

-ECO-INNOVATION AND ITS EFFECTS ON THE ENVIRONMENT

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Abstract

In the current world context, where the environmental problems are becoming more visible, the problem of urban waste and not only, represents more and more interest for the local and central authorities and also for the simple citizens. The harm which we create to the environment and, consequently, to the health of the population needs the management of waste. We need to solve this problem as efficiently as possible and it should become a priority for any civilized state. To all the people it is important to know the situation we leave behind through our actions and to be aware of the effects that will occur.

The technologies required are already available and their respective economics are no obstacle. It remains unclear and from today's perspective even improbable whether humankind can go for that evolutionary transitioning the future.

Text

1. Introduction

The environment represents a system, a set of conditions and natural elements, such as air, water, earth, a biodiversity that interacts and influences living conditions and offers the possibility of future development of society. Nowadays it is important to know the effects we leave behind through our actions, the way we live on earth and to be aware of the effects that will occur.

Ahead of UN Climate Change Conference 2019¹ (COP25), World Meteorological Organization (WMO) issued its Greenhouse Gas Bulletin, showing that levels of heat-trapping greenhouse gases in the atmosphere have reached another new record high, the average levels of carbon dioxide reached 407.8 parts per million in 2018 and not long ago, 400 parts per million

¹UN Climate Change Conference (COP25), <https://public.wmo.int/en/our-mandate/climate/cop25>

was seen as an unthinkable tipping point. The last five years have been the hottest ever recorded, the consequences are already making themselves felt in the form of more extreme weather events and associated disasters, from hurricanes to drought to floods to wildfires. Ocean levels are rising quicker than expected, putting some of our biggest and most economically important cities at risk.

The *ecological consciousness*² is understood as a reflection of the psyche of a variety of man's relationship with nature, which express the position of the subject in relation to the natural world. Studies show that environmental consciousness is a complex mental education, which includes cognitive, regulatory, emotional, ethical, and other aspects.

Other authors claim that the current type of environmental consciousness determines the behavior of people in relation to the environment. Environmental education³ is a part of the integral pedagogical process of any educational institution, aimed at the systematic knowledge assimilation about the environment, society, development of practical skills and environmental activities. Environmental education is aimed at the formation of environmental culture of the individual to protect the environment. We observe that education plays a very important role in creating a conscious attitude about the present and future situation on the environment. The same authors⁴ claim that in their actions, people proceed from the needs, motives, and interests, pursue certain goals, guided by ideas and this means that they act consciously. In addition, it becomes increasingly important to add to the list mentioned above and the impact left on the environment when we decide to go in one direction.

Cities around the world are developing, a context in which an adaptation of the development strategy to the needs of a constantly changing society is fully justified. The state of the environment directly affects the life and health of people, conditions in which the main concern should be to maintain a healthy, clean and safe environment.

In order to maintain a balance between the natural environment, more precisely between the resources offered by it and the activity of the people, a strategic development planning is required. The justification for this strategy is to permanently achieve a stable relationship between the way of managing natural resources and the human population. The strategy for the development of cities is one of the main tools through which the priorities in the economic and social field can be promoted.

²V.I. Panov, *Ecological Thinking, Consciousness, Responsibility*, Procedia - Social and Behavioral Sciences, Volume 86, Russia, 2013, pages 379-383, <http://www.sciencedirect.com/science/article/pii/S1877042813027146>

³Elena I. Cherdymova, Svetlana A. Afanasjeva, Aleksandr G. Parkhomenko, Maria B. Ponyavina, Ekaterina S. Yulova, Irina A. Nesmeianova, Oleg A. Skutelnik, *Student ecological consciousness as determining component of ecological-oriented activity*, EurAsian Journal of BioSciences Eurasia J Biosci 12, 2018, 167-174.

⁴Idem, p. 2.

2. Strategic vision

The strategic vision on environmental issues must be realized and implemented according to the aspirations presented by the European Union and the recommendations offered by the European Commission. The dynamic and competitive environment specific to the century in which we live, therefore, the environmental strategies must be aligned with the development strategies, supporting each other. This is necessary in order to be able to use the resources most efficiently and to solve the existing gaps, in order to improve the quality of the living environment, the socio-economic environment, the business environment and implicitly the increase of the local competitiveness. In the context in which the human society represents the central component of the environment, the access to resources offered by the environmental components, rich in quantity and with an adequate quality, represents an increasing need in today's society.

