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Recovery and Recycling of Waste Tires in Poland

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Abstract

The article aims to make a market diagnosis of the recovery and recycling of waste tires in Poland and to indicate development trends in this area. In the study the analysis of organizational and legal conditions for the recovery and recycling of used tires was carried out. Additionally, main problems and development prospects of the market recovery and recycling of waste tires were highlighted. Research methods such as literature analysis, legislation and statistical data analysis were used. The main finding of the analyses is that used tires from a problematic waste have become to the desirable raw material in industry. This was possible thanks to the implementation of effective management tools in waste management.

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1. Introduction

In the European Union waste treatment hierarchy recovery and recycling take the second place as the most desirable direction after the prevention of waste. Entrepreneurs in Poland, by the provisions of law, since 2001 have been subject to an achievement obligation of the level of recovery and recycling of certain types of waste. The period of 15 years functioning of recovery and recycling market makes possible to observe changes that have been made on it and to assess the effectiveness of the instruments in waste management. An example of waste, which well illustrates the changes in the recovery and recycling market are used tires.

The article aims to make a market diagnosis of the recovery and recycling of waste tires in Poland and to indicate development trends in this area. Research methods such as literature analysis, legislation and statistical data analysis were used. The study covered the period 2002-2014 because such data are currently available in official statistics. In

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the study in-depth interviews and own observations were used that was possible through long-term author's cooperation with recovery organizations.

2. Organizational and legal conditions for the recovery and recycling of waste tires in Poland

In the literature as well as in practice most often used definition of waste comes from Waste Framework Directive and is defined as any substance or object which the holder discards or intends or is required to discard [1]. Another definition highlighting the characteristics of the waste determines it as a solid or liquid (but not being waste water) by-product coming from production or consumption, useless in time and place where it was created and harmful or onerous for environment or people [2].

There is a rather complicated definition of waste recovery existing in Polish law, which means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy [3]. In practice, most often waste recovery means energy recovery. It is the conversion of non-recyclable waste materials into useable heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolyzation, anaerobic digestion, and landfill gas recovery. This process is often called waste-to-energy (WTE), [1].

In the tires case mainly energy recovery is used. It involves burning tires in whole or after earlier shredding them. During combustion the heat is produced which is used in technological processes such as the clinker-burning in cement kilns or for the steam production in power plants. The calorific value of the rubber is comparable to or even higher than the calorific value of coal. In cement kilns tires may be for up to $\frac{3}{4}$ of the required fuel mass. In Poland, the biggest interest in energy recovery from tires is expressed by cement factories.

The second most common method of waste tires processing is recycling. It means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations [3]. Another definition of recycling describes it as a system of cyclical economic exploitation of waste as secondary raw materials from exploited, defective or damaged products. The possibility of re-use of these products is due to the fact that they are made from renewable materials what means it is possible to restore them the original properties or to recover of the individual components or to remove harmful components from them by carrying out appropriate treatment [4].

In the case of waste tires, material recycling involves their use after being subjected to regeneration, compaction, fragmentation, dissolution processes. It is also a rubber processing for the recovery of raw materials used for its production.

Recovery and recycling of waste are elements of the waste management system. Waste management means collection, transport, treatment and disposal of waste as well as control, monitoring and regulation of the production and mentioned processes. It covers also prevention of waste production through in – process modifications, reuse and recycling. In the general waste management system three main elements can be distinguished: management institution, management instruments and managed object. In the process perspective objects of steering are following:

- Preventing the creation of waste
- Generating waste
- Selective collection
- Recovery and recycling
- Waste neutralization
- Storing on landfills [5].

Regarding to the specific waste, which are used tyres, the main role plays following institutions: minister responsible for the environment, marshals of provinces and The National Fund for Environmental Protection and Water Management (NFEP&WM).

Minister of the Environment is responsible for the realization of tasks resulting from the laws regulating waste tyres management.

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