law does not identify the amount and method of setting the tariff

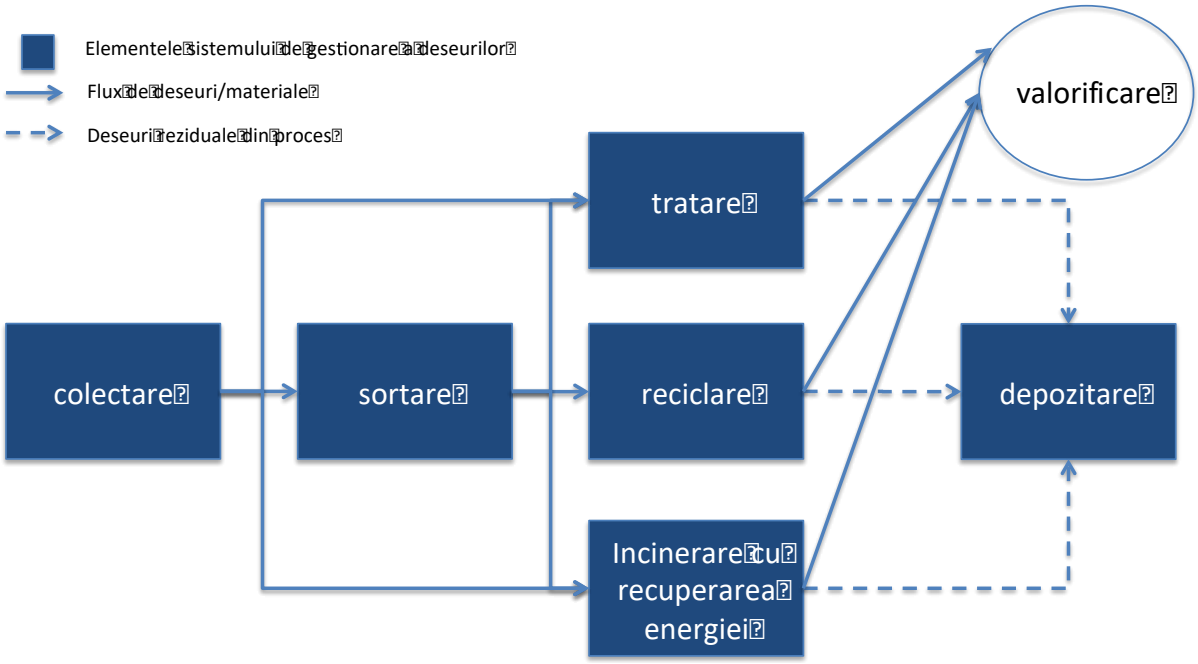
Regulation on waste disposal - draft 2016	Differentiation of tariffs by type of waste is a possibility, but does not specify the purpose of the instrument and does not link them to GHG reduction
	The amount and methodology of tariff calculation is not established, the LPA is asked to verify whether the price set by the operator is sufficient to cover the expenses, but without a clear standard to be observed, this verification is difficult
National Waste Management Strategy	Provides for the development of regulations on setting fees for waste collection and disposal, approved by a Government Devision, but the regulation had not been approved yet.

Recommendations:

- It is necessary to define how the tariffs would be calculated and how much would they be. According to MARDE in Moldova, the methodology for tariff calculation is being currently developed and it is estimated that by the end of 2020 it will be approved by the Government.
- It is necessary to introduce economic instruments to achieve the desired result, namely waste prevention, separation at source and re-use/recycling, reduction of landfills and encouragement of waste treatment technologies. This differentiation can be introduced anywhere in the stream of materials and/or waste where there is a monetary transaction.
- It is necessary to remove the payment for the disposal of production generated waste, it refering to the disposal of waste within the industrial production area, and to replace these provisions with provisions for an adequate treatment of waste, in the environmental authorization and on compliance with the system of **Extended Producer Responsibility (EPR)** in Moldova, in order to achieve the recycling targets, as appropriate. Adequate treatment will mean either the collection of waste by a commercial agent authorised to treat waste or investments in the manufacturer's perimeter in appropriate treatment solutions, complying with the BREF documents of the industry concerned
- It is necessary to develop a regulation on setting waste management tariffs/fees, which would establish the method of calculation in a transparent manner, through a fact sheet, containing the costs of sanitation services implementation.
- Although the practices in Romania are not perfect, they can be taken as a model for the method of calculation and the way of setting tariffs. We shall point out in the description where practices can be further improved on the basis of other European countries' experiences.

Calculation method for setting tariffs

Sanitation services may include one or more elements of the following activities: mixed or source separation waste collection, waste sorting, recycling, treatment, incineration with energy recovery and storage.



In Romania, the regulated sanitation services include the following elements:

a) pre-collection, collection and transportation of municipal waste, including hazardous toxic waste from domestic waste, except for those with special regime;
b) sorting of municipal waste;
c) organization of processing and neutralization of waste and its material and energy recovery;
d) controlled disposal of municipal waste;
e) establishment and management of landfills;
f) sweeping, washing, spraying and maintenance of public roads;
g) removing and transporting snow from public roads and maintenance of safe road use during ice and frost;
h) collection of animal dead bodies from public areas and their hand over to the rendering units;
i) collection, transportation, storage and recovery of bulky waste from the population, public institutions and economic entities, not similar to domestic (furniture, electrical and electronic waste equipment, etc.);
j) collection, transportation and neutralisation of animal waste from domestic households;
k) collection, transportation and storage of waste resulting from construction and demolition activities;
l) disinfection, pest and rodent control.

Ideally, the expenses are set for each individual item to understand the cost per ton per activity. This process is useful to understand the economic efficiency of each individual element of the service. In

practice it often happens that the operator calculates a cost per tonne on all the services it carries out and aims at economic efficiency in total through the established tariff.

This practice leaves less transparency to the technical department of the local public authority to make an economic management of the activities. Therefore, it can happen that street cleaning or snow removal, services usually contracted jointly with sanitation and quite well paid by the city hall, contribute to the financial viability of the package of services that includes collection. Often, waste collection is less well paid, or the rate of collection of fees may be low if it is left to the operator's responsibility, which does not have the necessary levers to apply penalties and to compel service users to pay.

