WASTE MANAGEMENT IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

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Abstract: *This paper presents the results of research concerning waste management system as one of the strategic goals of sustainable development. Waste can be both a resource and an environmental problem. Our strategic goal is to make waste a resource. Nowadays we have global trend to reduce, re-use, rework, recycle, recover, so-called 'waste' products. One company's waste or even one person's waste can now become another company's (person's) valuable raw material. And it has an economic impact. Also, with changing technologies, availability and cost of origin input materials, the demand for, or need to use recovered wastes is changing too. In order to promote sustainability with regard to waste management, appropriate waste solutions must be put in place. However, perspective on the area of waste is required to attain sustainable waste management. Various measures that reduce the volumes of waste streams according to the hierarchy for different methods of treatment are required. Recycled raw materials saves energy compared with the use of new raw material. Each opportunity we have to reduce our impacts on the planet is a step forward towards the implementation of sustainable development. And we can defy improving waste management as one of the main goals for sustainable development.*

Keywords: *Waste, sustainability, recycling, strategy, sustainable development.*
JEL Classification: *Q2, Q5, F6.*

1. Introduction

This paper presents the results concerning personal research of the situation of municipal solid waste management,relative to EU requirements. The aim of this research is to understand the environmental effectiveness of the solid waste management. Data were collected personally from different organizations.

This paper is the continuation of a series of publications presents waste management and its vitality for global sustainable development. Among these publications is the paper "The improvement of waste management system in the Republic of Belarus".

In the context of sustainable development, waste management is an activity that shapes the environmental protection. Sustainability has become the model of development adopted at international level, whereby both organizations and people act in accordance with the principles and its amendments. Since past centures that is seeking reconciliation between economy and ecology and until present, the concept of sustainable development was shaped by the various interpretations. Currently most organizations associate sustainable development with environmental protection and with actions related to society. Environmental concerns are still intense. Organizations and municipalities develop intensive activities in this direction. Together with measures to reduce waste, waste management contributes significantly to the achievement of sustainable development. This activity of waste management is complex and differently solved in European Union (EU). This paper analyzes the situation of waste management solutions in correlation with international provisions. Research are structured in various directions: the waste management definition, importance of waste management for sustainable development, international and EU experince. The paper ends with conclusions and future research directions.

2. Waste: past and present

Waste has always been a natural part of past ecosystems.Waste has always existed, and it has been generated by all living beings on the Earth. However, nothing was wasted in the natural system that is characterized by ecological harmony and circulation. Waste

was naturally transformed into a useful organic resource for other organisms in the circular process of the nature. Humans generated waste daily in the past, as we do today. Before the Industrial Revolution, people produced organic waste, as explained above. People created, and consumed items from nature, which would degrade naturally when the items became waste. Organic waste was used in various ways, such as a fertilizer. Also, people sold or exchanged an unwanted item in the market, when they no longer wanted it. Solid waste disposal and management is both an urban and rural problem. Every person is a potential generator of waste and thus a contributor to this problem (Adams, 2001).

Waste has become a serious social and environmental issue, qualifying now as a waste crisis.

For the understanging of the topic , author gives the decription of waste, it depends on many factors.

Table no. 1. Classify different types of waste. Waste description.

Waste description
the waste classification code, also referred to as LoW (List of Waste) or EWC (European Waste Catalogue)
whether it's hazardous
the type of premises or business where the waste was produced
the name of the substance or substances
the process that produced the waste
a chemical and physical analysis
any special problems, requirements or knowledge related to the waste

Source: Gov.UK

3. Waste management policy and measures

According to explanations waste management or waste disposal are all the activities and actions required to manage waste from its inception to its final disposal. This includes amongst other things collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling.

Waste management is a complicated issue that involves a variety of political, social, economic, technical, and environmental factors. Framework are generated to demonstrate their economic, environmental and social impact. Management of municipal solid waste (MSW) is a constant challenge around the world.

