

Green Technologies are an Integral Element in Environmental Protection

R. H. Bekmurzayeva, Kh. M. Balaeva and A. A. Shemilkhanova
Chechen State University named after A.A. Kadyrov, Grozny, Russia

Keywords: Green technologies, climate change, environmental pollution, biodiversity.

Abstract: The current stage of economic development is characterized by a large-scale transformation of all spheres of activity. A special place is occupied by transformations that characterize the relationship between man and the natural environment. Unfortunately, today the environment is in a critical state, therefore, environmental protection based on improving environmental safety is one of the priority areas of development. The aim of the work is to consider the main types of green technologies and reveal their advantages.

1 INTRODUCTION

The problem of climate protection is becoming more and more serious. To ensure the quality of our lives and our daily well-being, we are greening the economy. While the corona crisis has firmly gripped many traditional industries, the demand for green technologies is proving to be resilient despite the unfavorable economic situation. A look at the automotive, engineering, or chemical industries shows that even in times of declining sales, companies and consumers continue to invest in sustainable technologies for the future. The coronavirus has brought the world to a standstill. However, global problems such as climate change or lack of resources cannot simply be put on hold. To remain sustainable, we must not lose sight of long-term goals. As the saying goes, "Tomorrow's pressure makes us to act today." Today, green transformation is no longer an academic theory, but is becoming a reality.

2 MATERIALS AND METHODS

In the course of this article, materials and methods obtained from the study of scientific articles, books, journals and other works were used.

3 RESULTS AND DISCUSSION

Green tech is much more than a catchy buzzword. Hardly any segment is currently growing faster than the green technology industry. Green technologies include all technological innovations that develop smart, intelligent and at the same time climate-friendly solutions for the economy. The strongest driver for the future development of green technologies is, of course, the European Green Deal. This is a concept presented by the EU Commission at the end of 2019 and supported by the European Council and the European Parliament. The Green Deal provides for a transition to a modern, resource-efficient and competitive economy. Thanks to green modernization and low-emission technologies, Europe will become climate neutral by 2050. To achieve this, the Commission has set itself the following objectives, among others:

1. ensure a safe and affordable energy supply in the EU;
2. improve energy efficiency and promote renewable energy sources;
3. develop green technologies and modern infrastructure;
4. reduce transport emissions by 90%;
5. reduce the ecological footprint of the EU food system, etc (Krichevsky, 2019).

Therefore, green technologies are at the center of European efforts.

“No other region in the world has such a comprehensive concept of climate protection as in the

European Green Deal. And no one else is as specific and far-reaching as the EU with its legislative packages to achieve climate goals." The Green Deal can also help Europe get back on its feet after the corona crisis. In total, 1.8 trillion euros are invested in the Green Deal from the NextGenerationEU development package and the 7-year EU budget. This is the largest stimulus package ever financed from the EU budget. The main focus of the measures is on the financing of modernization. Here are some programs of the agreement: Horizon Europe is the EU's global research and innovation programme. The focus is on healthcare, sustainable development and digitalization.

The Digital Europe program supports the "green and digital transition" and promotes green technologies in areas such as high-performance computing, artificial intelligence, cybersecurity, etc. Let us take a closer look at the essence of the EU climate policy and its possible impact on production and markets in Europe, as well as beyond.

The climate policy of the European Union is the main component of the new EU development strategy, which is called the European Green Deal, EGC (European Green Deal, EGD). For the first time, the main and "main task of the current generation" was recognized as the need to preserve the environment, prevent the negative consequences of climate change, and this is now the main direction of the development of the European Union.

The European Green Deal will strategically mean the development of activities in the following eight areas:

1. Biodiversity or "blue economy" - increasing the role of seas and oceans in economic development, conservation and restoration of ecosystems.
2. Smart Mobility - Switching to sustainable modes of transport (including bicycles, electric vehicles), reducing emissions of harmful substances from internal combustion engines, increasing the use of carbon-free fuels.
3. Modernization of industry - decarbonization of energy-intensive industries, the maximum reduction of waste, an increase in the share of non-waste production, the introduction of the principles of a circular economy, the introduction of a border carbon tax.
4. Climate improvement - reducing emissions by 55% from 1990 levels by 2030, achieving carbon neutrality by 2050,
5. Energy efficiency - development of renewable energy sources, efficient integrated energy systems.

