

INTEGRATED WASTE MANAGEMENT - ALTERNATIVE FOR A CLEAN ENVIRONMENT IN BUCHAREST

Silvia Tania PAȘNICU¹

Abstract: *Integrated Waste Management considers the use of selective waste collection, treatment, recovery and neutralization methods with a low impact on the environment.*

Waste management activities should be carried out in compliance with environmental protection rules according to the requirements of European legislation.

The European Union's waste management policy takes into account the need for an integrated approach to waste management by building waste disposal facilities with preventive measures by reducing their amount and recycling in a way that does not affect the environment.

This paper reviews the national legislation in accordance with the EU legislation in this field, and then deals with a case study of Romania's capital.

Keywords: *Environmental Management; Water, Air, Climate, Noise; Energy; Alternative resources; Urban, Rural and Regional Economics.*

JEL Classification: *Q2, Q25, Q4, Q42, R1*

1. Introduction. An approach to the Romanian legislation in the field

Law no. 211/2011 on waste management has established the necessary measures to protect the environment and public health for preventing and mitigating adverse effects on waste generation and management and reducing the harmful effects of resource use and efficiency. This law act defines the responsibilities and tasks of the Ministry of Environment and

¹ Phd student, SCOSSAR, Romanian Academy.

Climate Change (MECC) as the competent authority for decision-making and control in the field of waste management. The National Environmental Protection Agency (NEPA) is the central public administration institution under the MECC, having the competence to implement environmental legislation and policies, according to GD no. 1000/2012 on the reorganization and functioning of the National Environment Protection Agency and the public institutions that are subordinated to it. The National Environment Guard (NEG) is the institution ensuring the control of the uniform and integrated implementation of the policy of the Government for the enforcement of the legislation in the field of environmental protection, harmonized with the Community policy and having attributions regarding the application of the Government policy in preventing, establishing and sanctioning the violation of legal provisions on environmental protection. The Environmental Fund Administration (EFA) is an institution fully funded from its own income that was set up under GEO no. 196/2005 concerning the Environment Fund and which is coordinated by the MECC. The purpose of setting up the EFA is to manage the Environmental Fund to support and realize priority projects for environmental protection, in accordance with the legal provisions in the field of environmental protection.

The National Waste Management Policy is in line with the objectives of the European waste prevention policy and the reduction in resource consumption through the practical application of the waste hierarchy. The principle of preventive action is one of the principles underlying the provisions of GEO no. 195/2005 on environmental protection and Directive 2008/98 /EC on waste was transposed into national legislation by publishing Law no. 211/2011 on waste regime.

The waste hierarchy, which is applied in order of priority and the policy on prevention of waste production and management, has been established in this law: prevention, preparation for re-use, recycling, various recovery operations (in this case energy recovery) and, as a last option, elimination. According to the requirements of the European Union legislation, the strategic documents at national waste management level include the following:

- The Waste Management Strategy – the framework setting out the country's waste management objectives;

- National Waste Disposal Plan - containing details on actions for implementing the strategy, including deadlines and responsibilities.

The National Waste Management Strategy and the National Waste Management Plan elaborated by MECC are basic tools for the implementation of the European Union waste management policy in Romania, which were approved by GD no. 1470/2004, as amended and supplemented.

In order to implement the waste management directives at the level of the Municipality of Bucharest, the GD no. 82/28.04.2015 approved the Medium and Long-Term Development and Operation Strategy of the Public Sanitation Service in Bucharest.

The strategy is based on the principle that the polluter pays and establishes the directions for the development of the public service on sanitation in Bucharest, as the main legal owner of municipal and similar waste deposited in special containers which are located in Bucharest, according to the provisions of Law no. 101/2006 republished and are based on the following documents:

- "Waste Management Plan in Bucharest";
- "Integrated Program Air Quality Management in Bucharest";
- "Sanitation Norms in Bucharest";
- "Regulation on the organization and functioning of public services regarding sanitation in Bucharest".

2. The objectives regarding the implementation of the sanitation service strategy in the Municipality of Bucharest

The General Council of the Municipality of Bucharest coordinates, monitors and controls the Public Sanitation Service in Bucharest and each rule issued by Sectors 1-6 must be submitted to the City Hall of Bucharest.