According to the strategies, the city of the future must be an intelligent one ('SMART City'), whose development will be based on the exploitation of intellectual capital towards education and self-education, innovation and economic development among the active sectors that are environmentally friendly.

More specifically, the development must be based on a high quality of drinking water resources, proper waste management, improved atmospheric air quality and an adequate management of hazards and risks, in order to maintain a clean and safe living environment.

On the other hand, it is necessary to introduce in the strategic plans the development of the concept of "green and welcoming", such as through "Green City", "Green City". This would involve applying environmental policies based on the principle of sustainable development, linked to community, national, regional, county and local strategies, developing networks of interconnected green spaces, protecting biodiversity, limiting noise levels, sustainable planning of how to use land and limiting the effects of climate change.

Efficiency and approach from the perspective of sustainable development of activities, resources and energy is another goal. This can be achieved by taking into account the reduction of the specific consumption of resources, the energy efficiency, the encouragement of the sustainable mobility, to which is added the innovation and the economic development among the sectors of activity friendly with the environment. Sustainable growth aims to promote a more efficient economic structure in terms of resource utilization, more environmentally friendly and more competitive. These measures can lead to the provision of public goods in an environmentally friendly way, to the creation of new jobs, to the development of a safer,

healthier and cleaner environment and implicitly to the increase of the quality of life but also of the longevity of our planet.

The key issue of sustainable development is the link between the need for further economic and social development and the protection and improvement of the state of the environment, this vision being the only way for the well-being of present and future generations. Currently, almost half of the planet's population lives in cities. By 2050 this number will reach 70%. This massive growth represents a huge challenge for urban areas. The existing infrastructure contemplates its limits, and its development is difficult and expensive.

Among the main objectives are to solve the problem of public transport and to ensure the needs of water and energy, combined with the reduction of the environmental impact and the improvement of the quality of life of the residents, all these topics being interconnected.

The use of alternative energies in perfectly controlled and coordinated electricity networks, as well as buildings that will save energy or will be able to produce the necessary energy alone, are aspects of maximum importance of a successful energy strategy and environment.

Modern technologies are the key factor for successful city management. Intelligent and coordinated IT systems provide answers to complex problems. Siemens offers an extremely broad spectrum of products and solutions to help cities solve all these problems. These products and solutions are assembled in the Infrastructure and Cities Sector. The solutions must start from analyzing the problem, identifying relationships and establishing investment priorities.

Each city faces its own challenges, which means that a lot of approaches are needed to solve these problems. But one thing is certain: technology can solve the most important challenges that the cities of the present face. It can decongest the traffic, it can reduce smog, it can organize the supply of drinking water and electricity, as well as the problem of household waste and, all the technology can increase the safety of the citizens.

Often cities do not know where to start, what are the steps to follow and what order to follow, or even what technological solutions they can apply. This is where Siemens comes in, through its on-site specialists. They know the problems of the city and collaborate with the representatives of the municipality to identify the existing technical options and the order of priorities. Carbon dioxide does not have to be a polluting gas. This gas is suitable for nourishing algae, as they are the only organisms that can be obtained fuel and do not need agricultural land.

Idea no. 1. Separation and use of carbon dioxide

Despite the increasing use of renewable energy resources, there is still bad news: the global increase in the concentration of carbon dioxide in the atmosphere cannot be stopped. The fight to

reduce CO₂⁵ emissions must continue. But the carbon dioxide separation process offers an interesting perspective, especially for areas where CO₂ emissions are inevitable in the medium term. The question is: what can we do with the carbon dioxide obtained in this way? Reusing carbon dioxide as a raw material is much more cost effective than storing it. Here we can return to mother nature, for an example in photosynthesis. Plants use solar energy to convert carbon dioxide and water from their environment into hydrocarbons and oxygen. Hydrocarbons give plants the vital energy they need to grow. Fuels, as we know them, are hydrocarbon compounds.

For this reason, we can obtain biomass fuels: biodiesel and ethanol. The combustion of these substances will then release only the carbon dioxide that has been captured by nature. But ordinary biofuels are controversial, because their production reduces the area of agricultural land, we use for food plants. Algae, on the other hand, may prove to be the perfect power plants because they are ideal sources of raw material for biomass, biogas and biodiesel production. Because the entire organism of the algae is involved in the process of photosynthesis, unlike terrestrial plants, they are 5 to 10 times more efficient in the process of transforming solar energy into biomass. They need only sun, salt water, nutrients and carbon dioxide to grow. Facilities that provide these elements can be built virtually anywhere.

