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Strategic Solution of Ecological Problems in the Industrial Environment

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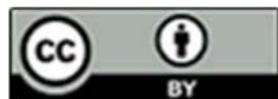
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ABSTRACT

The strategic business of industrial companies, observed on a global level, conceives of insufficient commitment of management to the environmental situation, which is influenced by an increasing number of harmful factors in the environment. Bearing in mind that the world's population is growing faster, according to the data, it is estimated that by 2050, that number will exceed the figure of more than 9 billion. This means that with the increase of the population, the consumption of a large amount of natural resources also increases. Surveys of statistical data in the field of environmental protection in the world show that if the world's natural resources are evenly distributed, in 2050, people will have at their disposal about 25% of resources per capita. Accordingly, it is important in the industrial environment to include experts from various fields: biologists, medical workers, ecologists and experts who can purposefully, based on their profession, contribute to the preservation of the planet, clean water and air. From the strategic aspect, in companies, this is solved within the framework of faster development of management awareness, which should be focused on understanding and greater understanding of the concept of "environmental protection". This means preserving an important industrial and living system, which should contain a set of measures that will protect the entire business space, the human environment as well as the entire biosphere from harmful influences. The importance and obligation of the management is, accordingly, to be ready at any time to eliminate or reduce the harmful changes that have occurred to the healthy environment, which have occurred as a result of the operation of their industrial plant. The paper presents strategic approaches to research of important performances of the development of the situation with the resulting environmental problems as a consequence of industrial production in the environment.

Keywords: Environmental Problems, Industrial Environment, Pollution Factors, Managerial Awareness, Strategic Problem-Solving Measures



Introduction

The global ecological situation is influenced by an increasing number of harmful factors within the state of Serbia and within the Region. Given that the world's population is growing faster, it is estimated that by 2050 it will exceed the figure of more than 9 billion. This means that with the increase of the population, the consumption of a large amount of natural resources increases, which are less and less available.

A survey of statistical data in the world shows that if the world's natural resources are evenly distributed, people will have about 25% of resources available per capita in 2050. According to the data, in the world today (2020), due to the Corona-19 virus pandemic, the number of inhabitants has decreased.

Consideration and analysis of the state of environmental strategy at the global level shows that it is important to involve experts from various fields as soon as possible: biologists, medical workers, ecologists and experts who can purposefully explain to the world in different ways the importance of preserving the Earth, clean water and air.

In the industrial world, the consciousness of management should be focused on the knowledge and greater understanding of the concept of "environmental protection". Observed evolutionarily, when there were no large industrial giants, until today, the environment has represented and still represents: the environment (environment) in which the industry operates in large%, in an effort to expand rapidly, polluting the air, water, land, natural resources, flora, fauna, people and their interrelationships.

According to *the importance of preserving a healthy environment*, it should be defined as: an important living system, which contains a set of measures that will protect the entire human living space as well as the entire biosphere from harmful influences. The importance and obligation of managers is to be ready at all times to eliminate or reduce the damage to the healthy environment, which occurred within the work of their industrial plant.

This includes:

- preservation of clean air, soil and water,
- waste disposal,
- protection against noise and radiation,
- utilization of resources through recycling, etc.

Research shows that waste generated from industries in Serbia, the EU and beyond should be categorized as hazardous waste, which includes properties: explosiveness, reactivity, flammability, allergy, toxicity, ecotoxicity, harmfulness, infectivity, carcinogenicity, teratogenicity, corrosivity and release of toxic gases by chemical reaction or biodegradation, etc.

Having in mind the harmful effects caused by waste, it should be known that it occurs in various forms that occur in containers with liquid chemicals, all the way to light bulbs and batteries that contain heavy metals.

Research shows that manufacturing industries can be the biggest source of hazardous waste, but it also accumulates in hospitals, laboratories, farms, small and medium-sized enterprises and even households.

The use of recycling in industrialized countries in the world is one of the most effective ways to preserve the environment.

Un environmental programs

According to research data, the United Nations Environment Program estimates that between 300 and 500 million metric tons of hazardous waste are generated worldwide each year. Poor and inappropriate waste disposal is a potential cause of dangerous effects on the health, economy and politics of the countries of the world. The problems are with (UN Environment Program):

- Contamination of the soil (pollution of the deep soil layer and its surface)
- Disruption of natural habitats
- Loss of earning a living
- Diseases and injuries
- Economic growth of the economy, etc.