The strategy addresses the following activities:

- Separate collection and selective transport of municipal waste originating from industrial, commercial and institutional activities, without affecting the flow of electrical and electronic waste, batteries and accumulators;
- Collection of household waste resulting from internal and external rehabilitation and transport;
- Processing, neutralization and utilization of the energy materials of the waste;

- Sorting municipal and similar waste in sorting stations;
- Organization of municipal waste treatment and management of landfills or waste disposal facilities.

The general objectives of the Medium and Long-Term Development Strategy for the Sanitation Service in Bucharest are as follows:

- Increasing the living standard of the population;
- Economic-social development of the allocations;
- Increasing the efficiency and quality of the sanitation service;
- Support for the specific mechanisms of the market economy;
- The sustainable development of this activity;
- Promoting competitiveness, efficiency and transparency;
- Promoting sanitation rehabilitation programmes through multi-annual investment planning;
- Protection of the environment and the health of the population.

The specific objectives regarding the activity of the sanitation service in the Municipality of Bucharest are as follows:

- recovery and prevention of waste generation (recycling, reuse, energy recovery) in accordance with the requirements of the European Waste Strategy and management at the national level;
- elimination of uncontrolled waste disposal;
- attaining the proposed targets for the storage of biodegradable waste and electrical and electronic packaging waste;
- attaining the target of 15% annual reduction in the amount of waste to be deposited and separate collection for material or energy recovery;
- separate collection of waste by the two fractions (wet and dry) and transport to recovery facilities;
- implementation of collection systems in homes, owners / tenant associations, assemblies / residential, etc.;
- unitary and integrated sanitation service at the sector level in Bucharest;
- establishing the rights and obligations of legal and natural persons regarding the sanitation service and stimulating and raising awareness of the population to reduce the quantity of waste produced and achieve the separate collection thereof.

3. Waste management in the Municipality of Bucharest – A case study

1. Integration of the necessary funds into the budget of revenues and expenditures for waste management, environmental infrastructure, environmental protection and conservation, rehabilitation of historically polluted areas, etc.

According to the income and expenditure budget approved for the year 2016, environmental protection expenditure is as follows:

Table 1 - Environmental expenditure for the year 2016

- lei -

| Indicator name | Indicator code | Commitment credits | Budget appropriations | | Budgetary commitments | Legal commitments | Payments made | Actual expenditure |
|---|----------------|--------------------|-----------------------|------------|-----------------------|-------------------|---------------|--------------------|
| | | | Initial | Definitive | | | | |
| Protection Environment | 74.02 | 104,592,000 | 162,467,000 | 41,120,000 | 32,279,919 | 32,279,919 | 32,279,919 | 4,642,331 |
| Reduction and control of pollution | 74.02.03 | 60,801,000 | 17,585,000 | 4,099,000 | 1,425,689 | 1,425,689 | 1,425,689 | 2,610,473 |
| Sanitation and waste management | 74.02.05 | 462,000 | 1,444,000 | 280,000 | 229,600 | 229,600 | 229,600 | 204,600 |
| Collection, treatment and destruction of waste | 74.02.05.02 | 462,000 | 1,444,000 | 280,000 | 229,600 | 229,600 | 229,600 | 1,480,881 |
| Channelling and wastewater Treatment | 74.02.06 | 43,329,000 | 140,743,000 | 35,796,000 | 30,278,253 | 30,278,253 | 30,278,253 | 1,480,881 |
| Other services in the field of environmental protection | 74.02.50 | 2,695,000 | 945,000 | 346,377 | 346,377 | 346,377 | 0 | 346,377 |

Source: The execution account of the local administration of the Bucharest City Hall – full funding from the budget – expenditures on 31.12.2016.