6. Innovations in construction - reducing the consumption of electrical and thermal energy in the construction of new buildings and structures by increasing energy efficiency, renovation of old buildings and structures.
7. Development of organic agriculture "From farm to table" - supporting healthy nutrition programs, reducing the use of harmful chemicals, reducing waste.
8. Zero pollution: reducing the use of harmful chemicals in all industries, in private business, in everyday life.

Considering that all these questions in one form or another have been raised for a long time, one can ask the question: "What is new in the European Green Deal?" The answer is that the EGC is not just about solving environmental problems. First of all, this is a course towards changing economic, social and trade policies in the new conditions of the modern world: environmental destruction, climate change, greenhouse gas emissions into the atmosphere as a result of human activity. EGC's mission is to make conservation of the environment and reduction of the negative impact on the climate an integral part of the development of the global economy.

The costs of implementing the European Green Course are estimated at 1 trillion euros over the next decade. The main sources of funds are expected to be private business, investments, released capital due to the elimination of outdated "dirty" technologies (Lyandau, 2021).

In order to achieve the EU's climate and energy goals, it is vital to invest in sustainable projects and activities. COVID-19 has reinforced the need to redirect money to sustainable projects to make the economy, business and society more resilient to climate and environmental shocks.

This requires a common language and a clear definition of what is "sustainable". This has led to the need to create a common classification system for sustainable economic activity or "EU taxonomy".

The main feature of the EGD are mandatory emission reduction targets. This "Green Course" differs, for example, from the Paris Agreement, which does not impose specific requirements on countries.

Some experts and politicians consider the specific goals set by the EGD too soft, such as, for example, the Green coalition of the European Parliament, which states that the stuffing should be reduced to 65% by 2030. To others, on the contrary, they seem too harsh, since for countries with high-carbon economies – Poland, Germany and the Czech Republic - reducing emissions means an inevitable decline in economic

growth. Also, rapid transformation will be difficult and painful for the countries of Eastern Europe.

Therefore, the EGD assumes not just a reduction in emissions, but also the implementation of this in the format of a "fair transition". The restructuring of the economy should take place in stages, with the replacement of traditional industries with new ones. Projects on their transformation are already being implemented in the coal regions of Germany and Poland.

Despite the active declaration of "green" strategies in European countries, the European Union is forced to import a large amount of resources and goods from other countries that are not affected by the "green" course. This contributes to the emergence of additional risks in the implementation of EGD. Therefore, one of the tasks of the EU is to ensure the synchronization of the standards of foreign importing companies with European standards.

This means that the EGD will affect not only the European Union, but also all countries with economic ties with the EU, in particular Russia.

According to the Paris Agreement, which was signed and ratified by the Russian Federation, it should reduce emissions by 2030 to 70% of the 1990 level, and in fact by 2018 this figure in Russia was 52%. Thus, the emissions plan has already been exceeded. But the EU's proclaimed policy of abandoning fossil fuels and decarbonization can greatly affect the Russian economy, which is heavily dependent on oil and gas exports.

Not only Russia may find itself in such a situation, but also European countries themselves, where not all energy companies will be able to comply with too strict environmental standards. This may lead to an outflow of such companies from the European market. To avoid such risks, the European Union provides mitigating factors and different transition periods for dependent economies. Accordingly, relations with Russia will also be built depending on specific conditions and the current agenda.

The transition to a resource-intensive, climate-friendly and sustainable economy is a necessary development not only because of internationally agreed commitments to protect the climate, the growth of the world's population and increasing pressure on the environment (for example, biodiversity, toxicity, genetic modification). The shortage of raw materials and the associated increase in the cost of materials are increasingly becoming a driving force for change, even in those sectors that have so far demonstrated enormous inertia. First of all, this concerns fossil resources and energy carriers. Their replacement promises economic independence and environmental

