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NECESSITY OF LANDFILLING - IMPACT ON THE ENVIRONMENT TODAY

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ABSTRACT

The future of waste disposal, which represents a major ecological and environmental problem in Europe and its individual countries, is still not solved in any effective way. Landfilling is directly related to the waste management programs of individual countries of the European Union, which mainly strive to mitigate the impact of waste on the environment. Improper handling of waste poses a threat to all components of the environment, therefore proper handling and subsequent processing is essential.

Keywords: Circular Economy; Environment; Landfilling; Municipal Waste.

1 INTRODUCTION

The situation with waste disposal remains uncertain due to various pressures, primarily economic, ecological, but also environmental. The suitability of landfilling, especially of municipal waste, is often questioned, despite the fact that, unfortunately, the amount of waste is increasing. With successful progress in the field of processing and subsequent use of waste as a consumer raw material, whether in the field of energy or further use, a fairly large breakthrough may occur after which we as a society could gradually get rid of the habit of putting waste in landfills. However, everything will depend on the suitability of choosing environmentally friendly technologies.

2 WASTE IN THE CIRCULAR ECONOMY

The circular economy is a model (Figure 1) of production and consumption in which things are not thrown away, but are shared, reused, repaired and recycled as far as possible. In this way, the lifetime of products is increased and waste is reduced. Thanks to recycling, after reaching the end of the product's useful life, the materials should then be used to produce a new product. Depending on the type, the waste can be temporarily or permanently stored in a landfill. As temporarily stored waste, we can consider, for example, old clothes that can be recycled and reused [1].

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Figure 1. *Infographic explaining the circular economy model [2]*

In the future, however, we should count on the possibility of gradually abandoning landfilling in order to free up vast areas that fundamentally affect the landscape and the environment. However, this will be quite problematic, but not impossible, according to many statements of leading representatives of individual states in Europe, given the diversity of the amount of waste production depending on the size of individual countries.

3 STATE ENVIRONMENTAL POLICY OF THE CZECH REPUBLIC 2030 WITH OUTLOOK TO 2050

With a view up to the period of 2050, this strategic document is at the top level. The first document was already adopted in 1995 and is currently number 6. Document is intended for a ten-year period (2020-2030). The document forms goals in the area of environmental protection of the Czech Republic, sets strategic direction and covers environmental issues in their entirety. Sustainable development goals and legislative documents at the national and international level are respected.

One of the strategic goals of the State Environmental Policy of the CR 2030 [3] is the transition to a circular economy, which is supposed to ensure proper management of raw materials, products and waste in the Czech Republic. With the growing population, there is an increase in waste production in the regions. Related to this is a greater burden on the environment and human health. The effort of many states is therefore to achieve the so-called decoupling, when the performance of the economy is separated from the pressure on the railways. Within the framework of sustainable development and management of natural resources, it is therefore necessary to focus on the prevention, minimization, recycling and reuse of waste and thus switch to a circular economy system.

The requirements for common and harmless raw materials must be taken into account when designing the product. This requirement will be ensured by the so-called material eco-design, which prevents obsolescence and increases the life of the product, enables it to be effective repaired and easy recycling. In the future, an increase in the potential of waste as a raw material is expected within the framework of recycling. The Czech Republic supports the hierarchy of waste management. Waste prevention is preferred over material recovery and recycling. Recycling, on the other hand, is preferred over energy utilization of waste, which in turn is ahead of landfilling. Closely related to waste management is the bioeconomy, which is based on the principles of sustainability, circularity and includes the production of renewable biological resources.

The Czech Republic will use the State Environmental Policy document to follow up on international EU documents such as the circular package adopted by the EC in 2005, the New Action Plan for the Circular Economy, A cleaner

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and more competitive Europe, the UN document Sustainable Development Agenda for the period 2015-2030, or Directive 199/31/EC or the plan circular economy of the Czech Republic.

Another goal of the circular economy document is to reduce the material intensity of the economy. Since the extraction of primary (non-renewable) resources is associated with a significant burden on the environment, the goal should be to ensure the production of products while limiting pollution and the impact on the environment (e.g., using secondary raw materials, recycling, nano materials, etc.). By using secondary raw materials, we can help reduce material inputs and the environmental burden associated with mining. In practice, this measure should primarily concern public contracts. Primary raw materials are planned to be reduced through fees or taxation. Innovation and development of new materials, procedures and technologies will reduce the material demand.

