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# Legal and regulatory framework of environmental initiatives in the Czech Republic as a potential model for green policy implementation in Eastern Europe

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***Abstract***

EU countries, in particular the Czech Republic, are developing structural mechanisms to influence the development of their economic model in the environmental sphere. The study of the Czech Republic's experience in implementing environmental reforms is relevant for understanding their impact on the country's economic sustainability and fulfilment of international obligations. The purpose of the study was to analyse the regulatory framework and results of the reforms implemented in the environmental policy of the Czech Republic and their impact on the country's further development. The results were obtained using special legal methods, such as terminological, formal legal and special legal methods. Identification of the main environmental problems, reformed economic sectors and the

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intensity of human activity's impact on nature, determination of stakeholders in the changes and identification of the problems solved allowed us to conclude that the measures taken were rational and varied in their effectiveness. The analysis of the environmental and regulatory framework of environmental policy in the Czech Republic and the adopted environmental legislation, such as CO2 emission quotas, rational use of natural raw materials, waste management, green taxes, benefits and subsidies for the functioning of markets for environmental goods and services, showed the undeniable advantages of an environmentally oriented economic model over the one focused on profit. The study found that the application of such measures helps to reduce the negative impact on the environment, improve the quality of life of the population and ensure sustainable economic development. Incentives for companies that implement environmentally friendly technologies stimulate innovation and reduce production costs. Legislation plays a significant role in this, in particular, the Law of the Czech Republic No. 165/2012 Sb. The results of the study can be used by researchers from around the world who study the implementation of new methods of environmental policy

***Keywords:*** greening; energy saving; sustainable development; integrated approach; pollutants; green energy

## *Introduction*

Most modern countries have a unique set of environmental problems and mechanisms for solving them. The current system of selling natural resources and manufacturing products has a destructive impact on biological systems. Therefore, it is necessary to improve standards and principles of environmental management, and regularly review environmental policy mechanisms and quality criteria for environmental impact assessment.

The problem of the interaction between the economy and the environment is typical for all countries of the world, and the Czech Republic is no exception. The rapid increase in the level of material well-being in exchange for the quality and length of life of the population through the development of industrial capacities and savings on environmental protection measures leads to improved economic growth at the cost of ecosystem degradation. At the same time, dependence on and impact on the environment is not considered by economics as a science. In this context, the role of law, which can establish imperatives that may contradict market logic, is increasing.

The willingness of states to neglect the growth of economic characteristics for the sake of a "green future" is studied in a research article by E. Kyselá (2015) from Charles University in Prague. This paper identifies the factors that influence the acceptability of environmental policies. These factors include concern for the environment, the role of the state in environmental protection and trust in the country's political course. The study showed, on the one hand, that the population is interested in solving environmental problems, and at the same time, there is a low willingness to make economic sacrifices. The paper concludes that these two indicators play an important role in the effectiveness of the practical functioning of the reformed environmental policy in the Czech Republic. The commitment of the population to the economical use of natural resources can contribute to the effectiveness of the

implementation of the new environmental model and its beneficial impact on the functioning of a sustainable economy.

I. Cabelkova *et al*. (2021) have taken a more thorough approach to the issue of public support for the government's environmental policy in the Czech Republic. Their research examines factors related to public perceptions of climate change and the impact of environmental policies along with anthropogenic activities. The results showed that older people were less likely than other age groups to have information about the subject of the study and to be willing to act. The authors examine the hypothesis of the influence of state media and Internet technologies, which has not been sufficiently confirmed. The article does not fully address the issue of further research aimed at educating the population using eco-promotion methods.

A new approach to economic development in harmony with the Czech Republic's environmental policy is the introduction of elements of a closed-loop economy. This type of production is a green alternative to the linear economy. The circular economy is based on the reuse and recycling of resources and minimising waste. The study by L. Švecová *et al*. (2020) addressed the need to update the industrial policy of the Czech Republic and a new set of measures within the framework of the closed-loop economy package. The authors describe the positive dynamics of environmental indicators under the influence of elements of the new economic policy, which considers the requirements of modern environmental standards. The article describes the main enterprises of the country that have fully implemented the EU standards. The impact of environmental policy on ecosystem services in the Czech Republic was described by J. Daněk (2017). The paper discusses the results of the positive impact of the new environmental policy on the restoration of ecosystem services in the region. The study describes the instruments of influence on industrial emissions and production standardisation and shows the relationship between the improvement of economic stability of the Czech Republic's regions and the quality of ecosystem services.

Environmental issues such as climate change are global in nature. Overcoming global environmental problems is impossible without the participation of neighbouring countries. The negative impacts of climate change on economic growth in the Czech Republic are considered by B. Mats (2019). The author assesses the institutional cooperation between the Czech Republic, Hungary, Slovakia and Poland in developing joint protocols to combat the effects of climate change. The Czech Republic is a member state of the European Union with a set of unique environmental and economic characteristics. The European Environment Agency (2020) regularly issues reports on the state of the EU's environmental sector. The most recent report was released in 2020 and was titled "Europe's Environment: state and prospects – 2020". Based on the results of such documents, changes are made to the EU's environmental policy and adjustments are made to interstate environmental relations. The study of the results of the interaction of neighbouring countries in the European Union allows us to reveal the impact of environmental reforms on the sustainable development of the Czech Republic.

The study aimed to examine and analyse environmental policy reforms in the Czech Republic, their compliance with the EU green policy framework, and their impact on the development of a sustainable economy. To determine the impact of the new environmental policy on the dynamic changes in the Czech Republic's economy, it is necessary to examined the region's environmental problems, the goals of environmental policy

reforms and the results achieved. To better understand the specifics of the Czech Republic as a member of the European Union, the results and legislative framework of environmental reforms will be compared with the initiatives of the EU candidate country Ukraine. This helped to identify the challenges and prospects that Ukraine will have to face on its way to implementing a European style "green policy".

### *Materials and Methods*

A set of general scientific methods of scientific knowledge, such as analysis and synthesis; induction and deduction; analogy; and abstraction, were used in the study. Analysis and synthesis were used to study the links and relationships emerging in the process of implementing environmental policy reforms. The abstraction was used to focus on the results of the reforms and their contribution to the formation of a stress-resilient economic system. Induction and deduction methods were used to study and determine the experience of environmental policy reforms carried out by the EU countries; assess their consequences; and analyse the challenges that the Czech Republic will face on the way to forming a stress-resistant economic system. The systematic approach was used to consider the results of the environmental policy of the Czech Republic in terms of the integrity of the many reforms implemented and the synergy resulting from their implementation, which ensures the stress resistance of the economic system.