The tariff for each individual item and activity must cover at least the following cost items:

Investment costs, broken down by year (depreciation) Cost of financing the investment (credit reimbursement) • including costs for the replacement of fixed assets required to be implemented on a regular basis • Costs related to the implementation of the investment plan to improve services according to the legislation and the contract between the authority and the operator • shall not be calculated in the case of a non-refundable financing investment
Operating costs per year • human resources • fuel • utilities • maintenance

In order to arrive at the so-called unit tariff, a profit margin for the operator must also be taken into account if the operator is not owned by the city hall, and all proceeds from the exploitation of the materials must be deducted. In the end, a tariff per tonne or per person is obtained, which is the starting point for setting the tariff policy.

In Romania, Order no. 109 of 2007 of the National Agency for communal services (ANRSC) establishes the calculation method for setting tariffs.

- The Order for the calculation methodology for setting and amending tariffs contains an annex for the presentation of expenses, the so-called Fact sheet. The structure by expenditure elements in the fact sheet is indicative and can be adapted accordingly, for each activity specific to the sanitation service, taking into account only expenses related to that activity.
- The fact sheet, containing detailed information on investment and operating expenses, must always accompany the tender bids of operators wishing to provide sanitation services or enter into the concession/ PPP contract, or the requests to change tariffs
- The fact sheets shall also be submitted whenever the operator of the service requests the modification of the tariff. Tariff changes can be initiated either for economic reasons (such as

wage increases, minimum wage changes, inflation, etc.) or for technical reasons (new environmental taxes, recycling targets set by sectoral legislation, etc.)

- Annex 2 to Order no. 109 - budget lines for revenue and expenditure according to the fact sheet (the Order with Annexes can be found in Annex 10 of this document). Fact sheet 1.7. presents the amortization of investment expenses with means of transport and machinery. Budget line III Development quota refers to the reinvestment of part of the profit for the improvement of equipment and infrastructure. Credit reimbursements will be included in the Financial expenditure budget line. The model is indicative and some budget lines can be included and other non-relevant ones can be removed, it is important that those included are in line with reality and ensure transparency.

No.	Specification
	FACT SHEET
1	Material expenditure, of which:
1.1	Fuel and lubricants
1.2	Technological electricity
1.3	Spare parts, machinery
1.4	Raw materials and consumables
1.5	Work equipment and labor protection
1.6	Repair and maintenance
1.7	Depreciation of machinery and means of transport
1.8	Royalty
1.9	Other services provided by third parties
1.10	Other material expenditure
1.11	Environmental protection expenditure
1.12	Machinery operating leasing and operating rentals
1.13	Operating rentals, other than leasing
1.14	Recovery of accounting loss
2	Manpower expenditure:
2.1	wages
2.2	Social contributions
2.3	Unemployment fund
2.4	Healthcare insurance contributions
2.5	occupational accidents and diseases fund
2.6	share of contributions for leave and allowances
2.7	salary claims guarantee fund
2.8	other manpower expenditure (including meal vouchers)
3	Licence fees
4	Expenditure on the transport of historical waste
5	Ramp disposal expenses
6	Other expenditure (awareness)
A	Operating expenses
B	ANRSC fees and other contributions
C	Financial expenditure

I	Total expenditure (A+B +C)
II	Profit
III	Development quota
IV	Revenue from sanitation
V	Scheduled quantity (persons or tonnes)
VI	Tarif, excluding VAT (RON/ pers / month or RON / tonne)
VII	VAT
VIII	Tarif, including VAT

In the annexes we present Fact sheets of different operators for different elements of services:

- Annex 11 - Fact sheet Bistrita, operator of the Integrated Waste Management System that includes mixed collection and selective collection in Bistrita County, operation of transfer stations. Disposal expenses appear as an expense for this operator and will be an income for the operator of the landfill, or so-called Integrated Waste Management Center (CMID).

Anexa 1 – Fise de fundamentare

Tarif 1- Persoane fizice inclusiv asociatii de locatari/ proprietari –Zona URBAN
Precolectare, colectare, transport si transfer al deseurilor municipale, inclusiv a deseurilor toxice periculoase din deseurile menajere, cu exceptia celor cu regim special