Sustainable development goals

According to the data, at the Summit held in September 2015, the United Nations adopted Resolution A/RES /70/1 - Transforming our world: the 2030. Agenda for Sustainable Development. The 2030 Agenda is a universal strategy and the signatory states are expected to mobilize all resources in order to achieve the goals by 2030. The 2030 Agenda, with all 17 goals, includes three dimensions of sustainable development:

- economic growth,
- social inclusion and
- environmental protection.

Serbia took part in the development and writing of the Sustainable Development Agenda through the involvement of citizens in the process through consultations on the development agenda after 2015 and direct participation of state representatives in global forums defining sustainable development goals, and in 2019 submitted a National Report on its implementation. Workshops dedicated to the Sustainable Development Goals were held. More than 50 representatives of the institutions took part. The workshop had the following goals:

- Increase in the number of available indicators,
- Exchange of information related to the implementation of the UN Agenda,
- Maintaining contacts with producers and users of statistical data on the Sustainable Development Goals (COR), with a recommendation to take into account the quality of data, etc.
- To prepare a Report on the progress of achieving the goals of sustainable development by 2030 in the Republic of Serbia as an important aspect of the implementation of the Agenda for Sustainable Development until 2030. This report aims to show the situation in the second half of 2020 COR in the Republic of Serbia. This seeks to strengthen the factual basis for monitoring and further improving policies that lead to the achievement of these goals.

Strategic commitment for sustainable development in serbia

The concept of this strategy includes: A vision of sustainable development compatible with EU standards, and with a knowledge-based economy, for efficient use of natural and created

resources, greater efficiency and productivity, based on a thorough analysis of potential and conditions and constraints in which they are realized development goals for the quality of life of all citizens, etc.

Serbia's National Strategy for Accession to the European Union considers the possibility of achieving sustainable development of the Republic of Serbia and the introduction, adaptation and application of principles that dominate the EU, ie increasing competitiveness based on knowledge, innovation and entrepreneurship, as set out in the Lisbon Strategy.

The principles of the Strategy are based on the globally accepted principles defined in the Johannesburg Declaration on Sustainable Development, the Millennium Development Goals and the EU Sustainable Development Strategy. These are (Mihajlović, S. 2013):

- 1) Intergenerational solidarity and solidarity within the generation.
- 2) Open and democratic society - participation of citizens in decision-making.
- 3) Knowledge as a carrier of development. Promote a prosperous, innovative, competitive and environmentally efficient knowledge-based economy, ensuring a high standard of living and full and high quality employment.
- 4) Involvement in social processes
- 5) Integrate environmental issues into other sectoral policies.
- 6) Precaution. Require preservation of natural balance when there are no reliable ones information about a particular problem.
- 7) The polluter / user pays the costs related to the environment in the price of the product.
- 8) Sustainable production and consumption. Respect balanced relations in the exploitation of natural resources and ensure a high level of protection and improvement of environmental quality.

Reduce environmental pollution and promote sustainable consumption and production, but economic growth must not cause a proportional increase in environmental degradation (EcoSummit, 2016).

In general, sustainable economic development in the Serbian economy should enable continuous long-term economic growth that will not be based on excessive use of natural resources or with unacceptable environmental consequences that would jeopardize its sustainability, as well as the economic prospects of future generations. This specifically means that the development of the Serbian economy in the direction of sustainability can be seen only on the basis of achieving economic growth, primarily on the basis of knowledge, information, people, education and the quality of ties between people and institutions (Internet).

Waste generation in an industrial environment

Today, in industrial production on a global level, a large amount of waste is generated annually. The amount of waste is measured in (t / year) and per capita per year (kg/ apartment /year), and is identified in the Waste Catalog. These are the following types of waste (Internet):

- 1) generated hazardous waste in industries and households,
- 2) produced industrial waste,
- 3) produced packaging waste,
- 4) produced biodegradable waste,
- 5) produced waste from construction works, construction and demolition,

- 6) generated electronic waste,
- 7) waste vehicles,
- 8) waste tires,
- 9) waste oil,
- 10) waste sludge from wastewater treatment plants,
- 11) medical waste, etc.

The need for infrastructure for waste remediation is a priority of each state, as well as, accordingly, the designation of authorized entities for the establishment of sanitary landfills and waste management.

The essence is that waste management refers to the amount of recycled waste and the number of economic entities by type of waste. This includes research and analysis of the amount of biodegradable waste, then the amount of separated collected waste and collected packaging waste, etc. (World Commission on Environment, 2006).

