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Ecological Policy in the Selected Countries of the European Union

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Abstract. The free market and increasing competition in the current economy are conducive to achieving economic goals, but they may hinder the implementation of environmental goals. Such thinking has led to the emergence of new paradigms in economics, including the so-called ecological economics, which assumes that environmental goals should prevail over economic goals, although achieving them is also important. The aim of the paper is to assess the implementation of ecological policy in selected European Union countries (4 highly developed countries and 4 countries from Central and Eastern Europe). Thus, it will be possible to diagnose the relationship between the development level of the economy and the size and structure of expenses for ecological purposes. Based on the research, it was found that the share of expenditures on environmental objectives measured in relation to GDP is not directly proportional to the wealth of a given country. The situation looks different, however, when environmental protection expenditure per capita is analyzed – then the rich economies have leading positions. This can suggest that environmental protection objectives gain importance when national income increases and economic goals can be reached at a satisfactory level.

Keywords: Ecological Economics, Ecological Policy, European Union, Natural Environment.

1 Introduction

The policy connected with the protection of the natural environment is a practical implementation of the environmental economics and ecological economics assumptions. The sources of this economics can be found in the paradigm of neoclassical theory, integrating elements of economics and ecology, and combining the postulates of both these sciences resulted from public awareness of the responsibility for the natural environment and the limited resources. Environmental economics can be described as interdisciplinary science about the rational use of limited environmental resources to maximize well-being. This school investigates the static and dynamic conditions of optimal use of resources and environmental values, and its general basis is the theory of external effects and the theory of public goods. Economization of environment, the basic postulate (assumption) of the paradigm, should contribute to

more efficient use of limited capital and human resources necessary to achieve the goals that are formulated within the framework of ecological policy. Such an approach means de facto the supremacy of economic goals in relation to environmental conditions and the needs of its protection [4, 9].

Ecological economics was born in the mid-1980s on the basis of the neoclassical economics of the environment and neoclassical assumptions of the paradigm of free market and homo oeconomicus. The need to develop a new concept resulted primarily from the ahistoric nature of the previous neoclassical theory (abstraction from the uncertainty and irreversibility of processes), ignoring the limits of economic growth, too optimistic acceptance for the possibility of environment substitution by technical progress, underestimating the pollution of the natural environment and passing over the external effects of economic activity. The new approach proposed a look at the relationship between the natural environment and the economy, based on the recognition of the superiority of the natural environment to economic development [9, 16, 23, 25]. Moreover, ecological economics has become an multidisciplinary science, as it requires methodological pluralism and refers to other sciences, including biology, physics, sociology [16]. In the application dimension, ecological economics became the basis for formulating long-term economic growth strategies, in which the objectives related to the protection of the natural environment play a key role.

2 Research Methodology

The aim of the publication is to assess the implementation of ecological policy in selected European Union countries. The analysis covered 8 countries, 4 of which are EU-15 (Denmark, Germany, France, Sweden), the other four are so-called new Member States (Bulgaria, the Czech Republic, Poland, Slovakia). The difference between these countries mainly concerns the level of economic development. Thus, it will be possible to diagnose the relationship between the development level of the economy and the size and structure of expenses for ecological purposes. In order to fully illustrate the relationship between the above-mentioned values, data for all EU countries were also used, calculating Pearson's correlation coefficient. The assessment will be preceded by information on the creation of waste and the emission of atmospheric pollution in the analysed countries. The selection of variables for analysis, the choice of time range (averages for 2013-2015) and spatial coverage was dictated by the availability and comparability of Eurostat data. The paper uses methods of critical analysis with elements of inductive reasoning.

3 Theoretical Aspects of Ecological Economics and Policy

The main postulate of the ecological economics is to treat the earth and the world as a closed, non-growing and non-multiplying ecosystem, in which the global economy functions as one of the subsystems [8]. On the one hand, the economy uses natural resources, and on the other hand, it utilizes waste in the environment, so that the natural environment determines the barrier of economic growth and the limits of resource use

[27]. Ecological economics proposes, therefore, striving to create a sustainable social system in which the high quality of life and the occurrence of limitations related to the natural environment are in harmony [20]. Improvement of production processes (through the implementation of scientific and technical progress, increase in the efficiency of resource use) may shift this boundary, however in the long term it is necessary to preserve the environment in such a form that it is able to restitution. Due to the fact that certain economic activities may have irreversible effects on the natural environment, it is necessary to observe the principle of prevention and the activity of economic policy (instead of conducting a passive policy reacting afterwards) [8, 27]. The long-term and holistic approach to the above relations creates real opportunities for achieving an intergenerational balance [20].