	Tarif 1					
	PF DM URBAN MODIFICAT		PF DM URBAN IN VIGOARE		Δ	
	RON / an	RON / pers/an	RON / an	RON / pers/an	RON / an	RON / pers/an
1. Cheltuieli materiale, din care:	2.931.277	37,35	2.931.277	29,03	0	8,32
1.1 Combustibili	854.834	10,89	854.834	8,47	0	2,43
1.2: Energie electrica tehnologica	47.253	0,60	47.253	0,47	0	0,13
1.3. Piese de schimb utilaje (fara reparatii incluse utilaje)	127.677	1,63	127.677	1,26	0	0,36
1.4 Materii prime si materiale consumabile, lubrifianti	17.001	0,22	17.001	0,17	0	0,05
1.5 Echipament de lucru si protectia muncii	4.093	0,05	4.093	0,04	0	0,01
1.6 Reparatii	130.693	1,67	130.693	1,29	0	0,37
1.7 Amortizarea utilajelor si mijloacelor de transport	32.090	0,41	32.090	0,32	0	0,09
1.8. Redeventa	307.420	3,92	307.420	3,04	0	0,87
1.9 Alte servicii executate de terti (paza)	270.140	3,44	270.140	2,68	0	0,77
1.10 Cheltuieli cu protectia mediului	4.908	0,06	4.908	0,05	0	0,01
1.11 Alte cheltuieli si chirii	129.142	1,65	129.142	1,28	0	0,37
1.12. Leasing operational si chirii operatioanale utilaje	757.088	9,65	757.088	7,50	0	2,15
1.13. Chirii operationale altele decat leasing	248.940	3,17	248.940	2,47	0	0,71
1.14 Recuperarea pierderii contabile	0	0,00	0	0,00	0	0,00
2. Cheltuieli cu munca vie:	2.129.463	27,14	2.129.463	21,09	0	6,04
2.1 salarii brute si prime	1.595.130	20,33	1.595.130	15,80	0	4,53
2.2 - CAS 15,80%	252.031	3,21	252.031	2,50	0	0,72
2.3 - fond somaj 0,50%	7.976	0,10	7.976	0,08	0	0,02
2.4 - CASS 5,20%	82.947	1,06	82.947	0,82	0	0,24
2.5 - fond accidente si boli profesionale0, 26%	4.147	0,05	4.147	0,04	0	0,01
2.6 - cota contributii pentru concedii si indemnizatii 0,85%	13.559	0,17	13.559	0,13	0	0,04
2.7 - fond garantare creante salariale 0,25%	3.988	0,05	3.988	0,04	0	0,01
2. 8- alte cheltuieli cu munca vie (incl. tichete de masa)	169.686	2,16	169.686	1,68	0	0,48
3. Taxe si licente masini, asigurari, ITP, etc	84.107	1,07	84.107	0,83	0	0,24
4. Cheltuieli cu transportul deseurilor istorice	28.152	0,36	28.152	0,28	0	0,08
5. Cheltuieli cu depozitarea la CMID	1.287.888	16,41	1.287.888	12,76	0	3,66
6. Alte cheltuieli (constientizare)	95.700	1,22	95.700	0,95	0	0,27
A Cheltuieli de exploatare(1+2+3+4+5+6)	6.556.586	83,55	6.556.586	64,94	0	18,61
B. Taxe ANRSC si alte contributii	90.103	1,15	90.103	0,89	0	0,26
C. Cheltuieli financiare	13.285	0,17	13.285	0,13	0	0,04
I. Cheltuieli totale (A+B+C)	6.659.974	84,87	6.659.974	65,96	0	18,90
II. Profit	5.000	0,06	5.000	0,05	0	0,01
III. Venituri obtinute din activitate de salubrizare	6.664.974	84,93	6.664.974	66,01	0	18,92
IV. Cantitatea programata (persoane, tona)	78.475		100.964		-22.489	
V. Tarif, exclusiv TVA (lei/pers/luna)	7,08		5,50		1,58	
VI. TVA	1,42		1,32		0,10	
VII. Tarif, inclusiv TVA	8,49		6,82		1,67	

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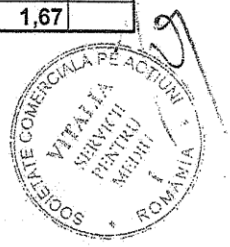


- Another example is the fact sheet from Suceava, which is submitted by the landfill operator and sets the disposal tariff. In this sheet, the closure fund appears as an expense and the tariff is set per tonne. (Annex 12, full text)

FISA DE FUNDAMENTARE A

Tarif preluare deseuri municipale reziduale in vederea depozitarii - (Tarif depozitare)

Specificație		Valoare total anuală (lei/an)	Valori unitare, lei/tonă
1. Cheltuieli materiale, din care:		*3.169.346,88*	*22,97*
Combustibili și lubrefianți		750.136,10	5,44
Energie electrică tehnologică		648.115,21	4,70
Piese de schimb, utilaje		96.080,97	0,70
Materii prima și materiale consumabile		11.879,23	0,09
Echipament de lucru și protecția muncii		38.067,48	0,28
Reparații		82.899,45	0,60
Amortizarea utilajelor și a mijloacelor de transport		59.184,62	0,43
Redevență (4,33%)	4,33%	263.350,92	1,91
Cheltuieli cu protecția mediului *(cheltuieli cu monitorizarea mediului)*		28.080,00	0,20
Alte servicii executate de terți *(ex. Cheltuieli cu instruirea personalului, costuri cu calificarea, verificari metrologice, costuri cu eliminarea deseurilor rezultate din activitatatea proprie care nu sunt asimilate deseurilor menajere, etc.)*		82.702,71	0,60
Cheltuieli cu tratarea levigatului		1.104.480,90	8,00
Alte cheltuieli materiale (a. + b. + c.)		4.369,10	0,03
a. Achiziții calculatoare și tehnica de calcul		*489,10*	0,00
b. alte cheltuieli materiale (garduri și protectii)		3.880,00	0,03
2. Cheltuieli cu munca vie:		*1.292.603,10*	*9,37*
Salarii		1.052.008,72	7,62
CAS 5,2%	15,800%	166.217,38	1,20
Fond somaj 0,5%	0,500%	5.260,04	0,04
CASS 15,8%	5,200%	54.704,45	0,40
Fond accidente si boli profesionale 0,27%	0,270%	2.840,42	0,02
Cotă de contribuții pentru concedii și indemnizații 0,85%	0,650%	8.942,07	0,06
Fond de garantare creante salariale 0,25%	0,250%	2.630,02	0,02
Alte cheltuieli cu munca vie (inclusiv tichete de masă)		-	-
3. Taxe, licențe		*80.599,85*	*0,58*
3.1 Licențe software		*1.551,25*	0,01
3.2 Taxa autorizare ANRSC si Gospodărirea Apelor		*7.290,00*	0,05
3.3 Taxa poluare (polita asigurare)		-	-
3.4 Asigurari		*71.758,09*	*0,52*
4. Cheltuieli cu închiderea utilajelor		-	-
5. Cheltuieli cu depunerea în rampă		*3.720,00*	*0,03*
6. Fond pentru închiderea depozitului de deșeuri și urmărirea acestuia postînchidere		*1.102.760,72*	*7,95*
7. Alte cheltuieli (inclusiv cu gestionarea și eliminarea deșeurilor periculoase și gestionarea deșeurilor voluminoase în cadrul Centrului Public de colectare)		*- 513.400,00*	*- 3,72*
7.1 Alte cheltuieli (cu gestionarea și eliminarea deșeurilor periculoase)		-	-
7.2 Alte venituri (din flux DEEE, voluminoase, periculoase)		*513.400,00*	- 3,72
A. Cheltuieli de exploatare (1+2+3+4+5+6+7)		5.135.630,05	37,22
B. Cheltuieli financiare		87.034,15	0,63
I. Cheltuieli totale (A+B)		5.222.664,20	37,85
II. Profit	0,5%	26.113,32	0,19
III. Cotă de dezvoltare [illegible]	15,95%	833.229,97	6,04
IV. Venituri obținute (I+II+III)		6.082.007,49	44,07
V. Cantitatea programată (tone):		138.000,00	
VI. Tarif, exclusiv TVA (IV:V)		*[illegible]*	
VII. Contributia pentru economia circulara		*[illegible]*	
VIII. Tarif, cu CEC inclus, fara TVA (VI + VII)		*[illegible]*	
IX. TVA (19% x VIII)		23,57	
X. Tarif, inclusiv TVA (VIII+IX)		147,65	