The first stage of the study identified areas of environmental policy and reform that have a significant impact on the formation of a stress-resistant economic system in the Czech Republic and are priorities in the framework of environmental cooperation between European countries. The study used data from the European Union Statistical Office, the European Environment Agency, the Czech Statistical Office, the Czech Environmental Information Agency, the official website of the European Union, the official website of the Organisation for Economic Cooperation and Development, and the European Investment Bank. Data analysis and evaluation of indicators were based on the following documents:

Data analysis and evaluation of indicators were based on the following documents: State Environmental Policy of the Czech Republic until 2030 with a perspective until 2050 (2021), Statistical Yearbook of the Czech Republic – 2021 (Czech Statistical Office, 2021) as well as the report "Air Quality in Europe 2021" (2021). Additionally, the 2019 review of the implementation of EU environmental measures in the Czech Republic country report (European Commission Staff Working Document No. SWD/2019/119 final, 2019) and the briefing "Bathing water quality in Europe in 2021" (2021) were employed. The briefing "European Environment – State and Outlook 2020: Knowledge for the Transition to a Sustainable Europe" (European Environment Agency, 2020) and the country report on the implementation of the 2022 Environmental Protection Project – Czech Republic (European Commission Staff Working Document No. SWD(2022) 264 final, 2022) were also considered. Finally, the report "The European Environment – State and outlook 2020: Knowledge for the Transition to a Sustainable Europe" (2020) was used. Certain legal acts of Ukraine and the Czech Republic were taken for comparative analysis, namely, the Law of Ukraine "On Alternative Energy Sources" (2003), the Law "On Amendments to Certain Laws of Ukraine on the Restoration and Green Transformation of the Energy System of Ukraine" (2023), Law of Ukraine "On Amendments to Certain Laws of Ukraine on the Restoration and Green Transformation of the

Energy System of Ukraine" (2023), Draft Law "On Amendments to Certain Laws of Ukraine on the Restoration and Green Transformation of the Energy System of Ukraine" (2023), Law "On Supported Energy Sources and on Amendments to Certain Acts" (2012), "Resolution No. 16/2016" (2016).

The second stage involved analysing the reforms implemented in the Czech Republic in recent decades; assessing the results achieved; presenting comparable data on the state of the objects under study in the EU; and identifying areas of work to ensure the achievement of the planned results. The Czech Republic's green policy legislation was compared with the similar Ukrainian regulatory framework.

The third stage of the research was a comparison of the legislative frameworks of the Czech Republic and Ukraine on the regulation of green energy development. This kind of research required the use of several special legal methods of scientific knowledge. One of the main methods was the formal legal method, which was used to trace the relationship between the legislative norms on the development of alternative energy sources and their actual implementation. The next special method was the comparative legal method, as mentioned above, at this stage the legal framework of the Czech Republic and Ukraine was considered, so it was necessary to compare specific legislative provisions of the mentioned countries.

At the final stage, the results of the study are considered in terms of their scientific value; a search for alternative points of view substantiating the author's approaches to solving the problems of reforming the environmental policy is carried out; conclusions are formulated and substantiated; directions for further research are presented, which will expand the range of tools, measures and reforms implemented to ensure the stress resistance of the economic system of the Czech Republic.

***Results***

The formation of a centralised environmental policy for all EU member states took place in the late 20th and early 21st centuries, during the rapid development of the industrial sector and the maximisation of natural capital. This was the first attempt to curb the growing trend of environmental degradation. Environmental policy integration is an ongoing process of introducing an environmental philosophy into the functioning of non-environmental structures, such as agriculture, transport, and the urban economy. Medium-term programmes are the basic regulatory documents for the practical side of the European Union's environmental policy. These programmes are a political and legal document that defines a set of environmental and political measures for the near term, considering the feasibility of its implementation. The main reporting document of the Czech Republic on the current state of the environment is the report of the European Environment Agency, which is presented to the public every 5 years. The latest and most up-to-date report was presented in 2020 (SOER) (European Environment Agency, 2020). The report helps the European Union's governing bodies make decisions on modernising European environmental policy. This flexibility in regular revisions of the environmental strategy contributes to the improvement of environmental performance in the EU member states. The 2020 report builds on the findings of the previous report and draws its conclusions.

In the Czech Republic, the document that incorporates the conclusions and forecasts of SOER 2020 is the State Environmental Policy of the Czech Republic 2030 with a vision to 2050 (2021) (SEP 2030), which formulates environmental objectives and addresses current environmental issues. SEP 2030 is a framework document whose planning horizon is not limited to 2030, it formulates

a comprehensive vision of the State Environmental Policy of the Czech Republic until 2050.

The main directions of the Czech Republic's environmental policy are as follows: more effective implementation of legislation; better information through an improved knowledge base; reasonable investments; and integration of environmental interests into other policies (Directive of the European Parliament and of the Council No. (EU) 2015/2193, 2015). Priority goals include rational use of natural resources, protection of natural landscapes, a safe environment for the population, combating climate change, and improving air quality.

The main problems identified for the Czech Republic in the implementation of environmental policy and EU legislation that need to be addressed based on the results of the Environmental Impact Review (EIR) (European Commission Staff Working Document No. SWD(2022) 264 final, 2022; Environmental Implementation Review, 2022) are as follows:

- intensifying efforts to create the necessary infrastructure and conditions for the transition to a circular economy;
- improving air quality in critical areas of the country, especially in urban areas, and reducing the burden on water and natural ecosystems;
- establishing transparent and efficient permitting procedures necessary to ensure compliance with EU legislation, especially concerning public participation and access to justice.

Air quality remains a serious problem in the Czech Republic. Despite the overall improvement in air quality and the steady decline in air pollution, the health of people living in the Czech Republic is still at risk of exceeding the limits for certain pollutants (e.g. particulate matter, nitrogen dioxide, ozone). The data published by the European Environment Agency estimates the number of premature deaths related to exposure to particulate matter (in this case $PM_{2,5}$), nitrogen dioxide ($NO_2$) and ozone ($O_3$) in the Czech Republic at 8500, 190 and 460 deaths, respectively (Air quality in Europe…, 2021). The main cause of dirty air in the Czech Republic is anthropogenic activity. The combustion of fossil fuels and the operation of internal combustion engines releases a huge number of pollutants into the atmosphere, such as particulate matter ($PM_{10}$ and $PM_{2,5}$), nitrogen dioxide ($NO_2$), ozone ($O_3$) and carbon dioxide ($CO_2$), methane ($CH_4$) and various heavy metals (Air quality in Europe…, 2021). Polluted air causes direct economic damage to the population and the country's economy. Dirty air is a source of a wide range of diseases in humans, which affects the ability of the population to work and increases the number of people incapacitated by disability. In addition, acid rain from hazardous emissions causes economic damage to the agricultural and municipal sectors, destroying plants and damaging urban infrastructure. Particulate matter concentrations in the air show a downward trend; for example, the level of fine particulate matter exceeding the European Union limit value in the Czech Republic decreased from 16% to 5% (Directive of the European Parliament and of the Council No. (EU) 2015/2193, 2015). The energy and agricultural sectors also demonstrate a reduction in $CH_4$ emissions. Thus, it is possible to state that the Czech Republic has made progress in reducing the concentration of pollutants in the last decade.

