

## WASTE MANAGEMENT - BEST PRACTICES FOR THE REPUBLIC OF MOLDOVA

### MANAGEMENTUL DEȘEURILOR – CELE MAI BUNE PRACTICI PENTRU REPUBLICA MOLDOVA

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**Abstract.** Waste management in the RM remains a difficult and still unsolved issue both from an organizational and institutional framework, as well as the creation of an integrated system of technical and ecological regulations in the fields of selection for recycling, recovery, disposal and storage of waste. This article proposes the study of the experience of foreign countries in the field of waste management and the possibility of implementing best practices in the Republic of Moldova. In order to achieve this goal, the practices of some EU countries were analyzed in order to manage and prevent waste. At the same time, the measures taken by the authorities from some selected countries regarding the waste management in the conditions of the Covid-19 crisis were studied. Within the research process, the policy documents from the EU waste legislation were analysed, but also the working documents of institutions responsible for waste management from some foreign countries.

**Keywords:** circular economy, covid-19, climate change, ecosystem, pandemics, pollution, waste management.

**JEL CLASIFICATION:** Q53, Q54

### Introduction

Waste is a problem that each year is increasing, affecting the whole planet. Everybody produces waste: on average, each of the 500 million people living in the European Union throws nearly half a tonne of household rubbish each year. Unused waste has a huge impact on the environment, causing pollution and greenhouse gas emissions that contribute to climate change and directly affects many ecosystems and species. Due to the fact that the created amount of waste is changing in terms of composition, most of all due to the increase of hi-tech products, the amount of waste at present contains a complex mix of materials, including plastics, precious metals and hazardous materials that seriously affect safe living.

Some ecosystems, such as marine or coastal ecosystems, can be severely affected by improper waste management or disposal. Environmental impacts throughout the life cycle are significantly higher than those occurring exclusively in the waste management phase. Anything that is not recycled or recovered from waste represents a loss of raw materials and other production factors used in the chain, respectively in the stages of production, transport and consumption of the product. Directly or indirectly, waste affects our health and well-being in many ways: methane gas contributes to climate change, air pollutants are released into the atmosphere, drinking water sources are contaminated, crops grow on contaminated land, and fish ingest toxic chemicals.

***What if we could use waste as a resource and thus reduce the need to extract new resources?***

Extracting less material and using existing resources could help avoid some of the impact created along the chain. In this context, unused waste is also a potential loss.

Waste management, as a notion, includes the activities of pre-collection, collection, transport, sorting, treatment, processing, recovery and / or storage of waste of all types, but also, the supervision of landfills after their closure.

Today, modern waste management, developed as a concept, at the level over the last few decades, takes into account the following main objectives:

- ensuring the protection of the population's health;
- environmental protection;
- maintaining cleanliness in public spaces with the dual purpose of protecting a health as well as aesthetic appearance;
- saving and conserving natural resources.

Transforming waste into a resource by 2020 is one of the main objectives of the ***EU Roadmap to an Energy Efficient Europe***. The roadmap also emphasizes the need to ensure high quality recycling, eliminate landfills, limit energy recovery from non-recyclable materials and stop illegal shipments of waste. The transformation of waste management is closely linked to EU waste legislation. The main legislative instrument in this area is the ***Waste Framework Directive***. It presents a hierarchy of waste management: it starts with prevention, followed by preparation for reuse, recycling and recovery and ends with disposal. The aim of the Directive is to prevent the greatest possible generation of waste, to use the waste generated as a resource and to reduce to a minimum the amount of waste that reaches landfills.

The Waste Framework Directive, together with other EU Waste Directives (on waste disposal, end-of-life vehicles, waste electronic devices, batteries, packaging waste, etc.) includes specific objectives. For example, by 2020, each EU country must recycle half of its municipal waste; by 2016, 45% of batteries must be collected; by 2020, 70% of non-hazardous construction and demolition waste (mass) must be recycled or recovered.