ASOCIEREA: SC FLORCONSTRUCT SRL Suceava, SC FRITEHNIC SRL Suceava si SC RITMIC COM SRL Ilisesti

Popovici Valerian - manager [illegible]

In addition to the practice in Romania, good practice requires that:

- The fact sheets should be completed separately by activity, but at least those for storage and collection, in order to increase the transparency of tariff setting, even if there is a single operator for the entire waste management system.

- The Fact sheets should be filled in including by the municipal operator, whether the Sanitation undertakings, owned by municipalities, or technical services of the municipalities, which operate components or a number of sanitation services, so that budget allocations are made transparently in order to cover expenses, and the housing stock departments could follow the good provision of the sanitation service.

LPAs may impose these practices as requirements via HCL.

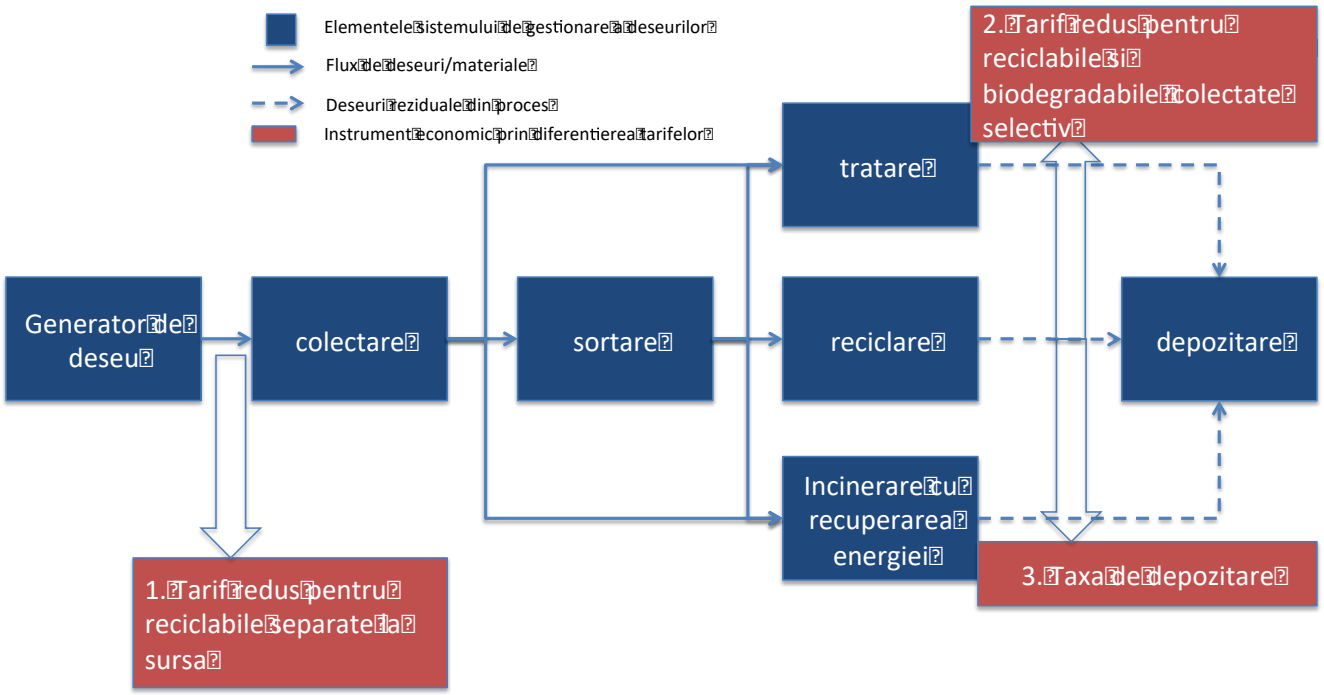
Pricing policy

The fact sheets and the unit tariff reflect the cost related to the persons served and the tonnes managed at each stage. The pricing policy, by which one agrees upon the tariffs approved by decisions of the local council, has also other considerations with regard to the compliance with the polluter pays principle, in particular:

- social acceptability, i.e. the principle of not exceeding 1% of the average income per person in the serviced area,
- the appropriateness of differentiating tariffs to encourage selective collection, and/or
- differentiation of tariffs between different categories of users in order to obtain cross-subsidisation, e.g. between economic and residential users, or richer and poorer residential users.

Economic instruments, differentiation of tariffs

The differentiation of tariffs applies across different elements of waste management, and can be introduced whenever it is a monetary transaction.



1. Reduced tariff for source-separated recyclables

When the waste generator/collection service user hands over the waste to the collection service, it is a transaction, the user pays for the collection service. There is an opportunity here to introduce an economic instrument.

Reduced tariffs for separate recyclables at source, the PAYT system, is being applied in Romania. In Cluj-Napoca, for example, it is regulated by HCL no. 393/2019 (Annex 13). Thus, for unsorted waste, a 25% tariff increase applies to the pre-collection, collection and transport tariffs of sorted municipal waste. The tariff increase for "unsorted waste" aims at encouraging sorting, as well as preventing waste generation. For the management of recyclable household waste (paper, plastic, metal, glass) there is no charge, encouraging sorting at source.

The reduced tariff for a reduced amount of generated waste would be an additional step that can be practiced using newer technologies, such as chips in containers. This type of charging would encourage the prevention of waste generation by reducing the consumption of packaged products, or avoiding over-consumption as a lifestyle.