The total emissions of the main pollutants into the atmosphere, according to the statistical yearbook of the Czech Republic published in 2021 (Czech Statistical Office, 2021), are shown in the graph (Fig. 1). The information on pollutant emissions currently available from open sources, such as the Czech Statistical Office, is limited to 2019. The data is based on the country

report on the implementation of the environmental project for 2022 – Czech Republic, which contains information for 2020 inclusive (European Commission Staff Working Document No. SWD (2022) 264 final, 2022), which is reflected in the study materials.

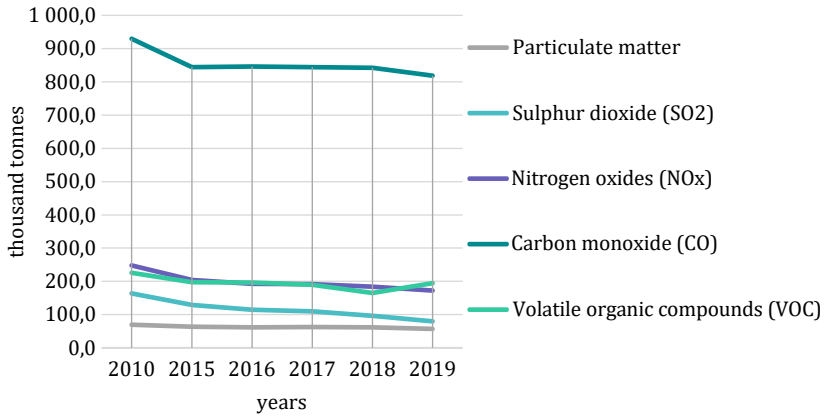


**Figure 1.** Total emissions of major pollutants, 2015-2019

**Source:** European Commission Staff Working Document No. SWD(2022) 264 final (2022)

In addition, the impact of environmental policy on air quality standards has been evident since 2000 in all sectors, including nitrogen dioxide emissions. The dynamics of the indicators demonstrate the effectiveness of the New Directive on National Emission Limit Values (The EU Environmental Implementation..., 2019) for sulphur dioxide, nitrogen oxides, ammonia and particulate matter. Additional actions are needed to ensure full compliance with EU air quality legislation in the Czech Republic, with the following as priorities: implementation of measures to reduce emissions from major sources as part of the National Air Pollution Control Programme (NAPCP); ensuring full compliance with EU air quality standards and maintaining a downward trend in air pollutant emissions to reduce their adverse health and economic impacts to reach the values recommended by the World Health Organisation (WHO) in the future.

An important area of work to ensure a stress-resilient economic system is to reduce greenhouse gas emissions and transition to a climate-neutral and sustainable economy. The EU is working comprehensively to reduce greenhouse gas emissions and transition to a climate-neutral and sustainable economy, as well as to address the inevitable consequences of climate change. EU climate legislation encourages the reduction of emissions from power generation, industry, transport, the maritime sector and fluorinated gases (F-gases) used in products.

The Czech Republic has an integrated National Energy and Climate Plan (NECP) for 2021-2030, according to which the national goal for 2030 is to reduce greenhouse gas emissions by 30% compared to 2005 levels (European Environment Agency, 2020). The Czech Republic adheres to EU regulations on combustion plants and emissions from passenger cars and light-duty vehicles (the Medium-duty Combustion Plant Directive) (European Environment Agency, 2018a). This innovation reduced emissions from cars and

harmonised performance with European standards. The dynamics of pollutant emission reduction demonstrate the effectiveness of the measures taken to ensure public access to clean air at the local, regional and national levels. However, the greenhouse effect that has already been formed will not be compensated for several decades. The ability of these substances to create a greenhouse effect has led to climate change on a global scale.

Adaptation measures to the adverse effects of climate change are very important for the European Union and its member states. To combat climate change, the European Union has developed an international emissions trading system – the EU Emissions Trading System (EU ETS) (European Environment Agency, 2023). It covers the energy, industrial and aviation sectors and is used in all EU member states. From 1990 to 2020, the Czech Republic demonstrated a 43% reduction in greenhouse gas emissions in the country, as illustrated in the figure (Fig. 2). The Czech Republic has developed and successfully implemented several sectoral strategies at the state level to ensure low greenhouse gas emissions. The EU Strategy on Climate Change Adaptation, adopted in 2013, has enabled a comprehensive, coherent approach to the problem and ensured highly effective coordination between EU member states. The goals and actual greenhouse gas emissions of the Czech Republic according to the Effort Allocation Decision and the Effort Allocation Regulation are presented in the figure (Fig. 3).

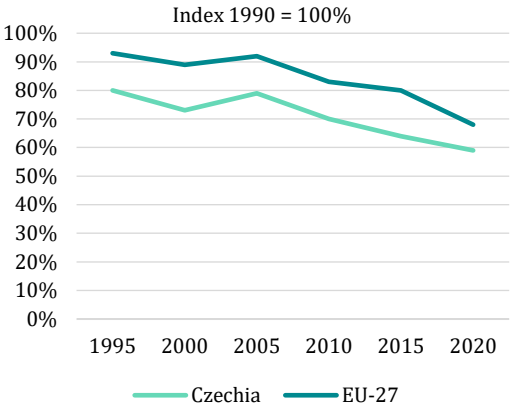


**Figure 2.** Changes in total greenhouse gas emissions in the Czech Republic, 1990-2020

**Source:** European Environment Agency (2015), OECD, (2018), European Commission Staff Working Document No. SWD(2022) 264 (2022)

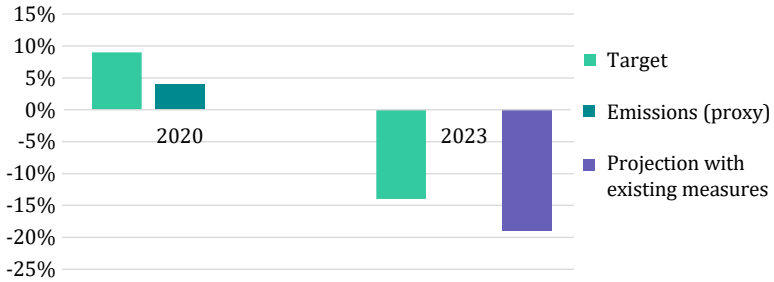


**Figure 3.** Goals and emissions of the Czech Republic following the Effort Allocation Decision and the Effort Allocation Regulation