According to the presented results we notice a decrease in the budgetary allocations approved by the rectified budget of 2016 regarding the environment protection, in a percentage of 74.7% (41,120 thousand lei / 162,467 thousand lei), and the budget execution for this article of expenditures was only 78.5%, the situation being as follows:

Table 2 - The situation regarding total expenditure approved by the budget and those on environmental protection for the year 2016

| Indicator name | Indicator code | Commitment appropriations | Budget appropriations | | Budgetary commitments | Legal commitments | Payments made | Actual expenditure |
|---|----------------|---------------------------|-----------------------|---------------|-----------------------|-------------------|---------------|--------------------|
| | | | Initial | Definitive | | | | |
| Protection Environment | 74.02 | 104,592,000 | 162,467,000 | 41,120,000 | 32,279,919 | 32,279,919 | 32,279,919 | 4,642,331 |
| Total operation and Development Section | | 2,019,287,030 | 3,520,327,000 | 3,112,880,520 | 2,877,441,309 | 2,877,441,309 | 686,031 | 2,617,887,517 |
| % | | 5.2 | 4.6 | 1.3 | 1.12 | 1.1 | 1.1 | 0.1 |

Source: The execution account of the local administration of Bucharest City Hall - full funding from the budget - expenses on 31.12.2016.

For the conservation and protection of the environment, the budget of the Bucharest Municipality for 2016 included allocated amounts to the 74.02.03 environment protection chapter for the following objectives:

| No. crt. | Objective | Allocated value 2016 (Thousand Lei) | Rectified value 2016 (Thousand Lei) | Achieved at 31.12.2016 (Thousand Lei) |
|----------|--|-------------------------------------|-------------------------------------|---------------------------------------|
| 1 | Ambient air quality plans in Bucharest Municipality | 559 | 503 | 447 |
| 2 | Achieving the Strategic Noise Map and the Action Plan for Noise Reduction in the Municipality of Bucharest according to Directive 2002/49 / EC | 1,557 | 1,553 | 894 |
| 3 | Inventory of private green spaces and updating of the register of green spaces of Bucharest Municipality, according to the Law 24/2007 and Order no. MDT.1466 / 2010, contract no. 398 / 09.08.2014 Updating the Green Spaces Register according to Ord. MDRT 1466/2010 | 5,000 | 1 | 0 |
| 4 | The Strategy of the Green Spaces of the Municipality of Bucharest General Framework on the Strategy for the Conservation and Development of the Green Spaces Network in Bucharest | 225 | 165 | 0 |
| 5 | Operational information system for air quality management in Bucharest | 7,000 | 7,000 | 0 |
| 6 | Service and maintenance of acoustic monitoring system | 123 | 121 | 12 |
| 7 | Service and maintenance for the self-laboratory for ambient air quality analysis | 123 | 123 | 26 |
| 8 | Project LIFE "Anti-dust solutions in Bucharest" HCGMB no. 60/31.05.2013 | 2,405 | 2,006 | 55 |

2. *Ensuring in the organizational structure of the Bucharest Municipality a structure with responsibilities in the field of environmental protection.*

The Environmental Directorate is the main structure of the Bucharest City Hall, which applies environmental policies at local community level, with the following services:

- ✓ **Service of environmental quality monitoring**, with main duties in:
 - monitoring and reporting of the implementation stage of the Local Environmental Action Plan under the responsibility of the Bucharest City Hall;
 - monitoring and reporting of the implementation stage of the Integrated Air Quality Management Program under the responsibility of the Bucharest City Hall;
 - carrying out periodical measurements of the air quality and the noise level with the equipment and informing the institutions authorized by the law;
 - ensuring the functioning and development of the urban noise monitoring system;
 - ensuring the management of the acoustic map of Bucharest;
 - the working-out of the Local Action Plan for the Ambient Noise Reduction, to be sends to the territorial authorities and monitoring of the actions established by it.
- ✓ **Approvals and Agreements Service**, having the following main tasks:
 - Issuing permits for dressing, deforestation, transplanting trees/shrubs from Bucharest, in accordance with the legal provisions;
 - Providing the necessary expert approvals/agreements required by the city planning certificates for the execution of infrastructure works (technical-urban and street networks);
 - Participation in the planning and restoration programs, maintenance of all categories of green areas and vegetation, for the sustainable development of green spaces;
 - Collaborates with the Lakes, Parks and Recreation Administration of Bucharest (A.L.P.A.B) and the Public Domain Administrations (PDA) of Sectors 1-6, to verify the conditions imposed by the expert approvals regarding the conclusion of some protocols for the

