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For scientists, scientists, students, graduate students, representatives of business and public organizations and higher education institutions and a wide range of readers.

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ECOLOGICAL TRANSFORMATION: CURRENT TRENDS IN THE IMPLEMENTATION OF GREEN TECHNOLOGIES

***Ponomarenko Ihor**, PhD Student,*
Sumy State University, Ukraine

In today's world, the issue of sustainable development is becoming increasingly important in the context of global environmental challenges and limited resources. The purpose of this paper is to analyze the main trends in sustainable development that affect the economic, social and environmental aspects of society. The importance of this study lies in the need to identify effective strategies and practices that will help achieve balanced development, improve the quality of life and preserve natural resources for future generations. According to Solaris Market Research, in 2023 the global market for green technologies and sustainable development was estimated at USD 23.37 billion. It is projected to grow to USD 26.85 billion in 2024 and reach USD 121.05 billion by 2032. This indicates significant growth, showing a compound annual growth rate (CAGR) of 20.7% over the forecast period [1]. Given the projected growth in the size of the green technology and sustainability market, it becomes apparent that there is a need to closely monitor new trends in this area. Continuous tracking of these trends will allow business and policy strategies to be adapted, contributing to an effective response to changes in market conditions and consumer demands. This, in turn, will help to optimize resources and implement innovative solutions that meet the principles of sustainable development and environmental responsibility.

Renewable energy sources. Recent data from Climate Watch shows that total energy consumption is the main source of global greenhouse gas emissions, accounting for 73.2% of the total. This is the largest contributor to air pollution, while agriculture is second with 18.4% [2]. In this regard, it is clear that energy production is of high interest and shows significant progress in developing sustainable solutions. The goal of achieving zero net energy is to ensure that total energy consumption is offset by total renewable energy production [3]. This means that the total energy consumption does not exceed the amount of energy generated from environmentally friendly, renewable sources. According to the analytical company Ember, in 2022, global solar and wind energy production accounted for 12% of total energy consumption, which is 10% higher than in 2021 [4]. This indicates the possibility of further growth in both renewable energy production and this market.

Another technology that is seeing a rapid increase in interest is green hydrogen. This is a hydrogen fuel synthesized using energy from low-carbon sources such as wind and solar power when there is excess electricity production. In 2021, the global market for clean hydrogen was estimated at USD 3.2 billion. It is projected that from 2022 to 2030, this market will show an average annual growth rate of 39.5% [5].

The transportation industry is an important sub-sector of the energy industry, and according to Statista, it accounts for 20.7% of global carbon emissions [6]. Electric vehicles are leading the way in efforts to decarbonize the transportation sector. In 2022, the electric vehicle market included 34 models, while in the first quarter of 2023 this number increased to 42 models [7]. At the same time, there has been a significant increase in sales: in the first quarter of 2023, sales of electric vehicles increased by 44.9% compared to the same period in 2022 [8]. Today, electric vehicles account for 13% of the global automotive market, which indicates the growing popularity and importance of electric vehicles in the transition to more sustainable forms of mobility.

Data from the United Nations Environment Program indicate that construction and infrastructure contribute to nearly 39% of global carbon emissions. In 2021, this sector emitted 10 gigatons of carbon, which is 5% higher than in 2020 and 2% more than before the pandemic peak recorded in 2019 [9]. The Paris Agreement has set ambitious targets to reduce the energy intensity of buildings by 30% per square meter by 2030, and to achieve zero emissions for the entire construction industry by 2050 [10]. A McKinsey survey found that 53% of construction industry executives expect sustainability trends to accelerate in the coming years, while 10% said they have invested in sustainability solutions since the pandemic [11]. Greener construction methods, such as prefabrication, modularization, and digitalization (in particular, building information modeling), are driving these changes. These approaches allow structural elements to be manufactured separately off-site, resulting in a 30% reduction in carbon emissions. Modular construction also reduces material consumption and improves safety on the construction site. In addition, such buildings take 50% less time to build, which emphasizes the effectiveness of these new methods in the context of sustainable development [12]. Although modular construction in the US accounts for only 4% of residential construction and 5.5% of commercial construction, the popularity of this technology is much higher in other countries. For example, in Sweden, modular construction technology is used in 45% of projects, while in Japan this figure is 15% [13].

After energy consumption, packaging is one of the most harmful aspects of human activity that negatively affects the health and future of the planet [14]. However, over the past few years, the number of countries that have implemented strict regulations on single-use plastic has more than doubled. Canada and India are the latest countries to start phasing out this type of packaging. In total, 77 countries have implemented a full or partial ban on plastic bags, while 175 countries have committed to comply with the UN resolution to end plastic pollution by the end of 2024 [15]. These initiatives demonstrate a growing awareness of the environmental impact of plastic use and a commitment to sustainable development. In 2021, the market for environmentally friendly packaging was estimated at USD 229.46 billion. It is projected to grow by 7.5% annually, exceeding $409.2 billion by 2030 [16].

Summarizing, the above data shows that sustainable development is becoming critical in the face of global environmental challenges. The green technology market is showing significant growth, which requires close monitoring of new trends. Renewable energy sources, as well as green hydrogen, are becoming key elements in reducing greenhouse gas emissions. Transportation, including electric vehicles, and the construction sector are also undergoing a transformation, contributing to a shift towards more sustainable practices. In addition, the growing awareness of plastic pollution is leading to the introduction of strict regulations, creating new opportunities for companies to produce environmentally friendly products. All of this demonstrates the need to integrate sustainable solutions into various sectors of the economy to achieve the goals of environmental responsibility and ensure a sustainable future.

***Academic Supervisor**: PhD, Assoc. Prof. Bohdan Kovalov, Sumy State University.*

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THE ROLE OF VIRTUAL BUSINESS ENVIRONMENTS IN "GREEN ECONOMY" ENTITIES

Pavlo Hrytsenko**,** *PhD., As. Prof.,*
Sumy State University, Ukraine
Tao Senlin, *student*
Sumy State University, Ukraine

The modern world faces global challenges related to environmental changes, requiring a fundamental reconsideration of economic models. The "green economy," which focuses on sustainable development, environmental conservation, and efficient resource use, is becoming increasingly relevant. In this context, virtual business environments (VBEs) play a crucial role in ensuring the transformation of economic activities, reducing environmental impact, and supporting the principles of sustainable development.