**Source:** European bathing water quality (2021), European Environment Agency (2023)

Based on the Climate Change Adaptation Strategy, the Czech Republic adopted the National Action Plan for Climate Change Adaptation in 2017 (European Environment Agency, 2023). The

strategy covers such environmental policy sectors as forest management, water regime, agricultural land, biodiversity, transport, industry, energy, and emergencies. The total revenue from the sale of emission permits under the EU emissions trading system over the past five years has amounted to approximately 566 million EUR, of which 37 million EUR was generated in the Czech Republic. At the same time, 88% of the proceeds were spent on climate and energy goals, which contributed to strengthening the economy of the Czech Republic (European Environment Agency, 2015; OECD, 2018). Positive changes in the environment and economy caused by the impact of the new environmental policy have affected the industrial and municipal waste sectors. After the European Union adopted the Circular Economy Action Plan in 2015 (Eurostat, 2020), the main tasks are:

1. Make environmentally friendly products the norm in the EU;

2. To expand the purchasing power of consumers;

3. Focus efforts on sectors that use the most resources and have high circular economy potential, such as electronics, batteries and automobiles, packaging, plastics, textiles, construction, food waste, water;

4. Guarantee less waste;

5. Make waste recycling accessible to the public;

6. Improve the infrastructure of regions and cities;

7. Lead global efforts on the circular economy.

In 2016, the reuse of materials in the Czech Republic was 7.6%, but this figure has been steadily increasing and by 2020 it was already 13.4% (European Commission Staff Working Document No. SWD(2022) 264 final, 2022; European Environment Agency, 2023). In 2020, the Czech Republic's performance in terms of resource recycling (1.19 euros/kg) was below the EU average (2.09 euros/kg). A comparison of EU and Czech productivity in the period from 2010 to 2020 is shown in the figure (Fig. 4). Resource productivity is defined as the ratio of gross domestic product to domestic material intensity.

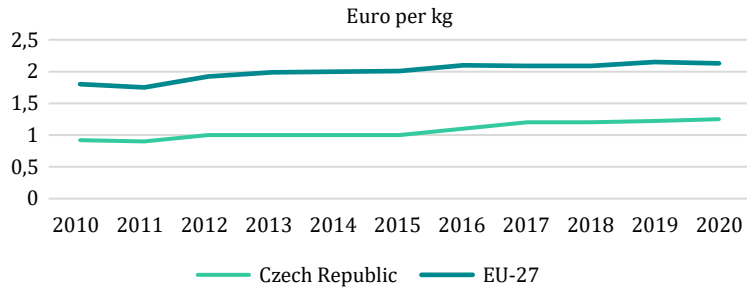


**Figure 4.** Comparison of waste recycling productivity in the EU and the Czech Republic 2010-2020

**Source:** European Commission Staff Working Document No. SWD(2022) 264 (2022), European Environment Agency, (2023)

The philosophy of treating waste as a valuable resource has not only reduced the negative impact of waste on the biosphere but also created new jobs. In the hierarchical model of household waste management in the Czech Republic, the model of waste prevention is at the top of the list. This is followed by preparation for reuse without recycling, reuse with recycling, ecological

disposal (with a minimum ecological footprint on the ecosystem when incinerated) and landfill disposal. The economy was positively impacted by environmental policy in recycling household and industrial waste. The creation of new jobs and environmental taxes have contributed to the formation of a stress-resilient economy. In 2015, 8,000 jobs were created related to the recovery of recyclable materials from mixed waste types at pretreatment plants (Salvetti, 2018). The new environmental policy of the Czech Republic effectively uses economic instruments to build the sustainability of the national economy in the process of transition to a circular economy. Taxes are applied on landfilling, incineration and storage of waste at landfill sites. Green subsidies are provided to businesses and households for proper waste sorting and recycling.

The EU Ecolabel and the Eco-Management and Audit Scheme (EMAS) are licensed organisations that assess the transition of the public economy to a circular economy. They also show the extent to which companies are committed to eco-policy and circular economy. As of September 2021, 5,187 products and 22 licences under the EU ecolabel scheme were registered in the Czech Republic out of 83590 products and 2057 licences in the EU, which indicates a low use of these licences (Salvetti, 2018; European Commission Staff Working Document No. SWD(2022) 264 final, 2022). The number of companies in the Czech Republic that have adopted a strategy of increased resource efficiency is gradually increasing, as there are 18 organisations registered with EMAS. The tendency to involve a wide range of stakeholders for better financing of eco-innovation also continues. The high motivation of companies for environmental reforms opens the prospect of a confident full transition to a circular economy in the coming decades. The transition process could be faster if the Czech Republic reduces its dependence on fossil fuels, as highlighted in the Environmental Performance Review 2018 (European Environment Agency, 2019). The Czech Republic's use of coal as an energy resource not only hinders the greening of production but also creates obstacles to a successful early transition to a circular economy. Specific data from Eurostat and the Environmental Policy Implementation Report show that household waste recycling in the Czech Republic accounts for 34% of all waste, while the EU average is 46%. A comparison of waste recycling rates in the Czech Republic and the European Union for 2010-2020 is shown in the figure (Fig. 5).

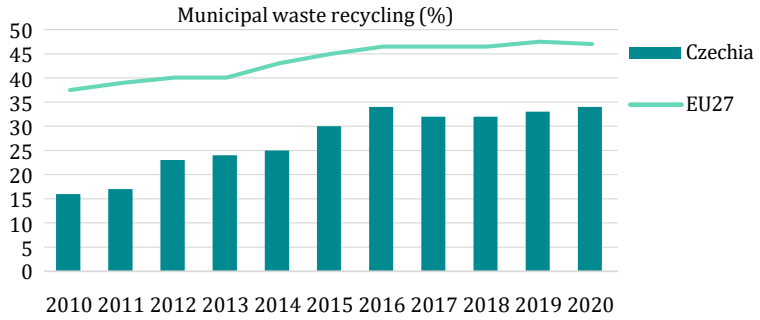


**Figure 5.** Household waste recycling rate, 2010-2020

**Source:** The EU Environmental Implementation Review. Czech Republic (2019), European Commission Staff Working Document No. SWD(2022) 264 final (2022).