- execution of the plantations in compensation, the restoration and the maintenance of the green spaces.
- ✓ **Green Space Monitoring Service**, having the following main tasks:
 - to verify the compensatory planting required by the expertise carried out by PDA for sectors 1-6, the administrations subordinated to the Bucharest City Hall, as well as by the natural and legal persons;
 - to centralize and archive electronically the data resulting from compensatory planting checks;
 - to check for compliance with the protocols on planting in compensation and reveals the non-compliances of the application for sanctions to the specialized department of the Local Police of Bucharest;
 - to initiate and check for the implementation of the Green Spaces Strategy of the Municipality of Bucharest.
 - ✓ **Urban Ecology Service**, having the following main attributions:
 - proposes strategies, ways and methods to educate citizens on environmental issues;
 - promotes concepts of sustainable development: urban mobility, sustainable transport, alternative, non-polluting transport;
 - initiates and carries out programs and projects in partnership with NGOs in the field, public institutions, to raise awareness on the importance of environmental issues;
 - organizes and supports at the headquarters of educational institutions lessons and educational-interactive actions on environmental issues;
 - initiates the Climate Change Strategy and the Action Plan to Adapt and Combat Climate Change.

3. Working out environmental protection plans and programmes in accordance with the provisions of the GEO no. 195/2005 with amendments and additions

On air quality

With the transposition of 2008/50/EC on ambient air quality and cleaner air for Europe by Law no. 104/2011 on ambient air quality, new responsibilities have been set for local public authorities to reduce air

pollution in urban agglomerations through the development and implementation of air quality plans and air quality maintenance plans.

In order to apply these provisions, the Bucharest Municipality shall draw up the Integrated Air Quality Plan and the Air Quality Maintenance Plan for Bucharest, which include measures for the next five years in order to place/maintain the concentration of air pollutants within the limit/target values provided by Law no. 104/2011 and compliance with EU requirements.

Air Quality Plans for Bucharest Municipality are drawn up in accordance with the Methodology for Air Quality Plans, Air Quality Maintenance Plans and Short-Term Action Plans, approved by Government Decision No. 257 / 15.04. 2015.

Air Quality Plans are developed by a Technical Commission composed of representatives of the Directorates of the Municipality of Bucharest: Transport, Roads, Traffic Systematization, Urban Planning Directorate, Environment Directorate, Public Utilities Directorate, Investments Directorate, General Directorate for Local Police and Control , Bucharest Autonomous Transport Administration, Street Administration, Lakes, Parks and Recreation Administration, Autonomous Distribution of Heat Energy Bucharest, and City Hall for sectors 1-6, National Environmental Guard, Public Health Directorate, National Registry Forests, General Directorate of Police of Bucharest, Romanian Auto Registry, SC Metrorex SA, SC Water NOVA, S.C. Enel Distribution Muntenia, S.C. Distrigaz Sud NETWORKS, Ministry of Transport, Ministry of Public Finance, Ministry of Agriculture and Rural Development, National Institute of Statistics.

The air quality study completed in accordance with the provisions of G.D. No. 257/15.04.2015 deals with:

- The inventory of the emission sources existing in the Bucharest Municipality in 2016;
- Configuring pollution maps based on the assessment of air quality by mathematical modeling of the dispersion of pollutants, highlighting the spatial distribution and level of pollutant concentrations caused by main emission sources responsible for air pollution in the Capital;
- The identification of 60 measures that can reduce pollutant emissions in the Capital; the three main sources of pollution considered are: traffic, home heating and construction sites.

These measures aim at:

- a) Reducing road traffic emissions by:

- Fluidizing traffic: increasing the average speed in the city, intelligent traffic lights, and completion of infrastructure projects;
 - Improvement of the car fleet: removing old cars, stimulating the purchase of new cars, especially gasoline/LPG/hybrid/electric cars;
 - Stimulating the use of public transport and other alternative means of transport - bicycle, improving the quality of public transport: RATB, METROREX;
 - Discouraging access/transit in the central area: parking management throughout the capital, closing/diverting traffic when alarm levels are reached;
 - Increasing the efficiency of the sanitation program for the intensely circulated streets;
 - New technologies to block particle suspension on the streets;
 - Creating green spaces along high traffic streets.
- b) Reduction of emissions from the residential sector through:**
- Increasing the energy efficiency of homes: thermal rehabilitation;
 - Encouraging the connection of new residential complexes to RADET, the extension of the network;
 - Introduction of natural gas block power plants with increased efficiency in the areas where heating is predominant with individual systems - the stimulation of the connection;
 - Stimulating the connection to the natural gas supply system for individual dwellings still using wood.
- c) Reduction of emissions from building/demolition activities through:**
- Development of air quality management plans for the building/demolition waste;
 - Strict programs to control compliance with management plans, in particular on the duration of activities with intense emissions (excavation/digging, transfer of powder materials, intense wind);
 - Air quality impact monitoring programs for scale works;
 - Increased sanitation of surfaces/streets in areas adjacent to large yards.
- d) Reduction of emissions from the wind erosion by:**
- Identification of surfaces subject to wind erosion: mapping, surface description;
 - Restoration of degraded surfaces and their efficient use.