EU countries can take different approaches to achieving their waste targets. Some approaches seem to work better than others. For example, if well designed, landfill fees appear to be an effective way to reduce landfill waste. Increasing producer responsibility, which means that the manufacturer must receive the product back at the end of its life cycle, also seems to be an effective method.

## **I. European Legislative aspects on organizing waste management practices**

Waste EU legislation and policies have as an objective the stimulation of Europe's transition from linear to circular economy to boost global competitiveness, foster sustainable economic growth and generate new jobs (EC, 2020), but also to reduce negative environmental and health impacts and create an energy and resource-efficient economy.

The EU's ***Sixth Environment Action Programme*** (2002-2012) recognized waste prevention and management as one of four top prime concerns. Its primary objective is to guarantee that economic growth does not lead to the creation of a higher quantity of waste. This led to the development of a long-term strategy on waste. The ***2005 Thematic Strategy on Waste Prevention and Recycling*** resulted in the revision of the Waste Framework Directive, which is considered the basis of the EU waste policy. All revisions made brought a renovated approach to waste management, underlining the fact that waste is already not viewed as an unwanted burden, but a valuable resource.

The Directive focuses on waste prevention and sets new targets which will help the EU move towards the circular economy. It includes targets for EU Member States to recycle 50% of their municipal waste and 70% of construction waste by 2020.

The European Union's approach to waste management is based on the "waste hierarchy" which sets the following priority objectives for waste policy in the EU:

- To reduce the amount of waste generated;
- To maximize recycling and re-use;
- To limit incineration to non-recyclable materials;
- To phase out landfilling to non-recyclable and non-recoverable waste;
- To ensure full implementation of the waste policy targets in all Member States.

Another fundamental principle of waste management, enshrined in the directive, is "producer responsibility". Business entities, and primarily manufacturers of products, should be directly involved in ensuring the proper handling of substances, components and products formed in the process of its production and operation throughout the entire life cycle. This encourages product manufacturers to take measures to reduce the amount of generated waste and create technologies for their disposal already at the product design stage. According to the directive, the EU countries are obliged to create an integrated and developed network of waste disposal facilities, taking into account the best available and economical technologies.

**Waste Management Directive 975/442 / EEC**, as amended by General Directive 91/156 / EEC, defines a waste management system. It requires striving to reduce their generation, encouraging enterprises to process waste, including their disposal and use as energy sources. Where it is technically and economically impossible, industrial waste should be disposed of in a manner that does not result in environmental impact.

**Directive 91/689 / EEC** provides a precise definition of hazardous waste, introduces licensing requirements for treatment facilities and recommends plans for the management of hazardous waste, including disposal. Wastes on the list drawn up by the Community are recognized as hazardous. Within the framework of the said directive, a number of mandatory instruments and methods of control over the handling and disposal of hazardous waste are determined, which complement the list adopted in directive 75/442. **Directive 91/689 / EEC** establishes measures for the disposal, disposal of hazardous waste, prohibits enterprises and organizations to mix hazardous waste of various types, hazardous waste with non-hazardous. It clarifies the permissive and other requirements for the production activities of industrial enterprises, which are not provided for by the directive on waste management.

**Directive 2000/76 / EC** on the incineration of hazardous waste sets out measures to prevent and reduce the negative impact on the environment and human health of air, soil and water pollution caused by the incineration of hazardous waste, and determines the standards for the emission of toxic products by enterprises. Requirements for incineration plants for municipal waste were previously enshrined in directives 89/369 and 89/429, hazardous waste in directive 94/67, which sets emission limits for pollutants and the necessary conditions for waste incineration.

**Directive 75/439 / EEC**, supplemented by directives 87/101, 91/692, sets out the rules for the safe collection, cleaning, storage, disposal and disposal of oil waste, including waste oil. Regeneration, then incineration, destruction, storage or disposal of oil waste has priority in oil waste management. In addition, this EU directive has established requirements for their incineration. Waste oil incinerators must comply with emission standards for heavy metals, chlorides and fluorides. The directive prohibits the discharge of used oil into waterways and sewer systems.

