

OPTIMIZATION OF WASTE MANAGEMENT SYSTEM AS A FACTOR OF SUSTAINABLE DEVELOPMENT IN UKRAINE

The waste problem is one of the five key environmental issues in global scale. It has a strong connection with the global environmental issues: climate change, environmental pollution and biodiversity loss. That's why waste problem decision is among the sustainable development goals: decent work and economic growth, sustainable cities and communities, responsible consumption and production. Climate action and life below water also need some decisions in waste sector. Today, Ukraine is facing an intensifying waste crisis due to military actions and their secondary effects on the economy, legislation and social sphere. Solving the issue of effective waste management is one of the most important challenges in the post-war period.

Now another type of industrial and municipal solid waste (MSW) has appeared – demolition waste, which is comparable in scale to MSW. Generally, 98% of waste is industrial waste, 2% is MSW. As of 01.01.2021, more than 15.6 billion tonnes of industrial waste were accumulated, which is almost 1.0% more than in the previous year. At the same time the volume of industrial waste recovery does not exceed 30%. More than 85% of industrial waste is waste from the mining industry: overburden and products of mineral processing - sludge, tailings, etc.

In 2024, the population of Ukraine produced the large volume of MSW, more than 8 mln tones. Significant changes occurred with the start of the full-scale invasion of Ukraine in 2022. According to data for 2023, the volume of waste collected fell by 13.7%, and its weight by 10.7%. As expected, the most intense decline was observed in the eastern regions.

90% of them were disposed into waste disposal sites with the total area above 8.4 thousand of hectares. Unfortunately, landfilling will be the main way to solve the problem of MSW for a long period of time, and we must take it into account. In addition, each year 13000 illegal dumps with an area of 500 hectares are generated. Illegal dumps are insignificant in terms of both area (7% of the area of official burial sites) and volume (4.12 versus 171 thousand m³ per hectare for official waste disposal sites), and 90% of them are eliminated within a year. The technogenic load module was 451.78 tonnes per km².

On average, solid waste landfills occupy 0.016% of the territory, with 1.1 landfills per 100 km² and an average area of 1.5 hectares. The technogenic pressure module was 451.78 t/km². As of 2021, 172000 m³ or 28700 tonnes of solid waste were landfilled per hectare of waste disposal sites. Over the past year, landfills have been replenished with 4% more waste. Only 57 of landfills have leachate collection system and 26 have landfill gas collection system.

There is a big problem to use the MSW resource potential. Only 9% of MSW is using as a secondary raw materials. Recycling companies are experiencing a shortage of raw materials and are forced to import 5-30% of recyclables. In the same time our national recyclables are filling up already overloaded landfills. More than 60% of MSW is biodegradable, but are not recovery.

The third waste category is waste from destruction. They are formed as a result of military actions on the territory of Ukraine. According to some estimates, the volumes of its generation are comparable to the annual production of MSW in Ukraine. This necessitated urgent adoption in September 2022 the Resolution of 'Procedure for management of waste generated in connection with damage (destruction) of buildings and structures as a result of hostilities, terrorist acts, sabotage or works to eliminate their consequences'. Waste from destruction contains these main components: parts of buildings, engineer network and related components, hazardous waste, caused some problem to use the resource potential. That's why there is only one way to manage is moving to temporary waste storage. Currently, only a few cities in Ukraine (Kyiv, Kharkiv, Lviv) have landfills and sites for deconstruction waste. Therefore, it is necessary to urgently find locations and set up new landfills for construction waste and debris. For example, 62 temporary sites for storing waste from destructions have been set up in the Kyiv region. Currently, 48 of them are in use, with 144,000 tonnes of waste already stored there.

All of these challenges in waste sector caused that we need to develop and implement an effective waste management system for opposing the waste crisis. Nowadays, Ukraine is on the way to significant changes in MSW management area. In 2017 the 'National Waste Management Strategy in Ukraine until 2030' was approved. The main stage was the adoption in 2022 the framework Law of Ukraine 'On Waste Management'. It is grounded on "three whales" of Ukrainian waste management – waste hierarchy, circular economy and extended producer responsibility. But for various reasons, the implementation of these principles in real conditions is being delayed. Even with the transformation of the regulatory and legislative framework in line with European requirements and the availability of infrastructure for processing the most common and resource-efficient categories of secondary raw materials, limited funding determines the individual trajectory for solving the problem of solid waste in Ukraine.