Last but not least, the goal should be the maximum prevention of waste. It is planned to expand the responsibility of producers, which imposes the obligation to reduce negative impacts on the environment (preventing the use of hazardous substances, low-quality materials, prioritizing design suitable for recycling). Environmentally friendly products can be marked with an ecological label. By supporting the consumer and also the contracting authority in the framework of public procurement in environmentally conscious decision-making in favour of products that are more environmentally friendly, the prevention of excess production for each consumer will be ensured. Products that are redundant or unworn can be returned to circulation (furniture, clothing, etc.). A significant volume in waste production is represented by consumer and transport packaging. That is why it is necessary to support the minimization of waste from packaging both for the consumer and for the trader, transporter or manufacturer. Food waste is an example of waste from unusable products (households, canteens, catering establishments, unsold goods from shops). By 2030, according to the document, it is necessary to reduce this waste by 50% per inhabitant. Unused food can be processed together with biological waste in composting plants or biogas stations, thus ensuring maximum use of the contained nutrients and energy.

Ensuring economic stability and neutrality within waste recycling should be key in relation to the waste management hierarchy. Construction and municipal waste are the most problematic groups in terms of the amount of waste produced. It is therefore necessary in the future to return construction waste to the production cycle or to use it in another way, for example for landscaping. A large part of municipal waste is still removed by landfilling, and more than half is used materially (recycling), and also a smaller part energetically (burning and production of electricity and heat). By 2035, the Czech Republic is obliged to meet European goals in accordance with waste regulations. Only 10 % of municipal waste will be landfilled [3].

According to data from EUROTSTAT in 2016, the Slovak Republic was 21st and the Czech Republic 13th in the share of landfilled waste. For comparison, Denmark ranked first with a share of only 3%, and Estonia ranked last with a share of up to 83% of landfilled waste from the total amount of waste. In order to determine the cause of the high proportion of landfilled waste, it was necessary to analyse the areas of the economy with the largest proportion of waste going to landfills, with an effort to reduce this proportion. Municipal waste still has the largest share, especially mixed municipal waste (Fig. 2). Other sources of waste are mainly the steel industry and waste produced during the production of electricity (e.g. furnace slag, ash, slag, etc.). These types of producers were and continue to be the main challenge in the field of waste management from the point of view of diversion from landfills. Considering the variety of waste generated in the economy, part of which cannot yet be recycled or energy-efficiently evaluated, municipal waste is the most important stream of waste that the Slovak Republic could shift to more positive numbers when changing disposal. In its third assessment of the European environment, the European Environmental Agency (EEA) assessed that, despite the measures taken (increased recycling rate, etc.), the volume of municipal waste continues to increase. Due to the different understandings of the definition of municipal waste by individual states, it was a challenge to adopt a clear basic definition in connection with the EU Action Plan for the circular economy [4].

4 EFFORTS TO PREVENT THE GENERATION OF WASTE

Waste prevention is implemented by using planning measures or other economic tools supporting the efficient use of resources. It is also important to support research and development in the area of achieving cleaner (more ecological) products and technologies, and products and technologies from which there is less waste. The development of relevant indicators of environmental pressures associated with the generation of waste should contribute to the prevention of waste generation at all levels, from the comparison of products at the EU level through the activities of local self-government bodies to national measures. Influencing the design of production and the distribution of eco-design supports means the systematic incorporation of environmental aspects into the design of products with the aim of improving the environmental performance of the product throughout its entire

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life cycle. Related to this will be the provision of information on waste prevention techniques to enable every industry to use the best available techniques. It is assumed that the use of awareness raising campaigns or the provision of financial, decision-making or other support to companies will also be beneficial. Such measures have proven to be particularly effective when they are targeted at and tailored to small and medium enterprises and operate through established business networks [1].

5 ENERGY USE OF WASTE

One of the representative examples for energy use of waste can be a biogas station, i.e., a device where, during the decomposition of organic substances (biowaste), biogas is produced by anaerobic fermentation in closed containers (fermenters) without access to oxygen, which is taken and burned in a cogeneration unit with the production of electricity and heat. Electricity and heat are produced primarily from organic waste, which is an inherently efficient way of removing it. In addition to gas, the output product of the anaerobic fermentation process is digestate, which is a mixture of solid and liquid fermentation residue, which can be further used as fertilizer in agriculture [5].

***Figure. 2**. Mixed municipal waste dump (Photo by Val'o A.)*

6 CONCLUSION

There is a direct connection between waste dumping and the environment, as landfilling directly interferes with it. However, the necessity of dumping waste in landfills (landfilling) is unfortunately still very important, as suitable technologies have not yet been implemented in practice, which could change in a favourable future for the environment. The appropriate choice of technologies, the correct processing of waste or, ideally, the prevention of waste generation would make our environment a little cleaner and healthier and, above all, we would ensure a cleaner future for future generations.

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