Licensing has been introduced for the collection, processing and destruction of this type of waste, as well as other special requirements.

**Directive 99/31 / EC, Decision 2003/33 / EC** on landfills sets requirements for landfills. They provide for the organization, management, elimination and monitoring of their locations, the possibility of placing certain waste on them, establishes mandatory preliminary waste sorting and restrictions on the disposal of organic, hazardous and household waste.

**Directive 91/157**, together with Directives 93/86 and 98/101, regulates the handling of used batteries and limits the content of mercury, cadmium and lead. Batteries must be marked with a crossed-out wheeled bin symbol to indicate that they must not be disposed of in normal household waste. Prior to the amendments in 1998, EU members were required to establish a separate battery collection system. Following amendments, the use of batteries containing mercury was completely banned.

**Directive 86/278** regulates the use of sewage sludge in agriculture. It established maximum limits for the concentration of heavy metals in sludge and soil and delimited the conditions for the use of sewage sludge. The sediment and the soil on which it is used should be checked regularly for heavy metal concentration.

**Directive 78/319**, Council of Europe Regulation No. 259/93 sets out the rules for the transport of waste and the control of their movement within the European Community, their entry into the EU and removal from the EU.

Particular attention in the EU countries is paid to packaging waste. Used packaging materials - paper, cardboard, plastic, glass, wood, fabric make up the bulk of municipal solid waste (MSW), their share in the total mass reaches 60%.

**Directives on packaging waste 94/62 / EC, 2004/12 / EC and 2005/20 / EC** require EU member states to establish a collection system for packaging waste, develop technologies for their recycling and reuse. The standards limit the content of heavy metals in packaging materials.

In accordance with **Directive 94/62 / EC**, systems for the collection and sorting of such waste have been established in all European countries. In addition to the adopted directives and laws in the EU countries, 33 Guidelines of the best available technologies in the field of waste disposal have been developed. They establish requirements for technological installations and methods of handling various industrial waste. These guides are updated every five years, taking into account the latest achievements in the field of waste processing.

It is fundamentally important that the regulatory and legal documents adopted in the European Union and existing practice consider waste not only as an environmental pollutant, but also as an important source of secondary resources. For this purpose, they establish the minimum mandatory norms for the involvement of waste in economic circulation. So, for example, packaging waste must be disposed of at least 60%, including by recycling into secondary material resources - at least 50%.

Utilization of used cars in EU countries must ensure that at least 85% of the vehicle weight is returned to economic circulation (from 2015 - at least 95%), including through the reuse of parts and the production of secondary material resources by less than 80% (and with 2015 - at least 85%). Also, when disposing of large household electronic equipment, 75% of its mass must be recycled into secondary material resources, when disposing of gas-discharge lamps - at least 80%. It follows from the above that, if properly managed, waste can not only significantly reduce environmental pollution, but also reduce the consumption of primary material and energy resources.

## **II. Waste prevention best practices**

The national laws in the countries of the European Union are harmonized with the European environmental law and the recommendations of the Basel Convention. In countries such as Germany, Sweden, Austria, Denmark, Belgium, Netherlands there are three fundamental principles for solving the waste problem:

- reuse and recycle valuable waste components as secondary raw materials;
- if the inefficiency of recycling is impossible, the waste should be used as secondary energy resources;
- when the above methods are unacceptable, the waste can be identified for landfill disposal.

According to the European Commission, about 118 and 138 million tons of bio-waste is generated each year in the EU, including about 88 million tons of household waste. This tonnage is predicted to increase every year by 10% until 2020 (EC, 2020). The Commission estimated that in the average European Union 40% of biowaste remains in landfills (in some countries even 100%). Such a landfill can cause significant environmental risks (emissions of greenhouse gases, such as methane, which is 25% more painful than carbon dioxide), as well as the risk of soil contamination of the groundwater.