The prospects for increasing the stress resistance of the economy and improving environmental performance in the Czech Republic are described in the National Waste Management Plan for 2015-2024 (The EU Environmental Implementation..., 2019). Key actions to achieve these goals: increase the existing tax on waste disposal; increase funding for waste processing companies; increase the existing tax on incineration of recyclable waste; improving the efficiency of separate waste collection and storage.

The problem of waste recycling is closely related to the problem of land degradation in the Czech Republic. The annual rate of withdrawal of natural land in the Czech Republic was 0.43% for the period 2006-2012 and 0.41% for the period 2012-2018, according to CORINE Land Cover (Eurostat, 2020). This dynamic is illustrated by the successful implementation of an amendment to the Soil Protection Act in 2015 as part of environmental policy reforms in the Czech Republic. This reduced the anthropogenic pressure on the country's agricultural land. Pollution of soil resources not only negatively affects the vital activity of flora and fauna, it can also dramatically reduce the quality of groundwater and surface water, thereby endangering human life and health. Soil erosion is a natural process, but due to human interference in natural processes, the rate of destruction of fertile soil is accelerating. Forest fires, deforestation, urbanisation and intensive land reclamation are exacerbating the situation. Since 2012, according to Eurostat, the rate of soil loss due to water erosion in the Czech Republic has been 1.64 tonnes per hectare per year (The EU Environmental Implementation Review..., 2019; Directive of the European Parliament and of the Council No. 2006/7/EC, 2006). Measures taken by the Czech Republic to reduce the anthropogenic impact on land have not yet achieved their economic and environmental goals. Out of 9300 contaminated land plots, only 257 have been restored as of 2018 (Directive of the European Parliament and of the Council No. 2006/7/EC, 2006). This means that it is necessary to further improve land protection mechanisms, as the loss of fertile soil affects the country's economic well-being and environmental profile. Fertile soil is a valuable resource for any country, and its loss means fewer jobs and less space for growing crops.

Modern EU legislation requires a reduction in the anthropogenic impact on water resources. The European Union's water legislation (European Environment Agency, 2018b) provides high standards of protection for all types of water in the territory of the EU member states. Mechanisms to counteract water degradation are primarily aimed at sources of pollution, such as chemical and food industries, utilities, and agriculture. The main sources of pollution in the rivers of the Czech Republic are municipal wastewater accounts for 38%, while agricultural water and acidic precipitation are sources of 22% of pollution. Overall, there has been an improvement in water pollution. In 2021, 332 or 1.5% of bathing places in the EU were of poor quality. Environmental reforms have improved the algorithms for monitoring surface and groundwater (European Environment Agency, 2018b). As of 2021, 81.3% of surface waters in the Czech Republic are in excellent condition; 9.7% are in good condition; 6.5% are not classified; 1.9% and 0.6% are in fair and poor condition, respectively (European bathing water..., 2021). This is evidence that the Czech Republic has many obstacles to overcome on the way to greening the country.

Since 2014, there has been an improvement in the environmental performance of bathing waters. The compliance of bathing waters with environmental standards contributes to the

sustainable development of the tourism sector and the improvement of the Czech economy. Figure 6 demonstrates the quality indicators of Czech bathing waters in 2017-2020.

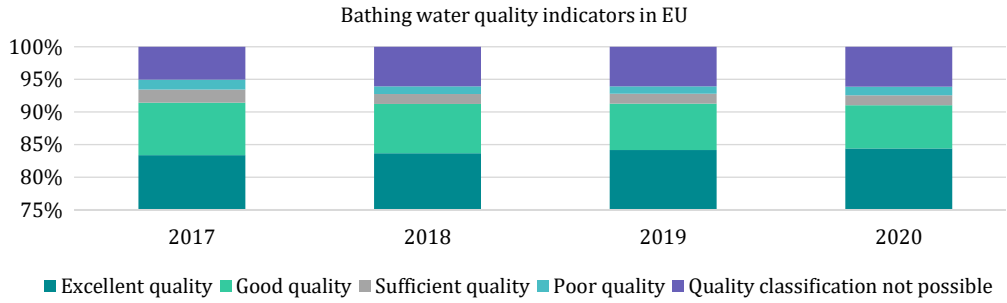


**Figure 6.** Bathing water quality indicators in the Czech Republic, 2017-2020

**Source:** Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions No. COM(2017) 749 final (2017), European bathing water quality in 2021 (2021)

According to the latest published data, 90% of municipal wastewater in the Czech Republic is treated. The remaining 10% require investment. According to the report of the Council Directive 91/271/EEC on urban wastewater treatment, the allocated 26 million EUR does not fully cover the costs of modernising urban wastewater treatment facilities (European Commission, 2021). To build a stress-resilient economy in the context of environmental policy modernisation, it is rational to use economic mechanisms in the form of financial incentives and green taxation. These methods are effective in achieving the goals of the Czech Republic's environmental policy. Since 2015, the Czech Republic has achieved few qualitative changes in the reform of environmental taxes. Although there has been a natural increase in the amount of tax revenue as a percentage of GDP, environmental taxes in the Czech Republic remain among the lowest in the European Union. In 2020, Czech environmental tax revenues totalled 1.93% of GDP, which is below the EU average of 2.24% (European Commission Staff Working Document No. SWD(2022) 264 final, 2022). Of this amount, energy taxes account for the largest share (94% compared to the EU average of 77.5%). The share of transport taxes in total environmental tax revenues was 5.7%, while pollution and resource taxes remained below 1% (0.7%), which is much lower than the EU average. Thus, the most profitable environmental tax in the Czech Republic is the air pollution tax. Since 1967, fees have increased by 37%. As the Czech Republic gradually reduces its dependence on fossil fuels, subsidies for non-green energy sources are being reduced. The excise tax refund on diesel fuel was phased out. The diesel market has reached a new low: in 2021, only 20% of cars were sold in the EU, and it will continue to fall. Positive changes have been seen in the purchase of cars running on alternative fuels. The market for electric vehicles will grow in the Czech Republic in the coming years as EU member states continue to pursue policies to reduce $CO_2$ emissions.

The Czech Republic uses private sources of funding and financial grants from EU institutions to achieve its environmental goals without damaging the economy. This successfully integrates

environmental objectives into various areas of environmental policy. From 2014 to 2020, the Czech Republic received 23.9 billion EUR from the European Investment Bank's funds (European Commission, 2020). Together with the state contribution of 7.88 billion EUR, the Czech Republic's total environmental budget totalled 32.8 billion EUR. This has helped to finance various areas of environmental policy impact, such as environmental research and innovation, job creation, environmental protection, modernisation of production, climate change, waste recycling, and social inclusion (The Czech Republic and the EIB, 2022). As part of the new environmental policy, investments were made to improve air quality. According to the European Commission (2020) report, the programme period from 2014 to 2020 showed an increase in the rational use of EU funds for investments in strengthening the environmental integration of the Czech Republic. The company has improved product competitiveness and increased the number of jobs.