In ecological economics there is considered the paradigm of "greening" economics joint with economic activity, which can be defined as the ecological paradigm of economics. The basis for this thinking is "ecocentrism", as opposed to environmental economics and its egocentrism. These different approaches result directly from the relationship between human managing resources and the natural environment. Ecological economics treats ecological conditions and goals of economic development as superior to postulates formulated and analyzed within the framework of neoclassical economics [4, 9]. Within the framework of ecological economics, the trend in Germany was known as the new environmental economy, significantly different from the neoclassical environmental economics. Its originators note that it is an attempt to develop an ecological economy towards a sustainable development economy, thus many postulates are very similar or even identical. In fact, ecological economics was a ground for the economy of sustainable development. It can be therefore concluded that, as in the case of the concept of sustainable development, the economic dimension in ecological economics is no longer the most important, and economic development is not a parent goal. Blind faith in the free market and the mechanism of competition can be an obstacle to the achievement of environmental goals and its protection. For this reason, it seems that a certain scope of the state's intervention policy is necessary, thanks to which the values of the natural environment could be preserved in the right form in the long term. It would be beneficial from the point of view of people health and quality of life, and thus the economy and the state budget. Social welfare in the long term depends not only on economic factors, but increasingly on environmental ones, that is why the approach treating these two elements in at least equivalent way is an important message for the formulation of economic policy, including ecological policy.

Ecological policy in the general sense is conscious and purposeful activity of the state, local governments and economic entities in the field of environmental management, including the use of its resources and assets, protection and shaping of ecosystems or selected elements of the biosphere [21]. Main aim of the policy is to ensure effective actions and implementation of law strengthening the protection and safe use of the environment. Ecological policy occupies a unique place in the entire policy of the state. Besides economic and social policy, it is the most important element of state management and includes, inter alia, protection of nature and the Earth's surface, water management, spatial management and protection of climate and

atmosphere [22]. Its multi-faceted management of environmental processes is designed to make them efficient and effective. It sets only general directions of action, and its detailed implementation is based on specific program documents, such as executive programs for policy or sectoral documents [5]. The way of conducting ecological policy depends on general state models, the political and economic system, as well as values and traditions prevailing in society. In this connection, it can be said that the government activity affects the interests of all citizens groups. They determine the model of ecological policy used in certain conditions. In this context, two are mentioned:

- liberal – focused on individual entrepreneurship and responsibility in the aspect of environmental protection, which is included in the system of market prices,
- social-democratic – integration of economic, social and ecological policies, in which the responsibility for environmental protection lies on the side of state, through various types of norms and legal framework and budgetary expenditure.

Ecological policy should be implemented in an effective and fair method and primarily socially acceptable. This fairness could be manifested by the imposition of financial commitment on entities that participate in the production of pollution or have economic benefits from environmental goods. The principles of such an approach have been developed many times by international organizations and groups, including EU or OECD. Separate regulations are developed within the framework of national state environmental policies. There are obviously many discussions and controversies about state policy and its scope in the national economy in general. It is worth to point out that solutions under the ecological policy can be consistent with the functioning of the market mechanism. Bell [2] suggest that state can promote ecological actions and it can have with the liberalism much in common. The concept of connecting these issues is ecological liberalism.

3.1 Instruments of Ecological Policy

One of the main factors that contributed to the current state of degradation and depletion of the natural environment is the fact that environmental aspects are not taken into account in the production processes. This applies to both enterprises, primarily those associated with high consumption of resources, and the agriculture sector, which uses a large part of land on Earth. This has an impact on the deterioration of the quality of natural resources, which in turn causes problems with the economic growth [7].

The state is obliged to take appropriate actions to protect the remaining natural resources and prevent their further degradation. However, this interference should not interfere with the functioning of the market mechanism. Under the environmental policy the state has a wide range of instruments, from which specific tools adequate to specific situations can be chosen [17]. Their choice is determined by the issue of internalization of external costs (i.e. negative externalities) occurring in the environment and resulting from human economic activity. These costs are understood as damage to health or damage to the environment and could be valued in money. According to the theory of internalisation of external costs, the perpetrator should incur

these costs (e.g. through the ecological tax) – in this context they become part of the economic account of the given entity [2, 24]. Depending on the nature of their activities, these instruments can broadly be divided into [17]: (1) direct regulations (also referred to administrative and legal instruments) and (2) indirect regulations (economic or market instruments). The above types of instruments often are interrelated. This is because in a democratic system the use of economic instruments involves the adoption of legal acts, and in turn failure to comply with legal obligations may involve fines [17]. The division of instruments can also be more detailed. Accordingly, direct instruments can be divided into legal and administrative instruments as well as administrative procedures. While indirect instruments are divided into economic and tools of social impacts or of voluntary use.