e) Measures for preservation/improvement/extension of the green spaces in the Capital by:

- Working out of the General Framework regarding the strategy for the preservation and development of the green space network at Bucharest level and the strategies of the 1-6 sectors for the management/maintenance of the public green spaces;
- Working out of the Landscape Planning Regulation of the green spaces in Bucharest;
- reforestation in certain parts around Bucharest by making a green ring with the identification of the possibility of concluding agreements/protocols with the authorities in the Ilfov County to introduce programs for forestation of some areas at the limit/in the vicinity of the city and identification of sources of financing.

f) Measures to raise public awareness regarding the real level of air quality, implications for human health through:

- informing and warning citizens about air quality;
- informing the population on the effects of pollution on human health and the main sources of pollution;
- elaboration of the unitary communication strategy for the Municipality and the administrations of 1-6 sectors;
- Providing information through seminars, brochures, broadcasts, spots, TV/radio media campaigns;
- Collaboration with public health institutions, experts, NGOs.

The analysis of the measures for each area of air pollution generation was made at the meetings of the working groups of the Technical Commission, in order to set the timetable for implementation, the estimated costs for implementation, the potential sources of financing, the quantifiable indicators for expressing the effectiveness of the measures.

Air quality plans – public consultation and public debates – are finalized on the basis of public comments and are subsequently endorsed by the local and national environmental protection authority. Their approval and adoption shall be made by a decision of the General Council of the Municipality of Bucharest.

Information on air quality plans has been posted on the pmb.ro website at the Services/Environment section of the Air Quality Plans subsection in Bucharest.

On urban noise

Within the framework of the Environmental Quality Monitoring Service, the project on the implementation of the Strategic Noise Map and

the Action Plan for the Noise Reduction in the Municipality of Bucharest was carried out, according to the Directive no. 2002/49/EC, the municipality having the obligation to develop a set of measures to reduce the number of persons exposed to the noise generated by the main noise source in Bucharest, namely road and rail traffic (tram), which exceeds the legal admissible level day and night.

On Green Area Management

The Environment Directorate initiated and the General Council of Bucharest Municipality approved by H.C.G.M.B. no. 128/26.05.2016 the Regulation for drawing-up and approval of landscaping plans for public parks/gardens, squares and green spaces related to the circulation routes or watercourses existing in Bucharest. It establishes, on the basis of uniform rules, the procedural framework for elaboration and approval of landscaping plans of public parks/gardens, squares and green spaces afferent to the circulation routes or watercourses located on the public domain of Bucharest Municipality, under the administration of Public Sector Administrations 1-6, Lakes, Parks and Recreation Administration Bucharest, as well as other administrators.

The main purpose of this regulation is to lead in the long term by specific measures to the creation of a coherent urban landscape and a healthy living environment with real benefits for the city and its inhabitants.

The regulation applies to the landscaping arrangements to be carried out on the territory of Bucharest and will be governed by the following principles:

a) *Comfort in use* – in the vegetal arrangements, the importance of foliar volume, the shading capacity, the ability to purify and cool the air during the summer, the natural illumination of the adjacent living spaces, the predominant use of species that do not have a negative impact the urban environment and the health of the inhabitants and the fluidity of pedestrian traffic;

b) *Sustainability* – the ecologically and economically sustainable character of the facilities;

c) *Landscape dynamics* - integration of the permanent evolution of the arrangement, from implementation to maturity/stabilization as well as throughout the existence of the arrangement through sustainable and differentiated management measures;

d) *Character* - the pursuit of the creation of facilities able to provide long-term local identity and to ensure visual attractiveness throughout the year;