Years according to (Waste Management Strategy for the time, 2010-2019). This strategy is considering the possibility of increasing the infrastructure for the treatment and disposal of hazardous waste. Here, the data indicate that there are no facilities for the treatment of hazardous industrial waste in the territory of the Republic of Serbia (there are several registered facilities for the physical treatment of special waste streams that belong to hazardous waste). There is no hazardous waste disposal site or central storage. Hazardous waste is temporarily stored in unsuitable warehouses, some of which have existed for decades, or in factory landfills.

Analyzes show that there is about 62% of temporary storage of hazardous waste that does not meet the prescribed conditions, and that only 5% of hazardous waste is temporarily stored in the prescribed manner. Also, the defined part of production capacities with the possibility of thermal treatment of waste is not used enough (cement plants, ironworks and thermal power plants). so for now, export is a solution for treatment in authorized and registered plants in the EU (incinerators, plants for physical and chemical treatment, etc.). The plants that export waste are from the domain of the pharmaceutical industry, electric power industry, laboratory waste from some medical institutions.

The problem is that even in today's conditions, waste recycling capacities have not been resolved in an organized manner. The data show that in the database of the Recycling Agency, about 302 business entities are registered for the collection, treatment, import and export of secondary raw materials.

There are no registered waste vehicle recycling plants, so this work is now being done in several metal waste recycling plants that have been authorized by the competent authority. The competent services assess that the situation in waste management is not satisfactory. Thus, there are close to 4,500 illegal landfills in the Republic of Serbia. The plan is to start the construction of several regional landfills - regional waste management centers. For now, there is no permanent storage of hazardous waste that complies with regulations, and temporary disposal is mostly done within the company, and very often in an inadequate manner. There are no facilities for the treatment of hazardous waste, air pollution, soil, surface and groundwater waste, as well as soil. There is no system for separate collection of medical waste (European Union, 2011).

Additional problems are created with the population, where public awareness of waste management is not sufficiently developed. There is no education of the population about waste, the manner of treatment and the obligation to recycle. The following problems in waste management in the Republic of Serbia have been identified: insufficient infrastructure for waste treatment and disposal, joint disposal of municipal and hazardous waste from households, lack of data on waste composition and flows, lack of storage, treatment and disposal of hazardous waste.

The most efficient solution for a clean environment is seen in the possibilities (Rega & Baldizzone, 2015):

1. Introduction of EU standards in the field of waste management;
2. The process of integration and use of EU and other funds
3. Rehabilitation of unregulated landfills and remediation of contaminated land;
4. Reduction of waste generation in industry;
5. Contribution to employment and job creation that will incorporate knowledge into waste reduction;
6. Collection according to the amount of generated municipal waste and
7. Faster legislative and institutional reforms.

The main role should be played by integrated waste management, which means considering its generation, the possibility of minimization (collection, transport, treatment of disposal, etc.). Here, it is of special importance to make a strategic decision on choosing the most suitable treatment option. It should be adopted through a life cycle analysis of the waste that contains the characteristics of the environment and the location where the waste is generated.

When making the Decision, important conditions that affect the disposal of waste are analyzed. That are:

- analysis of growing demands in one's own country and in the EU, for environmentally safe waste disposal and high disposal costs;
- realistic principles of charging the actual costs of waste disposal to the polluter, waste producer;
- faster development of new production technologies and waste management procedures and
- more efficient, research and development (R&D) market for recyclable products.

It is important to take into account products and materials that are classified as waste, which can be reused for the production of certain products. Product packaging also deserves attention, and manufacturers should respect the introduction and application of packaging regulations in the EU, as an incentive for manufacturers to consider the use of reusable packaging.

The essence of efficient waste management is reflected in recycling (both industrial and municipal waste), where significant technical, environmental and economic effects are achieved.

For industrial management, sustainable waste management means more efficient use of resources, reduction of the amount of waste produced, and a process that should contribute to the goals of sustainable development.

Regional waste management takes into account the development and implementation of regional plans based on European legislation and national policy. The principle of choosing the most optimal option for the environment is reduced to a systematic and consultative decision-making process, which includes the protection and preservation of the environment. The producer

bears the greatest responsibility for the management of his own waste because it affects the composition and properties of the product and its packaging.

It is estimated in point 7.1 of this strategic plan that the municipal waste generated by 2020 will take into account the change in the number of inhabitants and the change in the living standard of citizens by up to 90%. The generation of hazardous waste by 2020 is in the function of the work of the industry and it is expected that this amount will amount to 200,000 t/year.