Between 2014 and 2020, the European Investment Bank allocated 25.46 billion EUR of *ESI* funds to the Czech Republic to invest in job creation, a sustainable and healthy European economy and the environment. In 2021, the European Investment Bank and the European Investment Fund provided financing for projects in the Czech Republic in priority areas (Fig. 7) (The Czech Republic and the EIB, 2022). Direct EU investments in environmental protection in the Czech Republic totalled 2.36 billion EUR, with an additional 1.91 billion EUR designated as indirect environmental investments, bringing the total investment in environmental protection to 4.27 billion EUR.

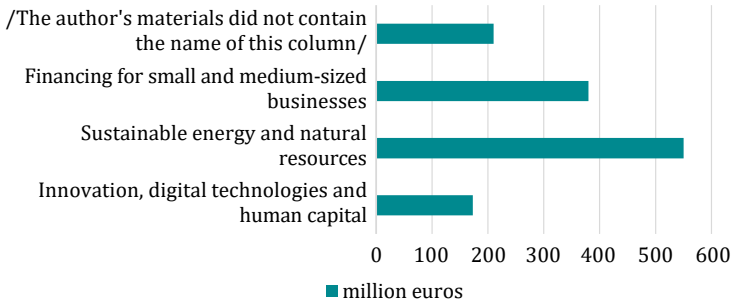


**Figure 7.** EIB loans to the Czech Republic in 2021, EUR million

**Source:** The Czech Republic and the EIB (2022)

The identification of the main beneficiary groups and their involvement as partners contributed to the positive impact of the new environmental policy on the environmental and economic transformation of the Czech Republic. The commitment and participation of key stakeholders in the development of the new environmental policy contributed to the effective implementation of the environmental policy objectives. The key stakeholders in the reformed environmental policy of the Czech Republic are NGOs, industry and business, farmers, local authorities, labour unions and the scientific and technical community. These groups of people and structures have helped environmental policy mechanisms to reach local, regional and national levels. One of the most useful functions of stakeholders is to monitor and evaluate. This played a role in raising

public awareness and helped to assess the results of environmental policy.

For a deeper understanding of the advantages and disadvantages of government action in the context of green economy development, it is important to consider the actions and measures taken by the Czech Republic with another country. An illustrative example in this case is Ukraine, which is not currently a member of the European Union but is actively implementing several mechanisms for developing a green economy. In Ukraine, several legislative decisions have been made to stimulate the development of alternative energy sources, which can be compared to Czech policy.

The Law of Ukraine "On Alternative Energy Sources" (2003) was adopted in 2003 and is the first and main law that defines the direction of development of alternative energy sources in Ukraine. This law defined the main terms and concepts related to this area and stated that the state takes a leading role in the development of renewable energy sources and delegates these powers to the Cabinet of Ministers of Ukraine. One of the key provisions of the law is the information set out in Article 9, which stipulates that the production and consumption of energy from alternative sources shall be stimulated through economic levers, the creation of favourable conditions for the construction of alternative energy facilities and recommendations for the installation of energy-saving and hybrid installations. However, specific steps and measures for the development of green energy are spelt out in the Law of Ukraine No. 3220-IX (2023), which provides for the promotion of renewable energy through several mechanisms. Firstly, it provides guarantees of origin for "green" electricity, which allows for avoiding additional taxation of Ukrainian goods when imported into the EU from 2026. Secondly, it entitles renewable electricity producers to sell their electricity on the market at a feed-in tariff, with the additional payment being made by the State Enterprise Guaranteed Buyer. This surcharge is defined as the difference between the feed-in tariff and the market price, which promotes market development and improves competition. The project also provides an additional incentive for distributed generation on the consumer side through a self-generation mechanism, which increases the number of generating units and the resilience of the power system.

In the Czech Republic, support for renewable energy is regulated by the Supported Energy Sources Act (SESAct) (Law of Czech Republic No. 165/2012 Sb., 2012). This law establishes mechanisms to support renewable energy, including a tariff system and state support. The SESAct establishes the conditions for environmental impact assessment for renewable energy projects (Art. 4-7), which makes environmental impact assessments mandatory for certain types of renewable energy, such as hydroelectric power plants or wind farms. In addition, according to Czech law, renewable energy projects must comply with all the operation and maintenance requirements set out in the SESAct and other laws, otherwise, producers face fines and other sanctions. For example, Article 6c of the law defines the basic conditions of production and requirements for certain aspects of setting up electricity production from gases generated by biomass. In particular, the article states that a power plant must be located at a distance of more than 5 km from a possible connection to a gas facility of the operator or gas producer when using at least 40% of the heat produced, or less than 5 km when using at least 50%, with the impossibility of connecting to the nearest gas facility confirmed by a capacity provision protocol (Law of Czech Republic No. 165/2012 Sb., 2012).

The Ukrainian legal framework includes regulations aimed at reducing the environmental impact of the energy sector and promoting the use of renewable energy sources. The above-mentioned Law of Ukraine No. 3220-IX (2023) provides for the promotion of renewable energy through guarantees of the origin of "green" electricity and the right of producers to sell electricity on the market at a "green" fare. In addition, the requirements for the development of alternative energy in Ukraine are determined by the Law of Ukraine No. 3460-IX (2023). This document defines, among other things, areas for the construction of renewable energy facilities, maximum capacities to be supported at auctions, proposed land plots and lease of roofs and building facades with technical conditions for connection to the electricity grid.

It should also be noted that the Ukrainian legislative framework for the development of green energy is evolving in line with European standards. In particular, the Draft Law No. 3056-IX (2023) ensures that Ukraine introduces legal regulation of guarantees of the origin of electricity from renewable sources, which meets the requirements of the mandatory Directive 2018/2021 of the European Parliament and the Council (Proposal for a Directive of the European Parliament and of the Council No. COM(2021) 557 final, 2021). The Guarantee of Origin confirms the amount of electricity produced from renewable sources and is issued for each 1 MWh, and its ownership can be transferred separately from the electricity. Guarantees of origin are valid for 12 months from the date of generation of the relevant electricity. A separate register of guarantees of origin will be created, which will be integrated into the regional register of the Energy Community, and the National Energy and Utilities Regulatory Commission (NEURC) will act as the authorised body to issue these guarantees. The procedure for issuing, circulating and redeeming guarantees of origin will be approved by the Cabinet of Ministers of Ukraine. The introduction of a system of guarantees of origin will facilitate the export of green energy and stimulate the use of renewable energy sources within the country. However, it should be noted that this is only a draft law and it has not yet been adopted and entered into force. Therefore, only a gradual transition to European norms should be mentioned, not full compliance with them.