Direct instruments are used to assume that without their presence, entities would not take appropriate actions or undertake activities incompatible with the adopted environmental policy of public authorities. They are therefore distinguished by the prohibitive or prescriptive character of the provisions. The use of these instruments creates a direct compulsion to enforce environmental protection regulations, and in the case of infringements, sanctions are a consequence. Typical direct instruments include [17]:

- standards for the use of the environment (e.g. possible maximum volume of emissions per production unit);
- determining the amount of mandatory reduction of pollution;
- individual permits for entities specifying limits and conditions for using the environment;
- technological standards (e.g. BAT or BACT);
- obligatory procedures (e.g. environmental impact assessment);
- obligations and prohibitions;
- operating and utilization licenses for individual entities.

In turn, indirect instruments are used because they significantly reduce the social costs of achieving the desired environmental status compared to direct instruments. These instruments, by means of indirect coercion, affect the entities using the resources of the environment and force them to take appropriate actions. These instruments include [17]:

- penalties for the emission of pollutions (in the case of exceeding the limits set in the legislation);
- fees for quantitative environmental degradation (e.g. use of agricultural land for purposes other than agricultural);
- system of tax differentiation (coal tax, ecological fuel tax);
- credits for emission reduction, tradable emission rights, etc;
- transferable certificates that confirm the achievement of environmental goals (green, red, white, brown certificates);
- ecological deposits, which are collateral for the obligations of entities to reduce the environmental nuisance of their operations;
- fees for the economic use of the environment.

Ecological policy usually uses a set of instruments, appropriately selecting direct and indirect instruments. Direct instruments are strengthened or supplemented in particular by economic instruments, e.g. various types of subsidies and investment support for environmental actions. In addition to the standard division of environmental policy instruments, we can also distinguish persuasive instruments, among others those that rely on the transmission of information. They assume that the behavior of entities depends on the acquisition and production of information. A separate group is also environmental management instruments, such as ecological reviews, non-normative and normative environmental management systems. Sometimes, planning and information instruments are also distinguished, which include, in particular, various spatial planning procedures.

4 Emission of Pollutants and Implementation of Ecological Policy in the Selected Countries

It is widely believed that in the less affluent European Union countries the level of environmental pollution is higher than in the rich countries of Western Europe. This is testified by reports on the concentration of dangerous substances in the air for the countries covered by the observation (see Fig. 1). Permissible PM10 and PM2.5 standards are more often exceeded in the eastern part of the EU (e.g. Poland, Bulgaria) than in its central and southern part (the northern part of Italy is an exception) and by far the lowest in the northern part of the region (Sweden, Finland, Estonia) [13]. A similar situation applies to toxic benzopyrene (benzo[a]pyrene – BaP), which is one of the PM suspended particulate components. The main cause of the emission is the burning of coal in old and often poorly adjusted domestic furnaces, practiced by the inhabitants of less developed EU regions [see 18]. Losses on this account can be expressed not only in the economic sense (costs of medical treatment, decrease in labor productivity due to absenteeism at work), but above all in the social dimension – premature deaths [12].

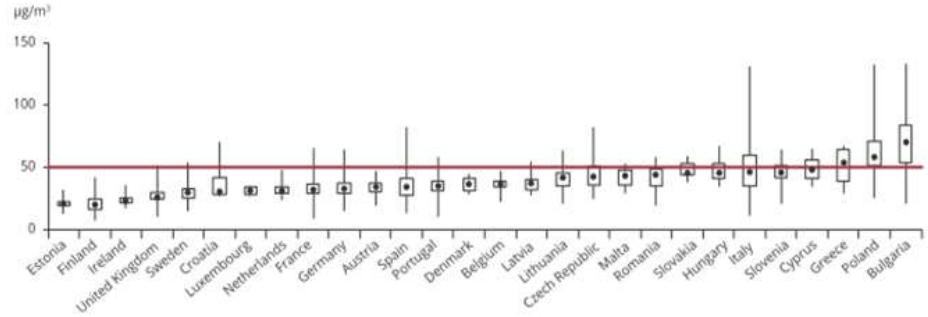

Fig. 1. PM10 concentrations in relation to the daily limit value (50 µg/m^3) in 2015 in the EU countries [14].