When organizing a waste management system, this strategy regulates the management of various types of waste on the basis of the Law on Waste Management in the Republic of Serbia, from generation to final disposal organized in accordance with national and European requirements and standards. The goals are:

- reduction of the amount of generated waste;
- reduction of the amount of waste disposed of in landfills by primary selection of useful waste;
- reduction of the share of biodegradable waste in landfilled municipal waste;
- reduction of the negative impact of disposed waste on the environment, climate and human health;
- management of generated waste according to the principles of sustainable development, waste recycling, etc. (Lienig & Bruemmer, 2017).

Landfill projects are in line with the EU Landfill Directive (in line with EU Directive 99/31/EC on Landfills), which is why it is important to envisage the construction of Regional Centers and take into account other important regulations in order to achieve sustainable development (Decree on the establishment, 2010-2014).

Data on environmental pollution, obtained within the research in Central Serbia conducted on Project Number: 03 – 2175 (2016). realized with the support of the Health Center of Arandjelovac and the Environmental Protection Fund with the support of the Ministry of Health entitled: "Educational activities to raise awareness of environmental protection of the Municipality of Arandjelovac ". with the aim of establishing " Developing public awareness and establishing a policy on developing public awareness for inclusion in solving environmental and waste problems, with the support of the Ministry responsible for environmental protection and local self-government at all levels, as well as with the support of medical experts and university institutions (Project Number: 03 - 2175. 2016).

While working on the project, the author asked 100 questions to a randomly selected sample of the population, of which he selected and selected the most critical questions for analysis 10: 1. Is there waste treatment, 2. Is the air inhaled by the population polluted, 3. Yes whether the water drunk by the population is polluted, 4 Are materials (paper, glass, metal, plastic, buckets) collected separately, 5. Do you have information on whether the land in this environment is contaminated, 6. Do you know if food that the population eats healthy, 7. Does this city / municipality cooperate with other cities / municipalities on environmental protection, 8. What do you think, what is GMO - genetically modified food, 9. Are there possible health problems in the environment in which population alive, 10. How much is the media involved in informing about the level of environmental pollution.

The obtained results of "environmental awareness of citizens" are presented in (Figure 1). A summary of the results of the respondents' answers to all 10 questions is given, on a scale of 0,20,40,60,80.

An important determinant of effective development of eco-quality is the media, they are the ones who support the management, and who at the same time, urgently inform the population about the measures taken to address every problem, which is a key source of information (at social and local level).

This is a case of low% of information, only 16% of respondents pointed out that the media inform the population about the pollution of their environment and thus participate in social work, why is the management of all industries responsible, while 84% answered that the media do not report regularly and in sufficient and sufficient quantities information on environmental issues as the most relevant support to management.

The interlocutors answered the authors' questions with YES, NO and PARTIALLY. Figure 1. Summary overview of the level of awareness of respondents about animal pollution middle when answering all 10 asked questions, on the scale: 0, 20, 40, 60, 80.

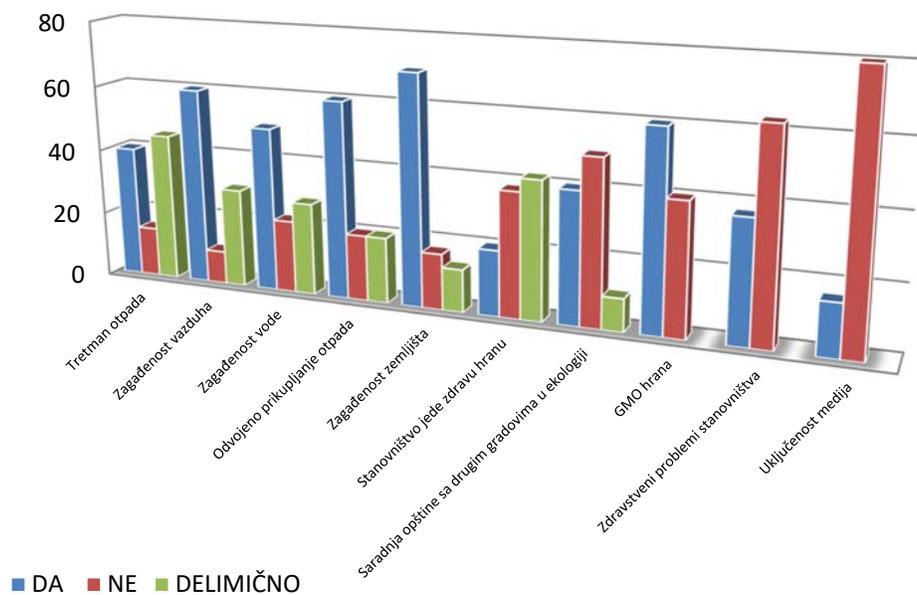


Figure 1. The results obtained by researching ecological awareness in drinking fountains (part of the project in Arandjelovac, Serbia, 2016)

In addition to the analysis of all factors that pollute the environment, the emphasis is on the analysis of answers from the questionnaire for primary categories (air, water, land and food), which are vital in the world for human life and healthy living and working environment. has the greatest responsibility.