e) *Consistency* - landscape arrangements will be made in concert with each other, aiming at the creation of coherent visual and ecological landscaping assemblies, thus generating urban landscape units with clear and distinct identities;

f) *Correlation* - the collaboration between the initiators of landscaping projects will be pursued so that the co-operation between them will generate coherent urban landscape units;

g) *Cost-benefit balance* - will focus on the creation of facilities combining the quantitative and the qualitative aspects, when it does not require the short-term principle of the lowest cost of the project to be implemented, as well as the costs of maintenance on long term. On a correlated basis, account should also be taken of the medium and long-term benefits from the public health point of view, the correct development of urban vegetation and the social and urban impact;

h) *Improving the quality of life* refers to the diminution of morbidity and mortality; in this sense, landscape developments will limit the use of plants that have a negative impact on the health of the population and will aim at increasing the whole-city foliar volume mass to improve air quality;

i) *Ensuring environmental protection* – the reintroduction of stable ecosystems in the urban environment, imposing minimum management measures and the facilities favouring natural vegetal associations, aiming to protect the environmental elements.

These principles will apply to all landscaping developments that will take place on public spaces starting with 01.01.2017.

The landscaping plans for green areas covered by the Regulation will follow the following **general rules**:

a) all arrangements of floricultural plants shall consider the use of perennial plants, with the exception of historical arrangements in which, due to their specific nature, the use of annual and biennial floral plants, exclusively or in combination with perennials, is permitted;

b) in decorative areas, the annual and biennial flower plantations taken together shall not exceed 30% of the total plants, the remaining 70% of the herbal plants with decorative role being perennial plants (perennial floral plants/woody plants/grasses);

c) existing areas occupied by floral plants cannot be increased in the new proposed arrangements except for the introduction of meadows on the areas which enclose and the respective areas with floral plants;

d) shaded areas (buildings, construction elements, tree vegetation) should avoid the creation of lawn surfaces, which are replaced by shade-resistant soil cover species;

e) non-recreational areas (picnic lawns, play areas and other recreational areas) or without a specific compositional role requiring the arrangement of lawn surfaces will favour the achievement of areas occupied by mixtures grassland type;

f) strips or alveoli incorporating street alignments, where the main purpose is to achieve the best possible soil-to-land use with low resource consumption in the management process (material resources such as water/fertilizer, human resources in the sense of personnel which is responsible for the maintenance of the respective spaces, etc.), the covering of the respective surfaces will be made mainly by grassland mixtures or by planting of shrubs belonging to species resistant to drought and pollution;

g) the proposed arrangements will seek to protect the existing viable trees predominantly;

h) newly introduced woody plants will be exclusively part of species adapted to soil conditions specific to Bucharest, capable of developing under optimal conditions within the type of green space arranged and requiring little management and maintenance;

i) when selecting the species used in the arrangement, attention shall be paid to the features of the growing species and the requirements of each species with regard to climatic factors and soil characteristics, thereby avoiding the use of species of inappropriate size (requiring later correction) or inappropriate to develop optimally under the conditions offered by the land under development (requiring further increased consumption of resources to remedy the problems);

j) in the case of newly introduced trees in the alignments of the 1st and 2nd class traffic ways (according to HCGMB 66/2006), the dendrological material used shall have the minimum crown insertion level at 4 meters height (the distance between the ground and the first grapple);

k) in the case of newly introduced trees in the alignments of the 3rd and 4th class roads (according to HCGMB 66/2006) or accompanying main alleys within the parks, public gardens or squares, the dendrological material used will have the minimum crown insertion level at 2.50 meters (the distance between the ground and the first slant);

l) in the case of green spaces that do not have an impact on the car traffic, the trees introduced in the new developments will have a trunk circumference of at least 24 cm measured at 1.30 meters from the ground, except for the trees planted in massive or those used for making protection curtains;

m) the compositions of arranged/planted surfaces embedded in the traffic routes shall be designed in such a way as to provide adequate visibility for a smooth car traffic;

n) in the case of alignments that accompany the roads, continuous permeable strips (which can be covered with vegetation/prismatic mineral elements placed on a bed of sand/mineral aggregates free or stabilized with a natural stabilizer) with a width of at least 1 meter, parallel to the traffic area, which encompass the trees that form this type of plantation, their role being to allow the rainwater to infiltrate the soil not only in the trunk area but also in the area of the rootstocks (which play an essential role in supplying with water and feeding the plant);