The Czech Republic also has a system of environmental standards and requirements governing energy use and environmental impact. The Czech Republic regulates environmental impact assessments for renewable energy projects, such as hydroelectric power plants or wind farms, to ensure environmental safety and compliance with environmental performance standards. In addition, requirements for the operation of renewable energy projects are also set out in Czech law, in particular in the Supported Energy Sources Act (SESAct) (Law of Ukraine No. 3460-IX, 2023), an example of which was mentioned in Article 6c above.

The connection of individual users to the centralised electricity system in the Czech Republic is regulated by Decree of the Energy Regulatory Office of the Czech Republic No. 16/2016 Sb. (2016). The conditions for the connection of the applicant's equipment to the transmission system or distribution system are the submission of a connection request, the examination of connectivity following paragraphs 6 and 7 a, and the conclusion of a connection agreement between the applicant and the transmission system operator or the distribution system operator or the amendment of an existing connection agreement. Paragraph 1 shall not apply and the only condition for connection shall be the connection agreement between the applicant and the transmission

or distribution system operator unless there is a change in the technical conditions of connection in the cases: change of the licensee without interrupting the connection of the production plant, replacement or modification of the production plant without exceeding the current reserved capacity, change of the natural or legal person entitled to use the electrical equipment, reduction of the reserved capacity or consumption of the equipment, change of customer identification data. The reserved capacity at the connection point of a production plant or the connection point of a consumption point may be stipulated in the connection contract in a range of up to 1.2 times the installed capacity of all plants connected to the connection point. For transmission points at the high voltage level, the reserved capacity may be specified in the connection agreement within the range from the highest reserved capacity of all connection points to the sum of the reserved capacities of all connection points. At the low voltage level, the reserved power is matched according to the current rating of the main circuit breaker in front of the electricity meter or the current rating of the nearest front circuit breaker if there is no main circuit breaker.

The Ukrainian and Czech systems of green energy development have their peculiarities, advantages and disadvantages that determine their efficiency and development prospects. In Ukraine, green energy incentives are based on feed-in tariffs, which guarantee producers of electricity from renewable sources a stable and profitable income. The Law of Ukraine No. 3220-IX (2023) provides mechanisms to guarantee the origin of "green" electricity and the right of producers to sell their electricity on the market. This creates attractive conditions for investors and promotes the active development of renewable energy. In addition, Ukraine is introducing a market premium mechanism to compensate for the difference between the feed-in tariff and the market price and to support its citizens who develop the renewable energy sector.

The main disadvantage of the Ukrainian system compared to the Czech system is the complexity and bureaucracy of the processes associated with the connection and operation of renewable energy sources. High costs of project documentation and other investment expenses can hinder the rapid development of new projects. Thus, both systems have their strengths and weaknesses, and the exchange of experience between Ukraine and the Czech Republic can help improve approaches to green energy development, ensuring more sustainable and efficient use of renewable energy sources.

### *Discussion*

A fundamental condition for the effective implementation and functioning of environmental policy is the degree of commitment to environmental policy by stakeholders. In general, the acceptance of the ecological model of economic development by the population of the Czech Republic was high (Kyselá, 2015). Comparison of the results of this study on the importance of stakeholder adoption of eco-policy with the works of foreign authors shows similarities in the main conclusions regarding this aspect of the issue. For example, A. Jordan and A. Lenschow (2010) concluded that with the support of society, the implemented eco-policy functions better and achieves its goals faster than the eco-policy functioning without such support.

A. Wijkman and K. Skånberg (2020) addressed the success of the transition to a circular economy through the prism of increasing the number of jobs and reducing carbon emissions in the example of the Czech Republic and Poland. The analysis demonstrates the implementation of

circular economy principles in the Czech Republic by assessing job growth and waste management principles. Both strategies have led to similar conclusions that the Czech Republic has benefited environmentally and economically from the gradual transition of its economy to a closed-loop economy. In addition, the study models various possible options for economic development after its full transition to the principles of sustainable development. The shortcoming of the cited work is the lack of data on waste recycling in the Czech Republic and the impact of quality recycling or disposal methods on the economy.

The Czech Republic has made greater progress in preserving its environmental potential in water resources management. Environmental reforms have improved algorithms for monitoring surface and groundwater. This has improved the safety of bathing waters, which has contributed to the stable development of the tourism sector and improved the economic performance of the Czech Republic. In her study I. Herová (2007) addressed the management of natural exhaustible resources in the context of sustainable economic development. The author concludes that natural resources such as groundwater, surface water and land are the driving force of the agricultural economy, without stable development the sustainable development of the Czech Republic is impossible. The results of the study confirm the author's conclusions about the importance of environmental protection measures and the conservation of natural resources, as well as their impact on economic stability at the state level. The cited article fully discloses the practical side of green environmental management, and the author draws similar conclusions about the importance of preserving the purity of natural resources for the sake of a stress-resistant economy in the Czech Republic.

A study of various information sources has led to the conclusion that the new environmental policy has maximised the effectiveness of investments in improving air quality. P. Blaschke (2022) concluded that green finance helps to reduce unemployment and described the importance of identifying the main groups of beneficiaries when developing environmental policies. These results are comparable to the results of this study, but the conclusions about the undeniable benefits of environmental investments do not fully coincide with the work of P. Blaschke (2022). The author argues that the expectations associated with investment incentives for the green economy prevail over the final results. Therefore, it is not reasonable to give green finance a central place in the environmental reform of the Czech Republic.

Thus, a comparison of the approaches of scientists to the problem of ensuring the effectiveness of environmental reforms allows us to conclude not only that the chosen topic is relevant, but also that a huge number of specialists from various scientific circles are keenly interested in it. A thorough study of scientific publications and comparison of the results obtained with the published results demonstrates similarities with the main conclusions formulated in this paper. The minor differences are explained by the choice of different methodologies and the fact that some authors have extended the results of other countries to the Czech economy.