The above data are, however, based on measurement systems located in an urbanized area. Therefore, they do not reflect the situation for the country in general, but only for

its regions, which may lead to wrong conclusions. If we look at the numbers in table 1, we can see that the total level of particulate emissions per km^2 in Denmark and Germany (in Denmark also in terms of per capita) is higher than in Bulgaria and the Czech Republic. Secondly, higher industrialization, including agriculture, and a more developed transport sector in terms of quantity contribute to increased greenhouse gas emissions in the above two highly developed economies [11]. Highly developed countries also produce a relatively large amount of waste. Even perceived as environmentally friendly, Sweden produces more waste per unit area than the Czech Republic and Slovakia (and per capita this ratio exceeds all analyzed countries, except Bulgaria). Therefore, if we take into account the total impact of human activities on the natural environment, we can say that the largest "polluters" are highly developed economies. On the global scale, the largest emitters of greenhouse gases (per capita) include the United States, Australia and Canada, while Germany and France rank among the top 10 countries [26]. In turn, the quality of the natural environment in less wealthy countries is in many cases better, as evidenced, inter alia, by Jaworska's [19] research. It shows that countries such as Bulgaria and Poland in the ranking of the quality of the natural environment are at the forefront of the EU countries (in 2013 Bulgaria was the 5th, Poland – the 6th). For this assessment, the mentioned author used a synthetic indicator that includes the emission of various types of chemical substances, the amount of waste generated, stored and smoked, the share of expenditures on environmental protection and the share of renewable energy [19].

Table 1. PM10 Generation of waste and air emissions in selected EU countries (2013-2015 average) [15].

Country	Waste production		Greenhouse gases		Particulates < 2.5µm		Particulates < 10µm	
	t./km^2	t./per.	t./km^2	t./per.	t./km^2	kg/per.	t./km^2	kg/per.
Bulgaria	1 385.8	21,3	513.6	7,9	260.7	4,0	434.6	6,7
Czechia	304.1	2,3	1 437.1	10,8	300.2	2,2	457.0	3,4
Denmark	451.8	3,5	1 979.7	15,1	855.1	6,5	1 102.3	8,4
Germany	1 075.0	4,7	2 697.0	14,6	513.2	2,3	878.3	3,9
France	602.6	5,0	830.1	5,6	324.5	2,7	512.0	4,2
Poland	556.1	4,6	1 236.0	10,2	414.3	3,4	734.6	6,1
Slovakia	189.7	1,7	834.4	7,5	603.2	5,5	748.0	6,8
Sweden	344.5	16,0	136.6	6,3	59.4	2,8	102.1	4,7

The above mentioned data could indicate that if affluent countries have the most negative impact on the natural environment, they should participate to a sufficiently high extent in expenditure related to nature. However, based on the analysis of the data, it was stated that the share of expenditures on environmental objectives measured in relation to GDP is not directly proportional to the wealth of a given country. It turns out that the largest amount of money in relative terms in 2013-2015 for environmental protection has been allocated by Bulgaria – about 4% of GDP. The Czech Republic

ranked second – 2.8% and Denmark – 2.2%. The lowest rate was recorded by Poland and Sweden – 1.9%. The high position of Bulgaria in this ranking has been maintained for many years. The report of the European Commission prepared in 2011 confirms this data, at the same time indicating a very low (as in Romania) efficiency of using energy and resources in the process of manufacturing goods and services [10]. In this case ecological investments can therefore be regarded as necessary to move to the higher path of "environmental productivity".