2. Reduced tariff for recyclable and biodegradable waste, which is selectively collected

When the collection system operator delivers waste at the gate of the landfill is another instance of a monetary transaction, which can be used for introducing economic instruments by differentiating tariffs.

There apply reduced tariffs for selectively collected recyclable waste in Oradea and this resulted in investments into a sorting and composting station in the perimeter of the landfill, which turned into a

Waste Management Center over time, so that the landfill operator could get additional revenue for selectively collected waste by their recovery. At the same time, these tariffs have created the financial motivation for the collection system operator to collect as much selectively as possible in order to get rid of disposal costs. The tariff system for the Waste Management Centre in Oradea, Eco-Bihor, is included in Annex 14. This type of differentiated tariff at the landfill works well if the landfill operator is different from the collection service operator.

Highly toxic or hard-to-treat waste usually has higher rates at landfills, as they may require pre-treatment prior to disposal.

3. Disposal fee

Another economic instrument which can be introduced at the same point of transaction, is the disposal fee. The disposal fee is a cost that reflects the negative environmental impact of the landfill, monetized and included in the disposal price in addition to the disposal tariff. The instrument aims at discouraging disposal in the landfill and encourage alternative treatment solutions or prevention of waste generation.

In Romania this instrument is regulated by Art. 9 letter c) and p) of EO no. 196/2005 on the Environmental Fund (Annex 15), establishing the contribution to the circular economy collected from the owners or, where appropriate, managers of landfills for municipal waste, construction waste and decommissioning intended for disposal in a landfill. The contribution for the circular economy for the aforementioned waste, which are to be disposed of at the landfill for 2019 is 30 lei/tonne and for 2020 it is 80 lei /tonne.

This regulation also sets a contribution of 50 lei/tonne, owed by the administrative-territorial units or, when appropriate, by the municipal administrative-territorial sub-units, when the yearly reduction objective by the percentage set forth in Annex no. 6 of the quantities of waste disposed of at the landfill had not been achieved, the payment being made for the difference between the quantity of the yearly objective and the quantity effectively handed over for recycling and other forms of recovery.

The process of delegating services ensures transparency in tariff setting and gives a clear management role to LPAs.

In Romania, the most sanitation services are carried out by delegation. The Law no. 51/2006 on community services of public utilities (Annex 16) regulates it.

The delegation of the service may be made for one or more sanitation services or different components thereof. A good practice is to delegate separate landfill services and the rest of the services, so that an opportunity is created for the LPAs to introduce clearer targets and financial instruments for reducing waste disposal at landfill, by differentiated tariffs at the landfill.

Services can be delegated by the following:

1. Service delegation Contract,
2. Concession, or

3. Public-Private Partnership.

Regardless of the type of contract, the award shall be made by public tender.

The Terms of reference shall be developed on the basis of a **Background study for the delegation of the service**. The background study has a preset framework content and must include the following elements:

1. Chapter 1 - General aspects

   General aspects
   Delegation subject
   Location
   Current situation
   Stakeholder groups
   Stakeholder needs analysis
   Legal framework

2. Chapter 2 - Operation aspects

   Analysis of operating options
   Monetary quantification of risks

3. Chapter 3 - Technical feasibility

   Waste management areas
   Service users
   Quantities, streams and forecast of waste generation
   Technical infrastructure

4. Chapter 4 - Economic and financial feasibility

   Introduction
   Costs related to the operation of the collection, transfer, transportation system and collection centres
   Assumptions

5. Chapter 5 - Environmental aspects
6. Chapter 6 - Social and institutional aspects
7. Chapter 7 - Conclusions

Chapter 4 of the Background study contains the economic and financial substantiation of the maximum tariffs that are included in the Terms of reference.

- In the public tender, in the Terms of reference, the public authority may specify, among requirements, performance indicators:
  - the minimal target for the recovery of waste whether through composting, recycling or energy recovery or other targets regarding the reduction of the quantities of waste disposed of at the landfill (these requirements are, as a rule, imposed according to the effective legislation; for these targets to be imposed by the LPA, they must first be in the sectoral waste management legislation, for instance, targets for reducing the

disposal of biodegradable waste). For example in Oradea, Romania, the PPP contract for the landfill management imposed targets for waste recovery.

- tariff differentiation may also be required depending on the type of waste brought to the perimeter of the landfill. For example, in Oradea, Romania, under a PPP contract, the LPA imposed differentiated tariffs for domestic waste and for waste mixed with debris, lower tariffs for construction waste, and vegetal land and selectively collected waste is taken free of charge. These tariffs have created the financial motivation for the collection system operator to collect selectively as much as possible.

- The bids submitted by the operators must include the justification of the tariff through the Technical bid and the Fact sheet. A very important criterion for the contract award is, as a rule, the lowest price offered, which needs to be well justified and credible.

Impact of modernisation investments on tariffs charged

Modernisation investments, increased recycling and advanced waste treatment result in higher annual total costs, which will be reflected in tariffs. As part of the feasibility study, after the technical solutions are established, the following stages are implemented:

- financial analysis, and
- cost benefit analysis

The financial analysis looks at the financial results of investments, such as net present value and internal rate of return on investment, as well as the analysis of the affordability of tariffs after the investments. Usually, if tariffs exceed the level of the affordability, i.e. 1% of the average income of the serviced population, the investments are considered to be too expensive or they need to be subsidized somehow.

The justification for these investments comes from the cost-benefit analysis which aims at monetizing positive social, economic and environmental impacts in order to select public investments that have an attractive internal rate of economic return.

In Romania, as regards tariff setting as a result of major investments, in the case of delegation of services, the Background study will contain all data on the feasibility study and the estimated investment costs and operating costs for each investment. These costs shall be integrated into the tariff estimates. In this case the operator does not rely on an expenditure history, but in turn when bidding for the operation of the investments makes cost estimates and offers a reasonable and competitive tarif (see Alba Foundation study, Annex 17, which includes elements of the feasibility study to explain in a transparent manner the technical solutions of the investments and the related costs, or the Terms of reference Bistriţa, Annex 18, which includes as annexes all the documentation from the feasibility study and design stages to inform the bidding operators correctly of the existing technical facilities after the investments).