As the results of the specific research show, much greater commitment of the management and all leading structures in the local self-government is needed to achieve a quality ecological environment, for a healthy life and work of the inhabitants in the area. The goal is for the management to set an effective strategic plan for the development of environmental quality, in

accordance with the requirements of all standards set by the state and the EU. Figure 2 shows the results of the level of awareness of the respondents (population) about pollution: air, water, soil and food on a scale of: 0, 20, 40, 60, 80.

According to the results given in the chart, it is concluded that the respondents have the most knowledge and awareness about pollution:

- countries about 70%, then,
- about 60% of air pollution,
- water pollution about 50%, and
- food pollution by about 20%.

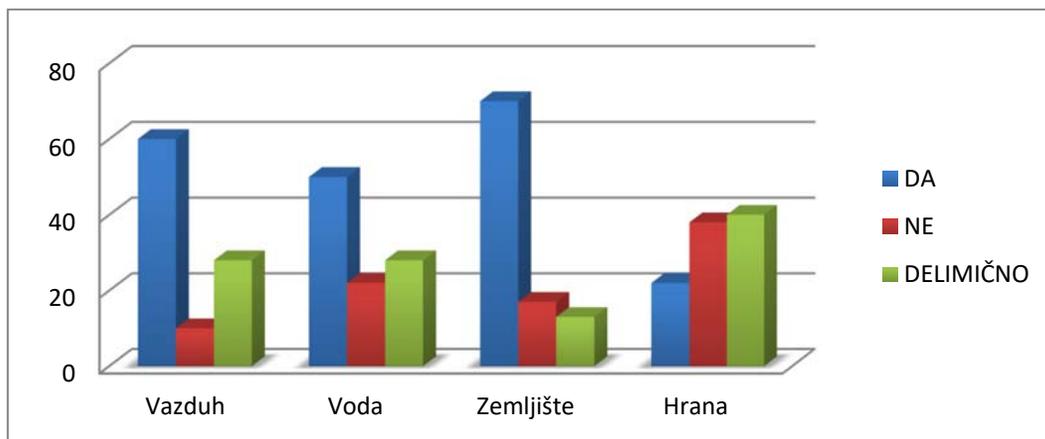


Figure2. Summary overview of levels of awareness of Understanding Existence of air, water, soil and food pollution

Conclusion

Ecology and ecological systems today and in the future are of great importance and application in world industry and in the environment in which these industries operate. The facts show that in the world and in Serbia, waste management is a key issue for improving the state of the environment, which has an economic and social dimension. Management has a role to more effectively develop strategic measures, techniques and technologies for the successful implementation of the strategic plan of environmental development of all environmental factors (industrial and other enterprises) for resource renewal, which is set by the strategic plan for a certain period in the future, according to state and EU regulations.

Based on the presented facts, obtained by concrete research, it is clear that the problem of soil pollution globally, in the industrial environment should be taken seriously. Residents should be informed through the media and through ongoing educational programs to learn how to recognize environmental problems: how to act preventively and how to launch civic and rural initiatives for preventive protection (specifically land) from pollution by various factors on land and air.

According to the research of many studies, in developed countries, management is more focused on solving environmental problems in order to ensure healthy production and quality products and services, as well as ensuring human health as a whole. The problem is that there is not enough awareness of management, employees and the population to solve the problem of everyday waste in large quantities, as well as any other form of pollution. There is a lack of

motivation, development of awareness and understanding of how strategically important this problem is for today's and future generations, both in Serbia and in the countries in the region.

The solution can be seen in: greater education, motivation and better educational structure of the population, application of ISO 14000 environmental protection standards and ISO 9000 quality standards. Recycling waste in the world and in Serbia shows that it is one of the best ways to achieve environmentally friendly impact on the world in which people live. Recycling is an industrial process that can preserve the natural environment and resources for the future. This issue requires that all waste companies include the development of public awareness of quality waste management.

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Conflict of Interests

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