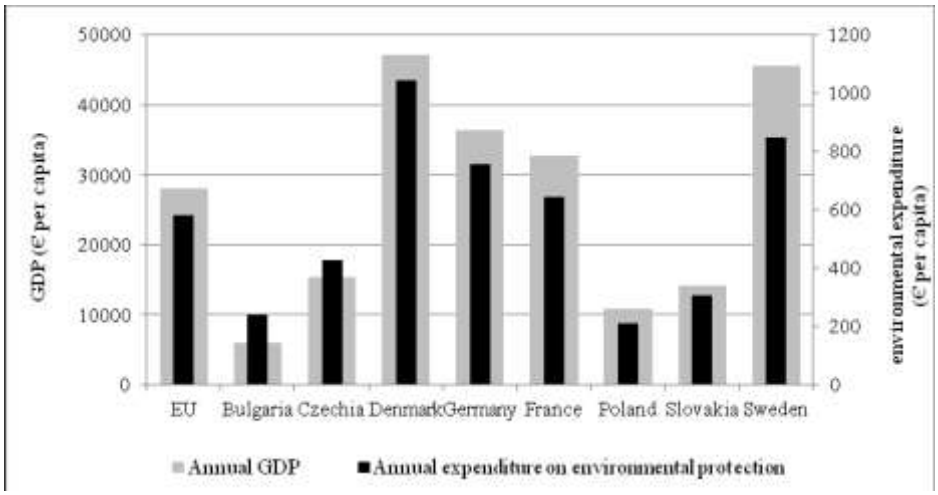

Fig. 2. Annual GDP (left axis) and annual expenditure on environmental protection (right axis) in selected EU countries (2013-2015 average) [15].

A clear, positive relation occurs in relation to the size of GDP per capita and environmental expenditure per capita (see Fig. 2). This way of presenting a relationship seems even more adequate. The low share of environmental expenditure in GDP does not have to mean a low per capita ratio, especially for countries with high total GDP. It can also be assumed that if a high level of national income leads to a relatively high level of environmental pollution, and this in turn to negative effects on humans, then human should be a criterion for determining expenditures on pro-ecological activities. As a result, among the economies studied, the highest level of environmental expenditure (per capita) refers to Denmark, Sweden, Germany and France, the lowest to Poland and Bulgaria. Such a payment allocation system can be considered fair in the context of the impact of individual countries on the environment, including climate change occurring in recent years. In turn, a similar analysis carried out for 20 EU countries for which complete data was available showed that the Pearson's correlation coefficient for GDP and environmental expenditure per capita amounted to as much as 0.86 for the years 2013-2015, which means a strong positive relationship between these values [15]. Figure 3 presents a scatter plot for the data described.

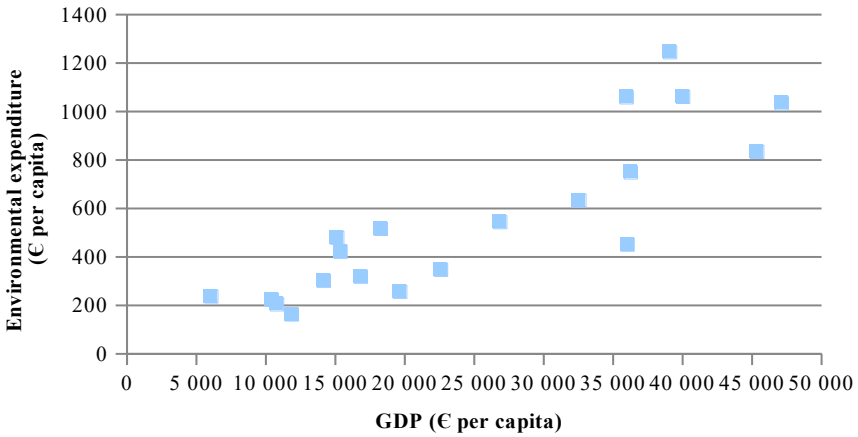

Fig. 3. Relationship between GDP per capita and expenditure on environmental protection per capita in EU countries (on average for the years 2013-2015) [15].

Analyzing the expenditure for environmental protection, it is worth noting their structure by the sector that makes this expenditure – then we can distinguish the private sector (households and enterprises) as well as the government and non-profit organizations. The largest amount of budget funds (plus non-profit institutions) in relative terms (as a % of all sectors' expenditure) is allocated in Bulgaria (57%), followed by Slovakia (37%). The lowest relative public expenditure are recorded in Germany (15%), followed by the Czech Republic and Denmark (20% and 21%). Regarding private sector expenditure, corporate spending is dominant – up to 67% in the Czech Republic and 61% in Germany. On the other hand, households bear the relatively high burden of environmental financing in Denmark (33%) and Poland (31%), and the smallest – in Bulgaria (only 9%) (fig. 4). The data would suggest that the above-mentioned social democratic model, in which the responsibility for environmental protection is primarily borne by the state, is common to Bulgaria and Slovakia, while Germany, the Czech Republic, Denmark and Sweden are farthest away from it, which would mean the dominance of the liberal model there. Such a situation in Bulgaria may result from the fact that it is still a country with relatively low national income (both total and per capita) and only the state (in conjunction with non-profit organizations) is willing to allocate funds for environmental purposes, while the private sector is primarily interested in economic goals. On the other hand, countries with high private sector spending on environmental protection belong to rich societies, more aware of the need to protect the environment and more willing to bear financial burdens in this area.

