TACKLING THE ISSUE OF WASTE CRISIS

Pavlo Kostiv

Educational and Research Institute of Nuclear and Heat Power Engineering, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

The issue of managing waste came on a global level. Annually, 2.12 billion tons of waste is produced across the world. A lot of garbage is disposed of illegally and oceans are filled with plastic waste. Worldwide the main waste management method involves burial in landfills. It's not rational to simply put all of the waste in the landfills, considering the long decomposition time, without sorting and recycling the amount of garbage is going to take up more and more space (Table 1).

Household waste:	Biodegradation time:
Food waste	5 days – 1 month
Paper	2 - 5 months

Car tires	2000 years
Plastic bottle	500 years
Glass bottle	1000000 years
Aluminum can	100 years
Nylon shirt	30 - 40 years
Painted wood	13 years

Table 1.

When buried under the ground and with anaerobic conditions (without access to oxygen) waste begins to biodegrade which leads to the formation of bacterial fungal infection with toxic gases such as methane (CH4) and carbon dioxide (CO2) (Mazur, 2022, p. 65). These types of gases lead to the greenhouse effect and pollute the environment.

In Ukraine waste management is a big problem, the lack of recycling stations leads to ecological catastrophe. A lot of garbage isn't being stored properly, being burned or thrown away into water sites. According to various estimates, there are over 30 000 illegal (uncontrolled) landfills, which is approximately 7% of the entire area of Ukraine.

However, household waste makes up only 5% of all waste, they carry greater danger for people and the environment. To solve this issue government and private enterprises should be interested in managing waste. To reduce the amount of garbage that comes to landfill it primarily should be sorted, and then either recycled or correctly disposed. Each type of trash should be divided into groups, and depending on that group there must be methods of taking care of it. The more financial resources are allocated to waste management the more different groups and methods can be used.

Components of household waste:	%
Food waste	35-50
Paper	10-15
Polymers	9-13
Glass	8-10

Metals	2
Textile	4-6
Wood	1
Construction waste	5
Other waste	10

Table 2.

Food waste makes up almost 50% of all the waste in Ukrainian landfills (Table 2). Organic waste can be put in a separate dumpster, sorted from other waste, and then taken to special areas for biodegradation. When decomposing waste needs additional oxygen supply to prevent the formation of greenhouse gases. Compost received due to this process can be used in agriculture, or sold to residents or industries for profit. To make the fertilization process more effective the waste can be additionally ground, and microorganisms can be artificially added.

Paper, glass, and metals can be collected, processed, and recycled into a raw material which can be then used for manufacturing new products. Polymers take a long time to biodegrade and they are difficult to reuse. But they can be recycled both mechanically and chemically. Plastic and rubber can be chopped, sorted by size and color, and then used in the production of something else. For example, rubber mulch is used for landscaping and playgrounds. Plastic can be incinerated with energy recovery, and rubber can be turned into fuel by pyrolysis.

The issue of waste can be managed in Ukraine and even globally. To make that happen government must fund and create favorable conditions for waste management businesses or solve the problem itself. Many enterprises worldwide have shown that it's possible to make money from garbage. People should understand and be taught about proper garbage disposal, as we are the only ones who can control our actions.

References:

1. Mazur, K. V., & Gontaruk, Y. V. (2022). Prospects for biogas production from waste of enterprises and households on solid waste landfills. Eastern Europe: economy, business and management, 65–66. https://doi.org/https://doi.org/10.32782/easterneurope.35-9

2. Baitsar, R. I., & Depko, K. I. (2009). Regulatory and legal provision of the sphere of management solid domestic waste, 206-207. https://vlp.com.ua/files/32.pdf
3. How Much Do We Waste? A Data-Driven Guide to Waste and Landfills. (2022, July 26). MeuResíduo. Retrieved from https://www.meuresiduo.com/blog-en/how-much-do-we-waste-a-data-driven-guide-to-waste-and-landfills/
4. How Long Does It Take for Common Materials to Decompose? (2022, August 15). Recycle Track Systems. Retrieved from https://www.rts.com/blog/how-long-does-it-take-for-common-materials-to-decompose/
5. Landfills and their impact on the environment. (2020, January 30). Reline waste and recycling solutions. Retrieved from https://www.reline.com.ua/statti/smittezvalyshha-ta-dovkillya/