protection. Thus, the demand for new technologies, processes and products will grow all over the world, especially in emerging market economies and developing countries. However, rare metals and earths also cause sensitive interference in many industries. A Swiss study, in which the Wuppertal Institute participated, recently showed how much the technologies of the future depend on rare metals: mobile phones, flat screens, digital cameras, cars and wind farms could hardly be produced today without these raw materials. The shortage of resources, including in comparison with previous innovation cycles, will cause a completely new quality and quantity of basic innovations of nature-saving technological progress ("GreenTech") and create rapidly growing new markets. Digital cameras, cars and wind farms today would hardly be possible without these raw materials. The shortage of resources, including in comparison with previous innovation cycles, will cause a completely new quality and quantity of basic innovations of nature-saving technological progress ("GreenTech") and create rapidly growing new markets. Digital cameras, cars and wind farms today would hardly be possible without these raw materials. The shortage of resources, including in comparison with previous innovation cycles, will cause a completely new quality and quantity of basic innovations of nature-saving technological progress ("GreenTech") and create rapidly growing new markets.

What is green technology?

Green Technologies or "Greentech" obviously refers to technologies that do not pollute the environment. In a broader sense, the term also refers to technologies that help reduce environmental impacts — through energy conservation, waste prevention, and necessary functions such as remote monitoring and maintenance of devices with limited carbon emissions. Examples of environmental technologies include a wide range of industrial applications, as well as sustainable products, services and infrastructure.

Cities and organizations use clean technologies for many reasons, including better environmental management, including reducing costs and risks. For example, mining can be extremely dangerous for workers, but the development of environmentally friendly technologies can lead to significant positive changes in terms of safety, supporting more sustainable and environmentally friendly methods (Lipina, 2009).

Examples of green technologies.

Green technologies can help cities and businesses achieve zero-emission targets. Here are some

examples that show what is meant by "green technologies":

Wind power: Wind turbines for generating electricity are among the most prominent new clean energy technologies in the landscape, and wind farms produce green energy from an infinitely renewable source.

Solar Energy: Solar panels use photovoltaic cells to collect energy directly from sunlight. The cost of rooftop solar panels has declined over the past few decades, and their use is increasing in both commercial and residential areas.

Hydropower. Hydroelectric power plants are another example of how energy and clean technologies go hand in hand. Hydroelectric power plants — one of the oldest forms of clean energy — power cities around the world.

Smart Cities: Cities have huge potential to reduce carbon emissions by optimizing critical services such as lighting, water/wastewater treatment and garbage collection. Many smart cities are investing in low-carbon technologies to become cleaner, more livable and more sustainable.

Smart Grids: Utilities use tools and financial incentives to reduce peak loads and shift consumption to off-peak hours, thereby reducing energy consumption. In addition, utilities are increasingly turning to renewable energy sources to meet demand.

Electric vehicles (EV) and charging systems. Since automobiles are the world's largest emitter of greenhouse gases, electric vehicles and electric vehicle charging stations are among the fastest growing forms of environmentally friendly technologies.

Sustainable infrastructure: From smart lighting and smart poles to more rational traffic management and more rational construction methods — infrastructure projects can make a big difference in reducing environmental impacts.

Precision farming: Farming solutions using environmentally friendly technologies help to save water and reduce the use of pesticides and herbicides, using them only where they are needed.

How do green technologies help us in our home and personal life?

Consumer applications such as smart devices and thermostats help make everyday life more energy efficient. In addition to improving the quality of life, environmentally friendly technologies also save money by reducing household energy consumption through more efficient heating and cooling.

Cities and organizations use clean technologies for many reasons, including better environmental management, including reducing costs and risks. For

example, mining can be extremely dangerous for workers, but the development of environmentally friendly technologies can lead to significant positive changes in terms of safety, supporting more sustainable and environmentally friendly methods.

Autonomous vehicles (AV) and drones can now reach places that would be risky or time-consuming for humans. We can more closely monitor conditions and assets in extreme conditions, allowing operators to quickly obtain information and eliminate ambiguity, minimizing environmental impact.

Why are green technologies so important? The critical need for sustainable technologies that protect our resources and our environment. The importance of eco-friendly technologies in promoting a greener planet cannot be overstated. Today, businesses and governments must use clean technologies to achieve efficiency, reduce carbon emissions and create a greener planet (Ralph, 2016).

Industry and urban infrastructure offer many opportunities for low-carbon technologies that can significantly reduce emissions.