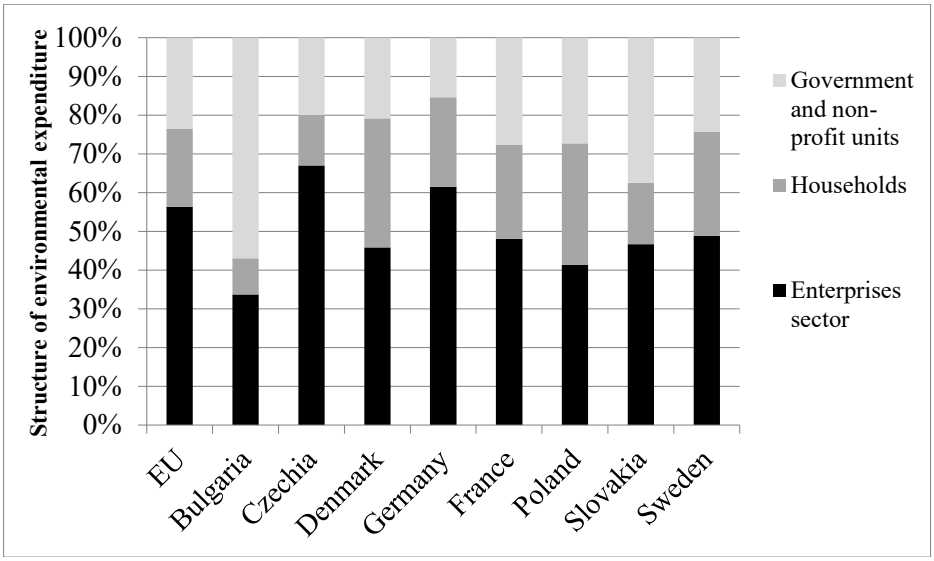

Fig. 4. Structure of national expenditure on environmental protection by institutional sector in selected EU countries (2013-2015 average) [15].

Finally, it is worth noting that the system of institutional expenditures on environmental protection in the case of some countries does not coincide with the market economy model existing in these countries. For example, in the Scandinavian countries, there is a welfare system in which government spending has a relatively high share in GDP creation. Meanwhile, the share of budget expenditures and non-profit organizations for environmental protection compared to private sector expenditure is relatively small. A similar situation occurs in Germany. On the other hand, in the Czech Republic, characterized by a relatively high degree of liberalization (total index of economic freedom in 2018 amounted to 74.2 points out of 100, which is 24th in the world; [1], private sector expenditure on environmental objectives they are relatively high [6]. In this case, we can therefore speak about the coherence of the ecological policy model with the market economy model.

5 Conclusions

The free market and increasing competition in the economy are conducive to achieving economic goals, but they may hinder the implementation of environmental goals. Such thinking has led to the emergence of new paradigms in economics, including the so-called ecological economics, which assumes that environmental goals should prevail over economic goals, although achieving them is also important. The implementation of the assumptions of this economic theory is expressed in the so-called ecological policy. The aim of the article was to assess application of ecological policy in selected European Union countries with a diversified level of development. Based on the research, it was found that the share of expenditures on environmental objectives

measured in relation to GDP is not directly proportional to the wealth of a given country. The leader in this area is the poorest of the analyzed countries - Bulgaria, which allocates 4% of GDP for environmental purposes, and many times richer Sweden, France and Germany - only about 2%. The situation looks different, however, when environmental protection expenditure per capita is analyzed - then the rich economies have leading positions, in particular Denmark, where one inhabitant spends 4 times more on average for these purposes than the citizen in Bulgaria and 5 times more than in Poland. In the middle of the ranking there is the Czech Republic. This suggests directly that environmental protection objectives gain importance when national income increases and economic goals (including those related to consumer demand) can be reached at a satisfactory level. There are also differences in expenses for environmental purposes, taking into account the institutions implementing them. In the poorer countries, the largest part of expenditure on environmental protection is borne by the government sector, and in the richer countries - the private sector, mainly enterprises. Relatively high private sector expenditure under the environmental policy may indicate that the public is more aware of the need to protect the natural environment and willing to participate in the costs of its financing.

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