o) in the case of alignments that are accompanied by highly mineralized circular ways, as well as trees inserted in mineral surfaces, permeable surfaces with a dimension of 2.00 x 5.00 meters (which may be covered after the planting of the tree) with vegetation/prismatic mineral elements placed on sand bed/mineral aggregates free or stabilized with natural stabilizer/grid protection metallic systems); in these cases, the existing layer will be replaced by plant soil at a depth of minimum 1.20 meters;

p) in special situations aiming at street alignments along roads that do not allow the planting of trees to develop in optimal conditions, planting boxes (constructed elements) with a minimum size of 3.00 x 1.50 x 1.50 meters (length x width x depth) fitted with adequate irrigation system and drainage system; in this case trees of small species will be used, the stability of which will be ensured by means of specific anchoring systems;

q) in the green areas, the vegetation will be maintained or increased;

r) green areas enjoy a minimum of 20% of the shaded area calculated as the projection of the foliar volume created by the tree material at maturity;

s) the planting and dendrological material proposed for use in a project submitted for endorsement will be in accordance with the norms and warnings in force issued by the Phytosanitary Directorate of the Ministry of Agriculture, Forests and Rural Development;

t) for green areas related to traffic routes, technical protection and water courses, solutions will be applied, percentages and plant species will be used in accordance with the visibility constraints necessary for the proper functioning of traffic, according to the legislation in force;

u) under any type of arrangement, plants placed in containers (pots/bins) will not be used, except:

- (1) situations when, underground, there are technical spaces or urban infrastructure elements that reduce the thickness of the soil layer to less than 30 cm, and the use of other systems for introducing plants is not possible;
 - (2) the situations in which arrangements are related to urban constructions/elements that form part of a historical or patrimonial assembly which are characterized by the use of containerized plants in such systems;
- v) the design projects will provide technical solutions to prevent soil dislocation, mud formation and scattering on paved surfaces, clogging of rain water take-off systems or leakage of sludge into the sewerage network of the city;
- w) where necessary, land use projects will provide for drainage systems to take over and redirect the surplus water in the soil.

4. The existence of a strategy for the reduction, reuse and recycling, disposal, as well as the collection, selection and processing / recovery of waste.

In 2015 the strategy for medium and long term development and functioning of the sanitation service in Bucharest approved by HCGMB no. 82/2015 was elaborated which contains provisions for separate collection of waste, sorting of waste, treatment and recovery, disposal (storage of waste).

With regard to separate collection, the strategy contains the provisions presented bellow:

An integrated collection system based on at least 4 containers (namely: biodegradable waste, cardboard waste, plastic waste and glass/metal waste) will be implemented at the Bucharest Municipality level.

Direct collection from the source will be made in the first year after the entry into force of the delegation contracts for the sanitation service, on two (wet and dry) fractions. After 2 years, separate collection is extended, where possible, to 4 fractions. 5 years after the start of the sanitation service, the separate collection by the 4 fractions is mandatory.

Within two years from the approval of the strategy, buried or semi-buried systems will be developed for separate collection of waste, particularly in pedestrian-intensive areas, in new housing districts, around agrifood and flower markets or near major crossings. The deadline for this is two years from the approval of this strategy.

Until 2025 it is mandatory to make "separate islands" of waste collection within the neighbourhoods. These "islands" will contain

platforms on which containers will be placed for separate collection of waste. These spaces will be appropriately delineated and signalled. Measures will be taken to ensure that access is provided only to those providing services. Each year, the Delegate will report to the Bucharest City Hall on the state of fulfilment of this requirement.

At the same time for the vegetal waste it will implement a program of endowment with composting units for the individual dwellings that produce vegetal waste through the sanitation operators.

Concerning the treatment and neutralization of waste, the strategy under Chapter “Measures of energy efficiency”, provides to build Thermal Treatment and Energy Utilization Plant of the Municipal Waste from the Bucharest Municipality, which will produce thermal energy and electricity. This combustion plant will have a capacity of 300,000-350,000 t/year of waste, an operating period of 8,000 hours/year and will produce about 124,400 MWh/year of electricity and 335,000 MWh/year of thermal energy, thus obtaining thermal energy and electricity (from renewable sources as required by the EU Directives), contributing to the achievement of waste reduction targets.

