Analysis of Industrial Waste Management Efficiency as Part of a Sustainable Business Development Strategy

Katsiaryna Afanasyeva (Euphrosyne Polotskaya State University of Polotsk, Belarus),
Alena Malei (Euphrosyne Polotskaya State University of Polotsk, Belarus),
Volha Sushko (Euphrosyne Polotskaya State University of Polotsk, Belarus)

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Abstract

The article presents methodology of analysis of industrial waste management efficiency based on the concept of balanced scorecard, which allows to assess environmental, economic and social efficiency of waste management in accordance with the strategic objectives of business development. The information basis for the process of industrial waste management and analysis of the efficiency of their treatment is the waste accounting system recommended by the authors at its' life cycle stages in the context of the following objects for management: industrial waste in physical terms and at fair value, the cost of industrial waste management (in terms of actual costs for their collection, accumulation, recycling and disposal). Analytical support for the industrial waste management process is provided by the developed system of environmental, economic and social indicators of the efficiency of the company and the effectiveness of management efforts in the field of waste management, which will determine the degree of fulfilment of the strategic goals of the company's sustainable development.

Introduction

Global climate change and the state of the Earth's ecosystems (Lutz, Zieschank, & Drosdowski, 2017; Steffen, Richardson, Rockström, & Cornell, 2015) coincided with the global economic crisis, which (Bina & La Camera, 2011) led to the search for new solutions aimed at a socially responsible and environmentally sustainable economy that goes beyond the usual growth strategies (German Federal Statistical Office, 2012; Hertwich & Peters, 2009; Wiedmann et al., 2013). Thanks to the United Nations Environment Program, the idea of a “green economy” has become a strategy that aims to reduce environmental pollution, increase the efficiency of energy and natural resources (UNEP, 2011). During the Rio + 20 Summit in 2012, representatives of 191 countries presented the green economy in the context of sustainable development for the first time. The summit culminated in the UN Resolution “The Future We Want”, in which the international community officially recognized that “green economy” can enhance the ability of companies to manage natural resources sustainably and reduce negative environmental impacts, improve resource efficiency and reduce waste.

For the Republic of Belarus, the issues of environmental pollution and sustainable management of natural resources are also extremely relevant. Thus, the National Action Plan for the Development of “Green economy” in the Republic of Belarus highlighted a number of unresolved interrelated environmental, economic and social problems, among which one of the most urgent is the accumulation of waste (Government of the Republic of Belarus, 2015).

The concept of sustainable waste management was first formulated at the Earth Summit, also known as “Agenda 21” in 1992. Minimizing waste generation, maximizing recycling, reuse and environmentally friendly disposal of waste are key criteria for sustainable waste management. The main provisions of the 3R Initiative concept formulated at the G8 summit in 2004 in Japan (reduce – reduce waste generation, reuse – waste reuse, recycle – waste recycling as secondary resources) (Tulokhonova & Ulanova, 2013) are considered as principles of sustainable waste management system. According to the concept of sustainable development, a waste management system must satisfy three fundamental components of sustainable development: environmental sustainability, economic viability and social acceptability.

The research of industrial waste management mechanism and the development of the methodology for its implementation is the object of scientific research by many authors, which confirms the relevance of the research.

The purpose of this article is to develop a system for assessing the efficiency of industrial waste management, which will allow companies to ensure competent waste management in order to achieve strategic goals in accordance with the concept of sustainable development. To do this, it is necessary to solve the following tasks:

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  highlight the company's target guidelines in waste management and, in accordance with them, improve management facilities to achieve economic, environmental and social sustainability;
- -
  develop a system of indicators for planning purposes, continuous monitoring of company's waste management efficiency based on operational information and determining the degree of implementation of the strategic goals of company's sustainable development.

Background

In the mid-2000s, the term “integrated waste management” became widely used in the research community. For the first time this term was mentioned in technical aspect in the 1970s in the works of such scientists as Murray R.U., Shivers R.U., Ingelfinger A.L. Their works resulted in a number of developments in the field of integration of solid waste management with wastewater treatment, as well as with energy generation and food production (Murray, Shivers, Ingelfinger, & Metzger, 1971; Ingelfinger & Murray, 1975). The integration of various technical elements into a single waste treatment process was considered by S.A. Crocker, L.F. Diaz, S.J. Golueke, D.J. Smith. (Crocker, 1983; Diaz & Golueke, 1989; Smith, 1990).

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