Nowadays EU waste management policy includes a range of measures across all 5 tiers namely, prevention and minimization, reuse, recycling, recovery and disposal. In Europe, waste is increasingly being used to produce both materials and energy, and recycling now saves more greenhouses gases than it generates. However, many developing and emerging countries are faced with the major challenge of improving their inadequate and unsustainable waste management systems. Waste must no longer be deposited in residential areas and uncontrolled landfills or end up on illegal rubbish tips and in waterways.Around 476 kilogrammes per person of municipal waste were generated in the European Union (EU) in 2015, with a significant portion – around one-third of all municipal waste in 2012 – still being disposed of in landfills. To manage waste as a resource, instead of as a problem, the waste industry will have to become a key partner of businesses operating in the circular economy. This means a transition from the "collect and dispose" method of waste management to prevention and maximising both the value and volume of resources within the economy. A new study published by the Scientific Foresight Unit of the European Parliament's Science and Technology Options Assessment (STOA) assesses the role of five waste streams – municipal waste, packaging waste, food

waste, bio-waste and critical raw materials – in the transition towards a circular economy in the municipalities and Member States of the EU. It examines the current policy landscape, trends, technologies, employment opportunities and future policy options for the EU. The analysis shows, amongst others, that half of the 28 Member States currently landfill more than 50 per cent of their municipal waste, while six Member States have met the 2030 target of no more than 10 per cent of municipal waste landfilled.

According to the World Bank's estimations,in 2012 world cities annually produce approximately 1.3 billion tons of solid waste (World Bank, 2018). With rapid population growth and urbanization, municipal waste generation is expected to rise to 2.2 billion tonnes by 2025.

Managing waste properly is essential for building sustainable and livable cities, but it remains a challenge for many developing countries and cities. Effective waste management is expensive, often comprising 20-50% of municipal budgets. Operating this essential municipal service requires integrated systems that are efficient, sustainable, and socially supported (Chambers, 1994).

In my opinion, for local and national administrations, the costs associated with waste management are considerable. In order to reduce these costs or meet them in a way that is effective and socially responsible, they must first be made transparent. In addition to the traditional approaches to financing, such as fee systems, the advisory project is increasingly developing economic incentive systems to avoid or recycle waste. The focus here is on concepts such as product taxation, deposit systems or user charges (Bekin and Carringan, 2007; Russell, 1988; Chambers, 1994).

Author has made the analys of international companies experience and conclude that: in recent years, waste disposal companies have increasingly been offering partners in developing and emerging countries technologies for recovering energy from waste, based in part on their potential for climate change mitigation. The project supports decision-makers in selecting adapted waste-to-energy technology and evaluating product offers.

In my opinion, this waste crisis has resulted from these three following factors; technological advances, mass consumption, and changes of people's practices in consumption and waste disposal behavior.

4. Sustainable development goals correlating with waste

Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs (Sachs, 2015).

At the environmental level, sustainability prevents nature from being used as an inexhaustible source of resources and ensures its protection and rational use. Aspects such as environmental conservation, investment in renewable energies, saving water, supporting sustainable mobility, and innovation in sustainable construction and architecture, contribute to achieving this environmental sustainability on several fronts.Successfull waste management plays an important role at the envoronmental level.

On 25th September 2015 the United Nations will announce the sustainable development goals (SDGs), a set of goals that aim to make our planet fair, healthy and sustainable by 2030 (United Nations, 2018).

The main goals are:

-Eradicate poverty and hunger, guaranteeing a healthy life;

-Universalize access to basic services such as water, sanitation and sustainable energy;

-Support the generation of development opportunities through inclusive education and decent work;

-Foster innovation and resilient infrastructure, creating communities and cities able to produce and consume sustainably;

-Reduce inequality in the world, especially that concerning gender;

-Care for the environment combating climate change and protecting the oceans and land ecosystems;

-Promote collaboration between different social agents to create an environment of peace and sustainable development.

So sustainable development is one of the main goals of the United Nations. Waste management is one of the main aspects of sustainable development.In that case, waste management is one of the main goalf of the United Nations. And sustainability is the foundation for today's leading global framework for international cooperation.