5. Reducing GHG emissions through circular economy

Circular economy is a system in which the input of resources and waste, emissions and energy losses are reduced by slowing down, closing or narrowing the loops of the use of energy and materials. This can be achieved through long-term design, maintenance, repair, reuse, refurbishment and recycling.

Normative act	Noncompliance
Law No. 1540/25.02.1998 on payment for environmental pollution	Art. 10 - establishes the payment for the disposal of waste from production, but this refers to the disposal of waste in the perimeter of industrial production and not to landfills. The payment was designed to encourage waste treatment or recycling.
	Art. 11 - a fee for goods, including packaging - many exceptions, e.g. primary packaging, double taxation, when introducing the Regulation on packaging and packaging waste (still a draft) - prevents the responsibility of the manufacturer from being taken over
Law No. 209/29.07.2016 on waste	Art. 6 - ending the status of waste opens the door for the implementation of circular economy measures - There are no specific measures yet for ending the status of waste
Decision No. 409/2014 National strategy for agricultural and rural development 2014 -2020 - • Promoting environmentally friendly and nature-friendly agriculture, taking into account climate change	The impact is only indirect, does not refer to the use of organic fertilizers, measures do not encourage organic products
Decision No. 160/2018 Green economy promotion programme	Objective 7 reads that, by 2020, 30% of industry and businesses implement the principles of resource efficiency and cleaner production The objective sets a target for the proportion of entities that will implement these principles, but sets no targets for circular economy, such as reduction of waste from production

Recommendations:

It is recommended to revise the Law no.1540/25.02.1998 on payment for environmental pollution, so that obsolete articles are removed and replaced by new financial instruments that encourage circular economy. It is recommended to:

- Revise articles 10 and 11 of the Law no. 1540, article 10 will focus on payment for waste landfill
- Introduce the **Fee for hard-to-recycle or non-recyclable products,** inefficient from the perspective of primary resources use
- **Introduce the Disposal fee** and sanctions applicable to administrative-territorial units (ATU) which do not comply with the target on the quantity of disposed of waste. It is one of the most popular economic instruments in the EU. It is composed of a fee upon the entry into the landfill and a fee for the disposal of waste. This fee may initially be introduced at a low level and will increase steadily in the following period. The first step in introducing this fee is the development and approval of a methodology for the application of the disposal fee. Exemptions from the payment of the disposal fee may apply for certain types of waste (e.g. biologically stabilised materials following mechanical-biological treatment with bio-stabilisation and thermal treatment, street waste for which treatment is not possible, small fraction waste, < 2 cm, generated from sorting operations)
- Introduction of the **"pay as you throw" (PAYT)** scheme. Usually in EU member states, the PAYT scheme is not implemented at national level, but at regional or municipal level. The principle underlying the PAYT scheme is the distribution of responsibilities related to the waste management process between households (waste separation at source), authorities (administration) and industry (waste collection and treatment). The fee paid by households should be high enough to encourage the population to collect the waste in a number of fractions. Usually, the PAYT scheme is applied in parallel with separate waste collection systems. Steps for implementing this instrument are as follows: drafting of a guide on how to apply the PAYT instrument, conducting information and awareness raising campaigns, modification by additional acts of existing sanitation contracts and introduction of provisions related to instrument implementation, including in the annual control plan the verification of the implementation of PAYT by TAUs and operators. The PAYT scheme can be introduced pursuant to art. 29, para.1, letter a, of the Law no. 209/2016 on waste, which provides for the principle "polluter pays". However, the recommendation is that the "pay as you throw" scheme is expressly regulated by the Moldovan legislation, respectively by the Law no. 209/2016. Art. 17 of the Law no. 211/2011 on the waste regime in Romania, which refers to the implementation of the PAYT scheme (Annex 5), can be used as an example. An example of PAYT scheme implementation at the local level can be found in art. 23, para.3, from Decision CL no. 88/2019 for approving the regulation on the sanitation of Cluj-Napoca, Romania (Annex 19). In the initial council decision of Cluj-Napoca proposal, it read that: *"To ensure the implementation of the "pay-as-you-throw" (PAYT) economic instrument, the collection vehicles will be equipped with weighing system and will issue a weight voucher. On the basis of weight vouchers issued within a month, covering the quantities of waste collected*

from the generator, the operator will bill the amount of payment for the provision of the sanitation service". However, in the approved version, in art. 23 it was opted for a solution with a lower precision in terms of the quantity collected, but which is more economical from a financial and technical standpoint. Another example of the PAYT scheme application is the one established by the sanitation regulation of Bistrita Nasaud county in art. 21 (Annex 21), where a system is being implemented whereby collection containers are equipped with RFID tags, for the automatic identification and counting of their pick-up by self-compactors equipped with readers.

- Introduction of **financial instruments** to encourage renewable energy generation (biogas):
    - Investment grants
    - The obligation to take over the generated energy at a favourable price or the introduction of the green certificate system.

The document is being updated through a project, funded by the German International Cooperation Agency (GIZ).

Ending the status of waste or the ”End-of-waste” (EOW) concept was introduced in 2005 by means of the Thematic Strategy on waste prevention and recycling and was adopted by the European Parliament and the Council in 2008 through the Waste Framework Directive (WFD). WFD introduces the possibility that certain waste streams, that have undergone a recovery operation and meet certain criteria - the so-called ”end-of waste criteria” - may cease to be considered waste.

The purpose of defining this concept and the related criteria is to bring clarity to the interpretation of the definition of waste, as confusion has been repeatedly reported at EU level on several streams of materials that have become waste, marketed on the internal market. Clarification of quality and applicability helps create more transparent market conditions, promotes the recycling of different waste streams by reducing the consumption of natural resources, as well as by reducing the amount of waste disposed of.