The environmental situation in the Czech Republic was studied by I. Hunova (2020), who, based on the analysis of relevant key documents and reports, provides a historical perspective on air pollution and the development of air quality in the modern Czech Republic (CR) over the past seven decades, from the 1950s to the present day. It discusses the main problems of air pollution, identifies the key problem areas and regions, and indicates the main air pollutants in the Czech Republic. Air pollution is considered in the broader context of its impact on human health and the

environment in the Czech Republic. The review consists of three main stages: (1) the period before the Velvet Revolution of 1989, (2) the transition period of the 1990s, and (3) the modern period after 2000. Air quality has improved significantly since the 1970s and 1980s, when pollution in former Czechoslovakia peaked, but the situation is now deteriorating again. One should disagree with the thesis that the air pollution situation in the Czech Republic has been deteriorating in recent years. As has already been demonstrated in the results of this study, in the graph presented in Figure 1, the total emissions of air pollutants in the Czech Republic have been gradually decreasing between 2010 and 2019. In addition, as already mentioned, the Czech Republic has been experiencing a downward trend in the concentration of particulate matter in the air; for example, the level of fine particulate matter exceeding the EU limit values in the Czech Republic has fallen from 16% to 5%. The energy and agricultural sectors also show a decrease in $CH_4$ emissions. Thus, it is possible to deny the thesis that the overall level of air pollution in the Czech Republic is increasing. However, I. Hunova (2020) also states that at this stage of development, new challenges have arisen due to the increasing concentration of certain substances in the air, in particular, fine aerosol, benzo(a)pyrene and ground-level ozone, the levels of which are still well above the permissible limits. In addition, despite the overall decline in emissions, atmospheric nitrogen deposition remains high in some individual regions.

Another important issue raised in this research paper is the establishment of a waste recycling process. This issue was studied in detail by B. Mikušová Meričková *et al*. (2020). The author argues that contractual waste management services are one of the most common methods of providing this service, and this topic has attracted considerable attention in scientific research. The study aimed to analyse the trends in municipal solid waste collection and disposal in the Czech Republic and Slovakia over the past 20 years, with a particular focus on the share of inter-municipal cooperation in the provision of this service. In contrast to Western European countries that are in the process of re-municipalisation, data collected for Slovakia and the Czech Republic over the past two decades show that contractual services dominate solid waste management, with an increasing share of contracted services over this period. This reflects the high level of fragmentation of municipal structures and the low willingness of municipalities to cooperate. The data collected also shows that the use of external suppliers provides only marginal cost savings that could be much greater; potential efficiency gains through contracting are limited by the poor quality of contract management. Concerning the main question, the author found that the share of inter-municipal cooperation in service delivery did not increase significantly during the study period. The study has identified three main factors that negatively affect waste management policies and overcoming them can increase the effectiveness of these activities. These factors are high transaction costs, lack of regular comparison of best practices and limited motivation to choose the best ways to provide services. It is necessary to agree with the results of this scientific work, since, as noted in the study, waste recycling is a multifaceted process that requires the cooperation and participation of many actors, including municipal authorities.

### *Conclusions*

Having examined the impact of environmental policy reforms on the formation of a stress-resilient economy in the Czech Republic, it can be concluded that there is a direct correlation between the effects achieved as a result of the implementation of environmental policy and their impact

on the stability of the state's economy. The study showed that the protection of natural resources, social stability and economic sustainability go hand in hand.

The level of air quality has a significant impact on the environmental and economic potential of the Czech Republic. Thanks to the implementation of environmental policy measures since 2000, we have managed to significantly reduce pollution levels, which led to a 16% reduction in toxic emissions below the EU average between 2012 and 2019. This has had a positive impact on public health, productivity and agriculture. The introduction of circular economy principles created 8,000 new jobs and increased environmental tax revenues. Despite progress in pollution control and water use, land protection remains insufficiently effective. Access to financing for environmental initiatives has helped reduce the financial burden on the budget and support sustainable development programmes. It should be noted that environmental reforms in the Czech Republic are fully compliant with EU legislation. The introduction of an emissions trading system and compliance with toxic emission standards demonstrate the Czech Republic's commitment to meeting EU environmental requirements.

Ukraine's green policy legislation is inferior to that of the Czech Republic in several key respects. Firstly, Ukrainian legislation is highly dependent on government regulation and subsidies, which can lead to instability in times of economic crisis. This makes the system less stable and predictable compared to the Czech Republic. Second, Ukraine pays less attention to integration with European energy markets. This limits the possibilities for exporting green electricity and reduces the attractiveness to international investors. In addition, the process of connecting and operating renewable energy sources in Ukraine is often less regulated and transparent, which can lead to bureaucratic difficulties and delays.

Ukraine can learn several lessons from the Czech experience to improve its green energy sector: increase transparency and predictability through regulated tariffs, including distribution prices; strengthen integration with European energy markets through market premium and guarantee of origin mechanisms; simplify bureaucratic procedures for connecting and operating renewable energy sources, reduce project documentation costs; attract investment through a stable legal framework and create favourable conditions for investors.

The study of the results of the 8th Environmental Action Programme until 2030 under the European Union's Environmental Policy can serve as a benchmark for further research.

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None.

***Conflict of Interest***

None.

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# Нормативно-правова база екологічних ініціатив у Чеській Республіці як потенційна модель для впровадження зеленої політики у Східній Європі

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***Анотація***

Країни ЄС, зокрема Чеська Республіка, розробляють структурні механізми впливу на розвиток своєї економічної моделі в екологічній сфері. Вивчення досвіду Чеської Республіки у впровадженні екологічних реформ є актуальним для розуміння їх впливу на економічну стійкість країни та виконання міжнародних зобов'язань. Метою дослідження був аналіз нормативного забезпечення та результатів реформ, впроваджених в екологічній політиці Чеської Республіки, та їхнього впливу на подальший розвиток країни. Результати були отримані за допомогою спеціальних юридичних методів, таких як термінологічний, формально-юридичний та спеціально-юридичний методи. Визначення основних екологічних проблем, секторів економіки, що реформуються, та інтенсивності впливу людської діяльності на природу, визначення зацікавлених сторін у змінах та ідентифікація вирішених проблем дозволили зробити висновок про раціональність та варіативність ефективності вжитих заходів. Аналіз природоохоронних та регуляторних засад екологічної політики в Чеській Республіці та прийнятого природоохоронного законодавства, таких як квоти на викиди CO2, раціональне використання природної сировини, утилізація відходів, зелені податки, пільги та субсидії для функціонування ринків екологічних товарів та послуг, показав беззаперечні переваги екологічно орієнтованої економічної моделі над тією, яка орієнтована на отримання прибутку. Проведене дослідження виявило, що застосування таких заходів сприяє зниженню негативного впливу на довкілля, покращенню якості життя населення та сталому розвитку економіки. Пільги для компаній, які впроваджують екологічно безпечні технології, стимулюють інновації та знижують витрати на виробництво. Значну роль в цьому грає законодавство, зокрема Закон Чеської Республіки No. 165/2012 Sb. Результати дослідження можуть бути використані науковцями з різних країн світу, які вивчають питання впровадження нових методів екологічної політики

***Ключові слова:*** екологізація; енергозбереження; сталий розвиток; комплексний підхід; забруднюючі речовини; зелена енергетика