The charging infrastructure makes it easy for residents to find charging stations, creating an additional incentive to switch from fuel-consuming cars to electric vehicles.

Smart street lighting offers cities a great opportunity to reduce energy consumption and carbon emissions through the use of sensors and automation.

Waste management increasingly uses technologies that optimize the planning and use of vehicles to improve energy efficiency and reduce costs.

Cities in cold climates are looking for ways to reduce the amount of salt used on roads in winter to reduce environmental pollution.

Public transport systems are increasingly switching to environmentally friendly technologies, including hydropower and electricity, to reduce emissions.

Incentives for the introduction of clean technologies are extensive and include the need to abandon non-renewable energy sources based on environmental pollution, reducing business risks (for example, oil spills and other environmental disasters) and obtaining energy loans. In addition, clean technologies open up new employment opportunities for developers, data analysts, equipment installers, maintenance personnel and other specialists in new clean technology industries.

More and more companies are starting to pay more attention to closed-loop business models. Unlike the usual linear model, cyclic models focus on

recycling strategies and extending the life of the product. In the past, the first initiatives were mainly related to reducing packaging waste, especially if it consists of plastic. The interest of consumers and companies has been great since it became known what a huge amount of plastic floats in the world's oceans.

Circular economic approaches open up the idea of limited resources in economic activity and help to reduce emissions. This includes, for example, reducing the use of chemicals, buying renewable energy sources and restructuring the company's processes towards an environmentally friendly value chain.

Removing environmentally harmful products from the market is an effective way to protect the climate. For this reason, the European Green Deal — the EU's carbon reduction and growth program — highlights the importance of closed-loop economic programs and models.

In the World Economic Forum's Global Risks Report for 2020, water scarcity is named one of the five main social risks of the next decade. The UN also predicts that water availability will decrease by 40 percent by 2030. Businesses can no longer afford to ignore water consumption. Instead, in the future they will have to do more cleaning processes and draw up new sets of rules in order to use water more consciously. For example, it is necessary to check the water consumption in production. It is also important to reconsider the choice of production sites if they are located in drought-prone regions, or if the local nature is particularly worthy of protection. Companies engaged in the rational use of water at an early stage improve their image and increase their value.

In recent years, the rapid development of intelligent technologies has given rise to many new business models. Some of them can radically change the energy industry. Two types of technologies are involved: physical and virtual.

Examples of physical technologies include wind turbines, photovoltaic batteries, electric vehicles, electric grids, rechargeable batteries and other energy sources. The performance of these technologies continues to improve, while their cost continues to decline. In addition, the Internet of Things creates the possibility of intelligent integration of all these technologies with each other through sensors. This contributes to the decision of many end-users to rely on renewable energy sources and intelligent electric networks. On the one hand, to have better cost control and security, and on the other hand, to benefit from greater reliability of complex networks.

Virtual technologies such as big data, robotics and artificial intelligence also help organizations operate more sustainably by providing faster access to high-quality information and optimizing knowledge-based decision-making processes. Artificial intelligence, for example, can predict when devices and machines will fail, saving companies time, money and resources. Blockchain-based platforms have also spread around the world. They can change the way end users interact with energy networks, as well as with each other. Blockchain-based activities include, for example, local energy markets that regulate exchange between end users. But crowdsourcing, financing and selling of renewable energy shares and trading of environmental certificates of electricity are also processed through the blockchain (Novikova, 2020).

Electric and automated vehicles are available as everyday technologies. Their impact on the global economy in the next decade could be huge.

Many countries have already significantly reduced the use of fossil fuels for cars over the past 25 years, and with the growing interest of users in car sharing, cities will have to change their infrastructure even more in the future, and people will have to change their mobility habits. The OECD makes an interesting forecast: self-driving car fleets can replace up to 90 percent of cars on urban roads in the near future.

Of course, these changes in traffic have implications for company employees and supply chains. They require significant investments in new fleets, charging stations and electrical networks. However, in the long run, a well-managed transition to general mobility and alternative transport systems can bring great benefits and, of course, provide fresher air in German cities.