In my opiniopn, for the goals to be reached, everyone needs to do their part: governments, the private sector, civil society and people.

Despite the superirity of waste prevention, the amount of research on the subject is relatively limited in comparison to other topics in waste management. When it comes to waste management at a global scale, attention is mostly focused on establishing improved waste management system in developing countries, such as collecting and delivering waste to designated locations under a municipality's authorityand international cooperation. With regard to the strengths of governance networks, they appear to be a promising way to govern in politics or public administration (Sachs, 2015; Adams, 2001; Bekin and Carrigan, 2007; Russell, 1988).

5. Zero waste cities. Challenges and opportunities

Zero waste and sustainable materials management (SMM) are two ways of reframing the process of waste management, by envisioning waste as potentially useful material. At this point, zero waste is an aspirational goal, and while many cities are working towards it, they must dispose of their waste somehow before they get there

The European Union imposes strict operating conditions and technical requirements on waste incineration plants and waste co-incineration plants to prevent or reduce air, water and soil pollution caused by the incineration or co-incineration of waste. The directive requires a permit for incineration and co-incineration plants, and emission limits are introduced for certain pollutants released to air or to water (Municipal Waste Europe, 2016).

In 2015, the European Commission released Closing the loop – An EU action plan for the circular economy (EU, 2015). This action plan focuses on "the circular economy," the life cycle of materials, and the transition to a more sustainable business model. From this perspective, the plan formulates a long-term strategy of increasing source reduction and recycling, changing mindsets around how waste is discarded, and increasing efficiency in the overall waste management system.

Zero Waste Europe, an organization aimed at redesigning how European nations manage and think about waste, praised the European Commission for releasing these reports that focus on reframing waste in Europe and view the larger picture when it comes to materials management (Zero Waste Europe, 2017).

In this topic we can define certain terms related to WTEFs (Russell, 1988):

- Energy recovery from waste is the conversion of non-recyclable waste materials into useable heat, electricity, or fuel through a variety of processes, including combustion, gasification, pyrolization, anaerobic digestion, and landfill gas (LFG) recovery. This process is often called waste-to-energy (WTE). Converting non-recyclable waste materials into electricity and heat generates a renewable energy source and reduces carbon emissions by offsetting the need for

energy from fossil sources and reduces methane generation from landfills. After energy is recovered, approximately ten percent of the volume remains as ash, which is generally sent to a landfill.

- Incineration means the controlled process which combustible solid, liquid, or gaseous wastes are burned and changed into noncombustible gases.
- Incinerator means a facility consisting of one or more furnaces in which wastes are burned.

Table no. 2. Classify WTEFs terms

	WTEFs terms:
Energy recovery from waste	
Incineration	
Incinerator	

Source: The World Bank

But, despite the promises of reducing emissions and increasing jobs, zero waste policy goals can be difficult to achieve. Some of the challenges for zero waste include short term thinking of producers and consumers.

Therefore, it is imperative that municipalities consider both the barriers and opportunities within zero waste policies to ensure that economic, social, and equity concerns are met.

6. Conclusions

The authors conclude that reliable, consistent and harmonised data is needed to better monitor and compare the state of waste management and progress towards a circular economy across and within EU Member States. Policy makers may provide stronger clarity on definitions as well as support further research toward development of a monitoring system including future modelling assessments taking wider social, environmental and economic indicators into account.

Waste management is connected with many other areas, affecting sustainable development, including urban development, water, energy and food security.It takes into consideration the environmental, social and economic aspects of waste management.

I would say,that without good solid waste management is hardly to built a sustainable and livable area.

Becoming part of the solution or problem, dilemma for people and duties of municipalities. To maintain a control over any type of waste, municipalities are playing a key for waste management. Waste is created by human and when people are aware of the affects if the waste, they will have to make a choice whether they will be part of the solution or keep on making things worse. So municipalties are becoming to manage a valuable resource if they manage to collet them properly.

Even if a city can reach a "zero waste-to-landfill" goal, there will always be some waste left.

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