The German energy company RWE has built a pilot plant in Niederaussem, which produces up to 6 tons of algae per year, consuming 12 tons of carbon dioxide. The German publication Der Spiegel also announces that scientists are trying to get algae that no longer needs to be harvested, algae directly producing the fuel it needs. Gregor Waldstein was the first to try to produce biofuel within his Austrian-German company Solar fuel. In fact, the technology developed by him in collaboration with the famous Fraunhofer IWES institutes and the Stuttgart Center for Solar Energy and Hydrogen Research can do much more.

Synthetic production of natural gas

Simply put, Solar fuel uses electricity from renewable sources to produce methane, a naturally occurring synthetic gas, which can be used directly in fueling cars as a neutral fuel to the environment, but can also be introduced into natural gas networks or stored in the tanks in this fuel. Methane can be maintained for a long time in such tanks in the event of excess solar or wind energy. The symbiosis between electrochemistry and biology opens the way to the production of plants capable of consuming both carbon dioxide and storing energy. The new generation electric buses manage to impress with a satisfactory autonomy, low operating costs, but also maintaining the air quality in the urban environment.

⁵How CO₂ Can Be Useful, The new city, 1/12, https://www.hitech.at/site/library/frame/hitech_012012-3.pdfpp. 34-39.

Idea no. 2. The electric bus without compromises

The new generation of buses⁶ to be used on routes in the center of Vienna by the Wiener Linien company is quiet and does not emit any polluting gases at all. Siemens has developed zero-emission buses for routes on the narrow streets of Vienna's historic center. Between two loads, a bus can travel a distance of 120-150 kilometers. The new electric buses are characterized by an innovative power technology, and the lithium ferrite battery charging time is 10-15 minutes per hour. Naturally, electric buses do not emit carbon dioxide and make no irritating noise. All these qualities impose the electric bus as ideal for use in the urban environment.

Idea no. 3. Use oil instead of wood, in the kitchen

About 50 million people cook in Indonesia for firewood. This leads to the rapid disappearance of the archipelago forests. Indonesian farmers are currently testing a cooking machine created by BSH, which works with jatropha oil. This plant⁷ is cultivated by them as part of a new model of sustainable agriculture that manages to protect the forested areas of Indonesia. This makes their farmers' lives easier and reduces the anthropogenic impact on forests. This project is promoted by the vegetable oil producer Waterland, BSH and the Indonesian National Forestry Authority.

Idea no. 4. Drinking water from polluted water

Around the world, 900 million people have no access to clean drinking water. With Sky hydrants from Siemens, laypersons can convert dirty water into clean drinking water almost anywhere. The Sky hydrant needs no electricity or chemicals and is easy to operate. The device costs 3,500 US dollars and cleans 10,000 liters of water per day, enough for 500 people.

Conclusion

We have to say that modern progress is based on individuals and individualism, which limits cooperation, often a crucial aspect for successful action. In this case we need to stop to have an ignorant attitude towards one another and to what is around us.

A good aspect of modern progress is that it emphasizes knowledge and rational thinking, downplaying other forms of human thought and experience. We, as people can learn new things easily and we can share the good behavior to the others. Everything people do, everything they learn, every skill and all knowledge they have can be turned into a productive power. Economic growth requires a holistic use of human capabilities, not only highlighting rational thinking. The

⁶The electric bus without compromises, The new city, 1/12, https://www.hitech.at/site/library/frame/hitech_012012-3.pdfpp. 34-39.

⁷Use oil instead of wood, in the kitchen, The new city, 1/12, https://www.hitech.at/site/library/frame/hitech_012012-3.pdfpp. 34-39.

third contradiction is that in the paradigm of modern progress, representative democracy has made other forms of democracy hard to obtain.

Sadly, the modern quest for material prosperity and control over nature has led to the current ecological crisis. This can't go over and over and this cycle has to be broke, to make space for the green behavior. More has to be produced out of less, and of higher quality. Negative environmental impacts have to be reduced as close as possible to zero. Material production is automatized, and the recycling of materials is efficient. Economic growth stems mainly from immaterial production ushered by the „sharing economy”.

The day when the resources generated by the Earth end, mark the day when the demands of humanity exceed the capacity of regeneration of the Earth in that year. In the last 20 years, this day came to be three months earlier, the record being in 2019, on July 29. This means that humanity is currently using nature 1.75 times faster than the ecosystems of our planet can regenerate. We all can be part of the solution. We just need to embrace our humanity and to heal the planet.

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