Regenerative agriculture is another dynamic change. In the course of climate change, biodiversity is being lost, and agricultural soils are beginning to lose nutrients. However, new methods can improve soils in such a way that they retain carbon and at the same time produce a crop rich in nutrients. This includes, for example, growing two or more plants together and using insects instead of chemical pesticides (Stolbovoy, 2020).

Thanks to the development of the Internet of Things, remote sensing systems and artificial intelligence, automated agriculture based on data can also gain a foothold in Germany in the long term. In the UK, 60 percent of agricultural land is already managed using precision techniques such as sensor systems, cameras, drones, microphones, virtual field maps, analysis tools and GPS-controlled tractors.

Investing in sustainable companies.

The interest of investors around the world in sustainably managed companies is growing. As more and more founders are engaged in the topic of sustainable development, the interest of financiers is also growing. Black Rock CEO Larry Fink recently stated in his company's annual letter that they want to avoid investing in companies that pose a high risk in terms of sustainability. The EU is also increasingly putting sustainable development issues on the agenda. And in its action plan for financing sustainable growth, the EU Commission obliges companies to disclose climate-related risks in order to finance a zero-CO2 economy (Sudas, 2017).

Environmental protection is becoming an increasingly important economic factor. This indicates the development of an ecological economy and green future markets, such as environmentally friendly energy production, energy efficiency, raw materials and materials, sustainable mobility, sustainable water management, waste management and recycling management. Therefore, a progressive environmental policy is also necessary from an economic point of view. Thus, "green" technologies can be found in many sectors, and they can be described as a complex of environmental technologies and services. The goal is always to protect the climate, environment and resources, which sustainable technologies achieve at the stage of use (Ivanova, 2017).

Environmental protection has long established itself as an important economic factor. This indicates the development of the environmental economy, which, as an intersectoral industry, includes all companies offering goods and services in the field of environmental protection. Environmental economics includes such areas as waste management and recycling, water protection and wastewater treatment, air pollution control, noise reduction, renewable energy sources, environmentally friendly products, rational use of energy, climate protection, as well as measurement, control and regulation technologies.

Thus, there is a growing demand worldwide for environmental and climate protection technologies, as well as for products that are environmentally friendly and resource-saving. As a result, the economic importance of environmental protection will increase in the future.

4 CONCLUSIONS

1. Environmental protection is becoming an increasingly important economic factor. Since the level of negative human impact on nature is

drastically increasing, accordingly, the environment needs protection.

2. Environmental economics includes such areas as waste management and recycling, water protection and wastewater treatment, air pollution control, noise reduction, renewable energy sources, environmentally friendly products, rational use of energy, climate protection, as well as measurement, control and regulation technologies.
3. In the modern world, "green" technologies can be found in many sectors, and they can be described as a complex of environmental technologies and services. The goal is always to protect the climate, environment and resources, which sustainable technologies achieve at the stage of use.
4. Worldwide, there is a growing demand for environmental and climate protection technologies, as well as for products that are environmentally friendly and resource-saving. As a result, the economic importance of environmental protection will increase in the future.

REFERENCES

- Krichevsky, G. E., 2019. *Green and nature-like technologies - the basis of sustainable development for future technologies*.
- Lyandau, Y. V., Maslennikov, V. V., Biryukov, E. S., Kalinina, I. A., Sadykova, K. V., Mrochkovsky, N. S., Elina, O. A., Zakharova, T. I., 2021. *Green technologies in entrepreneurship (Bachelor's degree, Master's degree)*. p. 118.
- Lipina, S. A., Agapova, E. V., Lipina A. V., 2009. *Development of the green economy in Russia: opportunities and prospects*.
- Ralph, F., 2016. *Green Revolution: Economic growth without damage to the environment*.
- Novikova, E. V., 2020. *Legal support of the "green" economy*.
- Stolbovoy, V. S., 2020. *Regenerative agriculture and climate change mitigation in Achievements of science and technology of the agro-industrial complex*, 34(7).
- Sudas L.G., 2017. *Business for sustainable development. Public administration in Electronic bulletin №64*.
- Ivanova N.I., Levchenko L.V., 2017. *"Green" economy: essence, principles and prospects in Vestn. Om. unta. Ser. "Economy". 2(58)*. pp. 19-28.