At European level, for some waste streams, sets of operational and transparent selection criteria have been defined, which are anchored by the vision for increasing the recycling rate, presented in the Thematic Strategy on waste prevention and recycling, in conjunction with the four conditions, set out in the Waste Framework Directive (art. 6), namely:

a) the substance or object is currently used for specific purposes;
b) there is a market or demand for the substance or object concerned;
c) the substance or object meets the technical requirements for the fulfilment of the specific purposes and complies with the laws and rules applicable to products;
d) the use of the substance or object will not cause harmful effects on the environment or the health of the population.

- Compliance with the first two conditions ensures that the object or substance is more likely to be subject to a useful purpose than to be disposed of. These two conditions prevent the definition of criteria for materials, substances or objects for which market demand is not yet developed.

- The third condition requires that a substance or object may cease to be considered waste only if it is suitable for a lawful use, since, after it ceases to be waste, it will be covered by the legislation applicable to the products.
- The fourth condition is that the use of substances or objects does not cause harmful effects on the environment. However, on a case-by-case basis, a comparison must be made between the environmental impact of the use of the substance or object under waste and product legislation.

As a general principle, the criteria for ending the status of waste reflect the fact that a type of waste has reached a certain stage of processing, by which it acquires intrinsic value, so that it is unlikely to be disposed of as waste, being processed to a point where its use does not pose a risk to the environment, which is why it can be considered a product/material.

- Thus, for certain wastes, the end-of-waste criteria can promote the production of high quality by-products by clearly defining the minimum technical and environmental requirements to be met. The information on product characteristics facilitates comparison and can increase the final quality of the product leading to an increase in demand, thus having a positive effect on recycling rates.
- The use of waste instead of raw materials is often hampered by the waste status of the substance or object/material.
- In most cases waste is associated with disposal and users are afraid to use it instead of raw materials of a certain quality.

Ending the status of waste can help mitigate potential harm to users, increase their confidence in quality standards and encourage the use of by-products. An example of EU-wide regulation on the end of waste is the *Regulation no. 333/31-mar-2011 laying down criteria for determining the conditions under which certain types of metal waste are no longer waste*. The Regulation lays down criteria for determining the conditions under which iron, steel and aluminium waste, including aluminium alloy waste, no longer constitute waste (Annex 21).

To align related strategies and policies in the context of Moldova, the following are the first steps proposed to be undertaken:

- **Include the objective of using organic compost, produced from selectively collected bio-waste, into the National Strategy for agricultural and rural development 2014-2020**. As part of the objective of promoting environmentally and nature-friendly agriculture, taking into account climate change, provisions can be made to define bio-products which would exclude the use of chemical fertiliser. Art. 12, of *the Council Regulation (EC) No. 834/2007 of 28 June 2007 on organic production and labelling of organic products* (Annex 22). In the above mentioned strategy, in Chapter II Strategic vision and objectives, General objective no. 2. Ensuring the sustainable management of natural resources in agriculture, one formulates the need to support the provision of organic production technologies and organic products (Specific objective 2.2.), without referring, however, to the concrete definition of bio-products, which would exclude the use of chemical fertilizers, and would imply and encourage the use of organic compost from selectively collected bio-waste. Moreover, the strategy refers to the need to take measures to mitigate the effects of climate change on

agriculture (with regard to water resources, soil quality, etc.), but without highlighting the indirect effects of circular economy measures. The SWOT analysis of the environment and natural resources, mentions only at Opportunities the "Increased investment in waste recycling", without formulating a firm urge in this regard. One possibility promoted by the EU with regard to introducing circular economy measures in agriculture is the use of recovered waste for fertilisers. An example is art. 19 of EU Regulation no. 2019/1009 on fertilisers (Annex 23).

- **Update the objectives of the program to promote the "green" economy in the Republic of Moldova for 2018-2020**.
    - The specific objective "*4) Promotion of organic agriculture by implementing the principles of "green" economy ensured by the end of 2020 and the area of agricultural land used for organic agriculture extended by about 20%*", it is recommended to introduce targets on the recovery of bio-waste and its use in agriculture.
    - With regard to the specific objective "*6) Promotion of measures to implement the principles of the "green" economy in the construction sector by 15% ensured by 2020",* target is not measurable. It is recommended that targets be more concrete and focus on the recovery of construction and demolition waste, minimising the consumption of materials, natural resources and energy throughout the life cycle of buildings.

The document is under review.

6. Risk analysis and adaptation measures

The connection between climate change risks and the waste sector is poorly understood and regulated in Europe. However, the waste sector is not exempt from these risks and good practice suggests the need to study this link in order to mitigate risks.

Normative act	Noncompliance
Regulation on waste disposal - draft 2016	The Regulation does not provide for measures which would take into account eventual threats of fires during droughts, floods, the need for water for the operation of treatment facilities or other risks and vulnerabilities related to climate change.

Recommendations:

- Implementation of a study to identify the vulnerability of existing and planned waste management infrastructure to climate change:

- Frequently flooded areas involve additional measures to protect infrastructure from flooding and the formation of anaerobic conditions in landfills
- Areas at risk of desertification and/or prone to fires involve additional measures to prevent fires at landfills, treatment plants and a system for frequent collection and treatment of waste from gardens and parks
- Dry areas where waste treatment processes require water and may fail without it
- Identification of areas where the risk of sanitation services being interrupted due to natural events is high

- Framework content for the vulnerability identification study:
  - Description of the waste sector, policies, existing and planned infrastructure, identification of those structures that are part of the critical infrastructure for further prioritisation of the proposed measures
  - Identifying climate vulnerability and risk areas, impacts of climate change
  - Analysis of climate change impacts on waste management infrastructure

Tabular models for Impact analysis and identification of the extent of vulnerability are presented below.

Identifying key impacts of climate vulnerabilities on waste management infrastructure:

	Climate change	**Potential impact**	**Consequences (can be defined specifically for the case of Moldova)**		
			Quality and sustainability of the sanitation service	Public health	Infrastructure damage
1	Increase in average temperatures	Increased waste decomposition			
2	An increased number of days per year with high temperatures	Increased fire risk			
3	Etc.	Etc.			

For each potential impact selected as a priority, with major consequences, one shall analyse by region the prevalence of that risk and associated impact and the waste management infrastructure in order to identify those structures and communities that are exposed to high risk and significant impacts.