When looking at the food waste situation, it can be noticed that in some countries, this type of waste is being sorted in the course of their generation. For example, in the United States, food choppers installed under a kitchen sink are often used. The crushed waste goes into the waste and is disposed of together. In Germany, crushers use waste sifting with the help of a sieve. Such systems are currently equipped in many residential areas where biogas plants are located directly in the houses. With the help of biogas plants, the accumulated waste is processed into bio-gas, as a result, the water is heated and electricity is generated.

By providing themselves with energy, houses become partially autonomous. In Germany, there are more than 70 municipal waste disposal plants with the extraction of thermal energy (approximately 14 thousand GW/h) and electricity (approximately 5 thousand GW / h), and this makes up almost 0.6% of all electricity, which produced in Germany. There are currently 25 incinerators in the UK, and there are plans to build such incinerators in England, Scotland and Wales. However, due to the development of such a situation, some countries even face the problem of a lack of garbage to provide thermal plants. Thus, Germany and the Netherlands are forced to import waste from other European countries.

The total growth of electricity production as a result of the incineration of municipal waste in the EU has been 140% over the past decade. The production of energy from waste incineration has been constantly increasing, with the exception of 2008-2009, when the dynamics has decreased by 2%. In 2010, Germany accounts for 29% of the total energy production in the EU, followed by France (16%), Italy and the Netherlands (10% each). Nearly half of the energy produced by burning household waste is obtained from biodegradable waste (biomass). Incineration continues to be the primary means of generating renewable energy from household waste. In 2009, 7.7 million tons of oil equivalent of biomass energy was restored, compared to 2008, this is 3.3% more.

An extremely tense problem of municipal solid waste is in Japan. More than 50 million tons of solid household waste is generated annually in the Land of the Rising Sun. The Japanese solve this problem in different ways. 75% of the waste is incinerated, about 12% is recycled. Sorting involves 4.7 million tons of household waste per year. MSW is consumed in the preparation of eco-cement, which is used to strengthen the seashore. Currently, the demand for such products is growing at 6

million tons per year. Unfortunately, eco-cement cannot be used in structures with iron fittings, because of the chlorine compounds contained in its composition.

Effective strategies to promote public awareness of waste prevention and to reduce the generation of specific types of waste are already operating in some of the EU Member States as well as in other countries. These practices demonstrate excellent examples of informational, promotional and regulatory measures to stimulate the prevention of waste. They were selected in consideration of the following criteria – these practices are:

- Targeted: Practices have a strong waste prevention focus, clearly distinct from other waste management strategies or broad environmental goals;
- Innovative: Practices use original or resourceful techniques for waste prevention;
- Replicable: Practices can be easily reproduced and are similarly relevant in regions across Europe;
- Representative: Practices originate from a wide range of countries, operate at national, regional and local level, and target a variety of waste streams;
- Effective: Practices have clearly defined objectives and measurable results.

Below there are given some of examples followed by the EU countries as well as other states on waste prevention best practices (EC, 2020):

1) **United Kingdom – the Courtauld commitment:** represents a voluntary agreement between some of UK supermarkets and the Waste & Resources Action Programme (WRAP) and aims to diminish household waste by cooperating with companies to design out packaging waste growth and begin delivering absolute reductions in packaging waste. As a result, more than 35 major retailers, distributors and brands signed the Courtauld Commitment, representing 92% of the UK grocery market. The first objective of halting packaging growth was obtained in 2007 despite 1.8% growth in the grocery sector. Also, a series of 30 case studies demonstrating optimal food waste and packaging solutions was produced (WRAP, 2020).