On the basis of the requests of the Bucharest City Hall to the Ministry of European Funds, the Operational Program for Infrastructure (POIM) for the period 2014-2020 position 3.1 included the “Thermal Treatment Plant and Energy Recovery of Municipal Waste in Bucharest” co-financed from funds European in value of 180,000,000 Euros.

The implementation chart was sent to the Ministry of European Funds and JASPERS experts (partners of the European Commission to provide technical assistance for European funded projects) for the implementation of the facility.

The state of implementation of this project:

Currently, Contract no. 252/05.06.2015 *“Acquisition of consultancy services for the elaboration of the technical specifications and project management assistance contracts, including the application for financing of the European funds”* in order to achieve the project *“Thermal treatment plant and energy recovery of municipal waste in Bucharest”*.

At the same time, the procedures for the Services Acquisition are at the offer evaluation level:

- Technical assistance for the preparation of the project “Thermal treatment plant and energy recovery of municipal waste in Bucharest”;

- Management of the project “Thermal treatment plant and energy recovery of municipal waste in Bucharest”.

The installation of thermal treatment and energy recovery of municipal waste in Bucharest is imperative, as Bucharest's contracts with the Vidra and Iridex waste dumps expire in 2020, and other waste dumps are no longer allowed in Bucharest-Ilfov region.

Also, the strategy includes measures to raise public awareness and information for separate waste collection.

5. Regarding the analysis of the expenditures made by the non-economic additional payments to the Environmental Fund Administration, according to Art. 9 letter p) of GEO no. 196/2005 with subsequent amendments and completions due to the failure to meet the obligation to reduce the quantities of waste eliminated by storage.

Conclusions

1. Through the rectified budget of 2016 for Bucharest City Hall, 74.7% (41,120 thousand lei / 162,467 thousand lei) was allocated to the environmental protection and the budget execution for this item of expenditure was only 78.5%, which shows insufficient concern for the achievement of environmental objectives.

2. Although the European directives on waste management have been transposed into national law, this has not been done in accordance with Directive 2013/2/EU amending Annex I to Directive 94/62/EC on packaging and packaging waste and the 2012 Directive/19/EU on waste of electrical and electronic equipment.

3. The implementation of environmental projects for which financing contracts have been concluded has been difficult due to the inconsistent and insufficient regulatory framework governing public procurement.

4. Local authorities are required to achieve a preparation level for at least 50% of the total amount of waste, such as metal, paper, glass and plastic from household waste and other sources, by 2020, of re-use and recycling.

5. Territorial administrative units must meet the target of 15% annual reduction in the amount of municipal waste collected through the sanitation service.

6. Local authorities are obliged to implement selective collection, such as plastics, paper, metals and glass.

7. Incineration or recovery in special installations with 60% recovery of energy from the packaging waste.

8. For collection of electrical and electronic equipment waste from territorial administrative units a selective collection point will be set up for 50,000 inhabitants.

Bibliography

1. Directive 94/62/EC on packaging and packaging waste;
2. GD no. 621/2005 on the management of packaging and packaging waste, as subsequently amended and supplemented;
3. Directive 99/31/EC - on the storage of waste and for which a transitional period has been reached by 2017;
4. GD no. 349/2005 on waste disposal, with subsequent amendments and completions; - Council Directive 2000/76 / EC on the incineration of waste;
5. GD no. 128/2002 - on the incineration of waste;
6. Council Directive 2002/96/EC on waste electrical and electronic equipment (WEEE);
7. GD no. 1037/2010 - on waste electrical and electronic equipment;
8. Regulation no. 259/93 on the import, export and transit of waste by the end of 2015;
9. Law no.101/2006, of the sanitation service of the localities, republished;
10. Law no.51/2006 of community services of public utilities republished;
11. Law no. 215/2011 of the local public administration, republished with subsequent amendments and completions;
12. Law no.211/2011 on the waste regime;
13. Law no.101/2006 of the sanitation service of the localities modified and completed by Law no. 99/2014;
14. Government Emergency Ordinance no. 195/2005 - on environmental protection;
15. GD no.349/2005 - on the storage of waste.