The study will recommend options for adaptation and increased resilience to the identified risks in terms of both the necessary policy changes and an action plan.

Recommendations

- It is necessary to establish construction and operating rules in the Regulation on disposal and other relevant policies that take into account the results of the vulnerability study. The recommendation refers to Chapter II, point 38 of the Regulation on disposal - to introduce new specific requirements in the procedure for issuing the environmental permit for landfills. So that landfill projects include:
    - Identification of risks in relation to climate change and measures to build project capacity to adapt to climate change;
    - Measures to reduce the risk of the project being affected by climate change (e.g. access to insurance instruments);
    - Measures to prevent the occurrence of risks (e.g. choosing the location of the project so that its exposure to certain risks, induced by climate change, is minimal);
    - Measures to allow the operation within the project and in the event of climate change constraints (e.g. water or energy efficient installations from own sources).
- Adaptation options and increased resilience may include:
    - Technological changes
    - Implementation of risk management plans as part of the infrastructure operation manual
    - Increasing awareness with regard to good practices
    - Rethinking area planning and strategic location of new infrastructure
    - Risk management and risk communication.
    - Mainstreaming the waste sector into the country's critical infrastructure and into the National Adaptation Strategy.

7. Mitigation of GHG emissions by eliminating anaerobic wastewater treatment

Water management policies and measures can influence greenhouse gas emissions. A significant volume of emissions results from wastewater treatment plant operations. For this reason it is important for the wastewater treatment sector to propose specific reduction targets and associated measures, to be coordinated with the sector's adaptation plans.

Normative act	Noncompliance
Decision no. 950/25.11.2013 approving the Regulation on requirements for the collection,	There are no specific provisions or considerations for the elimination of anaerobic

treatment and discharge of wastewater into sewage systems and/or water bodies for urban and rural localities	treatment or for the capture and use of biogas in the process.
Government decision no. 199/2014 approving the water supply and sanitation strategy (2014-2028)	

Recommendations:

- It is recommended that measures for retrofitting the wastewater treatment plants, improving the quality of sludge, with a view to reducing greenhouse gas emissions and the impact of climate change, by assuring that biogas is captured and efficiently used from energy perspective, are introduced into the *water supply and sanitation strategy (2014-2028)* at Chapter V, item 2.
- It is recommended that in *Decision no. 950 of 2013 approving the Regulation on requirements for the collection, treatment and discharge of wastewater into sewage systems and/or water bodies for urban and rural localities,* at Chapter V, that refers to the use of sludge from wastewater treatment plants, the following is introduced:
    - The need to develop a National Strategy for Sludge Management, with the obligation to renew this document every 5 years.
    - Establish sludge management plans at waste water treatment plants in such a way that no greenhouse gases are released into the atmosphere during and after the treatment of wastewater.
    - Requirement to monitor/calculate GHG emissions from sludge treatment and reduce them according to the sludge management plan/environmental authorisation

Disposal of sludge, resulting from wastewater treatment on landfills is one of the least sustainable alternatives, that does not consider the usable potential of sludge and has a high potential for GHG emissions. The National Strategy for Sludge Management will take into account the possibilities of co-treatment of biodegradable waste to achieve feasible projects and will include the following considerations:

- There are several technological alternatives that allow for the recovery of energy from sludge, the interest in their development and application being also determined by the possibility of considering them as sources of renewable energy. The use of sludge as alternative fuel is determined by the characteristics of solid substances, that have a calorific capacity similar to that of brown coal. Thus, by incineration or co-incineration, it is possible to produce energy that can be used for pre-drying sludge or for generating electricity (incineration strictly for sludge burning). For heat and electricity production (co-incineration with solid waste) it is possible to partially replace fossil fuels in energy-consuming units (cement factories, heating and electrical plants). Thus, energy can be recovered from sludge by:

1. conventional treatment by anaerobic fermentation of it – an already known and applied method of generating biogas in the process of microbiological decomposition of volatile substances from sludge. The final products are: a stabilized product that can be used as fertilizer and biogas that can be used to produce heat and energy.
2. pyrolysis and gasification - methods which, however, are not sufficiently developed or which imply higher costs, which prevents their widespread use.

8. Annexes

Annex 1. 2004 Technical standards on waste disposal
Annex 2. Decision no. 162-2002 on waste disposal
Annex 3. Order no. 95-2005 establishing acceptance criteria and preliminary procedures for the acceptance of waste at landfill
Annex 4. Decision no. 235-2007 on waste oil management
Annex 5. Law no. 211-2011 on waste management
Annex 6. National Waste Management Plan 2017
Annex 7. Law no. 249-2015 on the management of packaging and packaging waste
Annex 8. Emergency order no. 5-2015 on electrical and electronic waste equipment
Annex 9. Order no. 1172-2018 approving the Financing guide of the national program for the replacement of used electrical and electronic equipment with more performing equipment

Annex 10. Order no.109-2007 approving the Methodological standards for setting, adjusting or amending tariffs for the sanitation service
Annex 11. Rate changes address and Fact sheet Bistrita
Annex 12. Draft decision and Fact sheet Suceava landfill
Annex 13. LCD no. 393-2019 approving separate tariffs for domestic sanitation activity in Cluj-Napoca municipality
Annex 14. LCD on updating waste disposal tariffs at the Oradea ecological landfill
Annex 15. Emergency order no. 196-2005 on the Environmental fund
Annex 16. Law no. 51-2006 on community services of public utilities
Annex 17. Decision approving the background study to the decision concession of the operation of SMID Alba County
Annex 18. Terms of reference Consession of the Public Sanitation Service Bistrita
Annex 19. LCD no. 88-2019 on amending the Sanitation regulation of Cluj-Napoca municipality
Annex 20. Sanitation regulation, Bistrita Nasaud county
Annex 21. Regulation no. 333 -31.03.2011 laying down criteria for determining the conditions under which certain types of metal waste no longer constitute waste
Annex 22. Regulation (EC) no. 834-2007 on organic production and labelling of organic products
Annex 23. EU regulation 2019-1009 setting standards for putting fertilizers on the market