2) **Italy - Eco-Point initiative for Bulk Good Sales:** CRAI supermarkets created the 'Eco-Point' initiative in 2005, offering bulk products with minimal packaging for dry food. Through Eco-Points, which are placed in certain sections of supermarkets, CRAI offers a new version of sales, responding to a growing public interest in environmental issues. Eco-Points offer everyday products, such as pasta, rice, cereals, legumes, nuts, coffee, spices and sweets, in a bulk format through direct dispensers. Also, special biodegradable bags are available for dry food, as well as reusable containers for liquid detergents. As a result, the 30 Eco-Points in Italy and Switzerland allows the prevention of the use of an estimated million packages per year. In the village of Oulx for example, 2.700 kg of product has been sold in bulk, saving around 12.300 packages since the opening of an Eco-Point in 2005 (EC, 2020).

3) **Ireland - The Green Business Initiative (GBI):** supports the goals of the National Waste Prevention Programme and promotes resource efficiency and waste prevention in Irish businesses and organizations, offering evaluative tools and advisory services in three areas - waste, water and energy. It is a publicly funded enterprise that makes the business case for efficiency, focusing on bottom line savings and the benefits of environmental recognition. GBI exposes case studies via its website demonstrating how SMEs are saving money by increasing their resource efficiency. Within its first year of activity, 190 hotels joined the Green Hospitality Awards initiative, 80 of which were rewarded with the bronze, silver or gold standard. Through waste prevention and recycling efforts, each hotel saved between 5,000 and 45,000 Euros, equivalent to 4,000 tonnes of waste that would otherwise have gone to landfill (EPA, 2019).

4) **Croatia - Zero Waste Manual:** is a vision and a concept, utilising a series of measures to reduce the national tonnage of waste, which was launched in 2007 by the Croatian NGO Zelena Akcija. It provides practical advice and tips to maximize prevention, reuse and recycling efforts in Croatia. It also recommends waste related measures mainly for local authorities, emphasizing the need for joint actions by all stakeholders (including NGOs and the general public). The practical advice provided in the Manual includes information about waste prevention, re-use, recycling, disposal, public engagement and diversion of residual municipal waste; guidance for local authorities on planning their waste related activities in the future, as well as advice on household actions, etc. (EC, 2020).

5) **USA - The Waste Cap Programme:** offers a wide range of personalized services to members to set off real reductions in waste generation at all stages of production. The objective is to help businesses transform waste into resources, by reducing waste generation at source and in substantively increasing recycling levels. Within their projects, WasteCap helps businesses optimize the quantity of material purchased and utilised, by minimising waste at all levels of activity. Another example is the **Waste Wise Programme** that was created in 1994 to encourage companies to set targets and measure results on waste prevention and recycling. Waste Wise targets key municipal solid waste materials such as cardboard, office paper, yard waste, packaging, wood pallets as well as certain industrial wastes, including non-hazardous batteries, oil and ink filters, sludges. There are used different measures to interest companies. Partners are in particular provided with tools: to plan an effective waste reduction programme; to measure their progress; to consult expert advisors; to report results and announce achievements. Also, partners are required to submit baseline data within two months of joining the programme and to track changes annually via the Re-TRAC audit tool. To motivate partners to be active, success stories are recognized through an annual "WasteWise Award" in different categories (business, government and educational sector) (EC, 2020).

6) **Flanders - Flanders' waste prevention plan:** has been active since 1981 and codified in legislation since 1994. The general objective of waste prevention in Flanders is to reduce the amount of residual household waste per inhabitant per year to 150kg. This waste should then be incinerated for energy recovery. All other household waste should be prevented, reused or recycled. A basket of measures is used to guide businesses, schools, designers and local authorities in waste prevention. Within this initiative a number of activities were implemented to reduce waste: MAMBO – an educational tool that calculates the financial burden of waste and works under the slogan of "Less waste, more revenue"; ProductTest.be – an online product database to support green procurement policies; Take-back obligations on a wide range of materials to increase producer responsibility; Eco-Efficiency Scan – a tool for SMEs to assess their eco-efficiency and identify areas for improvement based on potential business savings; Ecolizer – A tool for comparing the eco-impact of materials and processes to promote better eco-design. As a result, since 1995, the quantity of residual waste has been significantly reduced. Overall generation of waste has been approximately steady since 2000, while the amount landfilled has been reduced to near zero. The vast majority of waste is recycled or reused, and about one quarter is incinerated (EEA, 2016).

### **III. Waste management in Rep. Moldova – main problems and challenges**

Waste management in the Republic of Moldova remains a difficult and unresolved issue, both from an organizational and legislative point of view. Although the field of environmental protection is regulated by about 35 legislative acts and over 50 Government decisions, the legal aspect of waste management needs to be significantly improved, requiring both the revision and modification of the

legal and institutional framework and the creation of an integrated system. of technical and ecological regulation in the fields of selective collection for recycling, recovery, disposal and storage of waste.

So, as it was above mentioned, we can attest a relatively good regulatory framework for waste management:

- Adoption of the Environmental Strategy for 2014-2023 and the Plan of actions for its implementation by GD no. 301 of 24.04.2014;
- The National Energy Efficiency Program 2011-2020 and the Energy Strategy of the Republic of Moldova until 2030;
- Waste management strategy for 2013-2027;
- Projects within the program "Greening the economy in the Eastern Neighbourhood": Environmental tax reform, Development of the green economy, Development of consumption and sustainable production policies, Waste governance, Creating market incentives for green products, Sustainable public procurement, Greening SMEs, Pure production and resource efficiency, Promotion of organic farming, Evaluation environmental impact.

Also, as a member of the EU's Eastern Partnership and in accordance with the EU-Moldova Joint Action Plan, which is based on the Partnership and Cooperation Agreement (PCA), the Republic of Moldova needs to reform its policies in order to build a sustainable economy. Achievements notable in supporting the national ecological transition are confirmed by the creation of the group inter-ministerial work to promote sustainable development and the green economy, launch Project "Strengthening the capacity for the implementation of the fiscal reform in the field environment for achieving national and global environmental priorities" and the Roadmap to a green economy. In this context, the primary task becomes to make the most of the potential of those projects to achieve notable and lasting results.

At the same time, the problems of waste management in the Republic of Moldova represent for the actors involved a complex and difficult situation. Civil servants, who have decision-making power under current legislation and regulations, face insufficient, inaccurate and outdated information, thus increasing the complexity of public policy decision-making. The low degree of capitalization is caused by:

- **Reasons of a technical nature** (lack of separate collection and sorting infrastructure in most areas of the country, respectively lack of recycling capacities for certain types of materials, such as electrical and electronic waste);
- **Economic reasons** (lack of financial instruments to stimulate / oblige the sanitation operators to deliver the collected waste to treatment / recovery facilities and not to disposal).

It is also to mention that for certain types of waste there are practically no viable recycling options at national level (for example, for glass, there is both a relatively low technical capacity of glass factories to process waste and a lack of interest, given the poor quality of the glass waste provided, ie the additional costs that would be required to obtain waste of appropriate quality). The interest for recycling is higher in the case of metal, plastic and paper, but here too there are relatively large quantities that are collected separately and then transported outside the borders of the Republic of Moldova for actual recycling.

To create an effective waste management mechanism is not enough to develop the appropriate infrastructure. They will only be created if there is and operates a waste market. In this case, the aim of waste management policy must be to create a functioning market for waste management services.



#### IV. Waste management during the Covid-19 pandemics

The COVID-19 pandemic has already registered significant impacts on the waste sector all over the world. With the pandemics progression, public authorities and municipal waste managers were forced to rapidly adapt their waste management practices and systems.

The crisis is also moving along the value chain, involving new participants such as recyclers. At the same time, in some countries, surveys are performed (at national, regional or local levels) to estimate the impact and provide a report on waste collection and management practices during the lockdowns. Below, are given some of the practices from Milan, Ireland and France:

1) *The Italian National Authority responsible to rule the Energy, Water, and Waste frameworks* has issued on May 5<sup>th</sup> a resolution referring to non-household municipal waste fee modulation criteria as a result of the pandemic. It stipulates measures aimed at reducing the lockdown economic effects for various categories of users. The resolution will have to be transposed into local regulations by the local authorities responsible for the municipal waste management (AMSA, 2020).

At the same time, the Italian Institution for the Local Finance and Economy issued on 25 April a note with instructions to municipalities about offering waste fee reduction for businesses which have had to suspend their activities or have exercised them in a reduced form due to the emergency caused by the COVID-19 pandemic, as this situation for these users caused a lower production of waste.

AMSA – the waste operator for the municipality of Milan, prepared an overview of Milan's activities during the COVID-19 (AMSA, 2020), which includes information on: current situation and critical issues; a rationalization plan and main goals; waste data; waste collection services and indications for separate collection; street sanitation; measures to prevent contagion among workers; communication; citizens' collaboration.

2) In *France*, AMORCE (French network for information, sharing of experiences and support for local authorities in the field of energy transition, territorial waste management and water cycle management) issued on 13 May a note to specify per activity the conditions under which the staff involved in the process of household waste collection and processing can gradually resume their duties without specific risk of exposure to Covid-19. AMORCE recommends to resume activities according to 3 axis (AMORCE, 2020):

- progressive return to activity in a territory (including the creation of an appointment system, limited opening days, etc.) or limitation to specific streams;
- regulation of flow using the social distancing rules through filtering vehicles, recall instructions and limiting the number of users on site;
- close cooperation of all actors.

3) *Ireland* – basic decisions aided the response of the sector to the pandemics included the establishment of the High-Level Advisory Group for Waste, the appointment of the Regional Waste Management Offices and the creation of the Local Authority Business Continuity Group. The Regional Waste Management Offices developed a risk based Monitoring and Early Warning System for the sector and produced weekly updates throughout the period. The cooperation of a wide range of waste sector stakeholders ensured that the response of the sector was effective and efficient. Key stakeholders included government and regulatory bodies, representative associations, industry operators and observers (Regional Waste Management Offices of Ireland, 2020)

## Conclusions

Research and analysis of foreign experience on best waste management practices allows us to draw the following conclusions:

- The problem of waste is put forward among the most important problems facing mankind; solving it requires careful, balanced and diverse approaches with the participation of many stakeholders: first these are municipal authorities, representative bodies, supervising institutions, public organizations, the media, heads of enterprises;
- Implementation of any development programs is not possible without the active participation of the population, therefore, city authorities, public organizations and other interested parties should conduct targeted work to inform and involve the population in the waste management process;
- The main problem of waste recycling is not recycling technologies, but organizing the separation of the waste stream into materials that can be used for further use. With efficient separation it is possible to recycle up to 90% of the generated waste; the implementation of this process by the residents themselves is considered a more preferable option for separating waste, rather than the creation of specialized enterprises for this purpose;
- Even with the effective organization of the processing of secondary resources, at present there is a part of the waste that can be disposed of in landfills, landfills or incinerated. Thus, it is required to develop an economic mechanism and a system of regulations that stimulate waste reduction, separation and recycling. Integrated waste management systems should be created at the national, regional and local levels, combining organizational, economic and social approaches.
- To prepare for future pandemics, authorities should reinforce the existing structures, develop risk-based approaches on waste management. Also, there should be implemented activities to rigorously monitor the waste sector and improve the quality of data, as well as to provide guidance and promote awareness campaigns. At the same time, to deal with vulnerabilities and main challenges in the waste sector, authorities should reconsider the total thermal capacity calculation in future waste plans as well as address the coordination and integration of public waste infrastructure.

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