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**POLYSTRUCTURAL MODEL OF THE EU ENVIRONMENTAL  
POLICY: AN ECONOMIC APPROACH**

*The article describes the features of the European Union environmental policy implementation in the context of economic mechanisms and tools to implement them. The article uncovers the character of polystructurality within the implementation of sectoral and horizontal policies of the EU and the possibility of introducing European approaches to preserve the environment in Ukraine.*  
**Keywords:** environmental policy; sectoral and horizontal policies; polystructural model; the EU.

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**ПОЛІСТРУКТУРНА МОДЕЛЬ ЕКОЛОГІЧНОЇ  
ПОЛІТИКИ ЄС: ЕКОНОМІЧНІ ПІДХОДИ**

*У статті розглянуто особливості реалізації екологічної політики Європейського Союзу за допомогою економічних механізмів та інструментів її здійснення. Визначено характер поліструктурності в межах реалізації секторальних та горизонтальних політик ЄС та можливості запровадження європейських підходів для збереження довкілля в Україні.*

**Ключові слова:** екологічна політика; секторальна та горизонтальна політики; поліструктурна модель; ЄС.

Табл. 1. Рис. 2. Літ. 13.

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**ПОЛИСТРУКТУРНАЯ МОДЕЛЬ ЭКОЛОГИЧЕСКОЙ  
ПОЛИТИКИ ЕС: ЭКОНОМИЧЕСКИЕ ПОДХОДЫ**

*В статье рассмотрены особенности реализации экологической политики Европейского Союза при помощи экономических механизмов и инструментов её осуществления. Определен характер полиструктурности в пределах реализации секторальных и горизонтальных политик ЕС и возможности внедрения европейских подходов для сохранения окружающей среды в Украине.*

**Ключевые слова:** экологическая политика; секторальная и горизонтальная политика; полиструктурная модель; ЕС.

**Problem statement.** The third industrial revolution, which is actively developing in the European Union, is based on a number of strategic elements, such as switching to energy-saving technologies, reduction of carbon emissions, emergence of the energy Internet, as well as systemic natural resources management. The aforementioned transition to "green economy", however, requires fundamental changes in the set of instruments and mechanisms of environmental regulation, developing new approaches to the energy sector Europeanization and building a multistructural environmental policy.

**Recent publications analysis.** The problems of environmental protection, as well as the development of sectoral and horizontal cooperation have recently become central in European economic studies. A. Cirilli and P. Vener (2014) have paid much attention to the assessment of economic consequences of territorial degradation.

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Sector impacts of environmental protection have been revealed by the experts in agricultural sphere F. Brouwer and J. Straaten (2002), while the evaluation of the significance of structural funds in financing Europeanisation of the sub-national policy in Poland and other Central European states has been made by M. Dabrowski (2013). The inter-state model of influence upon on nature protection has been provided by T. Borzel (2009). Given that region is the main polluter, S. Duhr and A. Muller (2013) think that spatial planning should contribute to further optimization of environmental regulation.

**Unresolved issues.** Despite all benefits of systematic environmental studies there remains an unsolved problem of assessing the environmental protection multistructural effects, regulation of hierarchical relationships in its management and the ability to implement the environmental protection model to Ukrainian areas.

**The aim of the study** is to evaluate the peculiarities of the multistructural model of the EU environmental policy and to identify on this basis some economic approaches to its implementation.

**Key research findings.**

**Theoretical background of European environmental and economic model.** Current development of the European Union is a complex multidimensional process wherein the problem arises as to the national choices between high rates of economic growth and the need to enhance environmental protection standards. The spread of resource-saving technologies, implementation of the "polluter pays" principle, as well as greening of the EU sector policies have all contributed to the process of harmonization of the relations within the system "Nature – Human – Economy" on the European continent.

It should be noted that the final outcome of the implementation of the EU ecological and economic development model is viewed quite differently by European experts. D. McCann (2010: 20), examining the process of Europeanization of the EU economic space as the Community's response to global challenges, argues that its most important elements are concentrated in the following selective areas: consumer protection, environmental protection, human health and working conditions. It is easy to understand that the result of the environmental measures implementation in the EU, according to D. McCann (2010), may improve the health of its citizens. Building on purely economic grounds, A. Martin (2007) elaborated his own approach to identifying the need for resource substitution, linking traditional for "The Economics" categories of supply and demand, output of goods and services and cost of their production with new indicators, particularly – marginal social cost (MSC) and marginal private cost (MPS). The area between the aforementioned two curves in the graph of supply and demand is nothing else but marginal external cost. Thus, it turns out that the quality of goods produced in the EU is directly connected to the damage inflicted to the environment and formed on the base thereof marginal cost and marginal revenue.

Fiscal stance to the problem of environmental protection and conservation of natural resources is developed by D. Pearce (2001: 220–221), for whom environmental pollution and the resulting climate change are related primarily to the taxation of economic activities. Thus, tax exemptions should be granted to the least polluters and those producing environmental equipment.

Accurate regulation of environmental protection facilities was and still remains an important element of adjusting the proportions of interaction in European society. According to F. Watzold and A. Bultmann (2001: 138), these could be environmental systems combining objects, operating systems, software and audit.

From somewhat another standpoint, so to say a multistructural one, Danish researcher T. Jeppesen developed his approach to environmental issues in the EU. For him, preservation / improvement of natural environment is not just a certain type of policy, but also a system of consistent actions to prevent and control the character of pollution (Jeppesen, 2002: 103–105), with the emphasis on international trade and capital movement (Jeppesen, 2002: 117–120). The basis of this distribution is formed by the implementation of the subsidiarity principle, which defines measures on centralization or decentralization of environmental protection and resource conservation policies (Jeppesen, 2002: 47–50, 67–70). So, it turns out that in order to preserve natural environment the Community urgently needs strategic policy, designed for a long-run perspective.

One of the first sectoral approaches to modelling the effects of agriculture on the state of environment was proposed by a group led by the renowned Dutch professors F. Brouwer and J. van der Straaten (2002), under whose direction new prospects for Community environmental policy were developed, following the research on the underlying linkages, including marketing ones, between agricultural sector and natural environment. As a result, one of the group-members C. Potter (2002: 68–69) proposed the agri-environmental policy development in the EU.

Naturally, rapid development of environmental research triggered the elaboration of effective mechanisms and instruments, which led many European scientists to the idea of optimizing mutual influences and the formation of innovative models of interaction in the environmental economy of the EU. One of them was the proposal by T. Borzel (2002) concerning natural resources management and modernization of environmental protection policies.

Since the beginning of 2010s horizontal shifts in European economy received a significantly increased attention, and thus research focus has shifted to regional level. That was when the uneven distribution of CO<sub>2</sub> emissions across various regions of the EU member-states began to be actively discussed. A typical example of such problems was brought up in the study of A. Cirilli and P. Vener (2014: 1997), who clearly distinguished structural levels of Italian regions' pollution by way of identification of some spatial elements, as well as socio-demographic and monitoring ones. Given this, it becomes evident that market transformations in the EU are closely interrelated with environmental protection. Thus, they need, according to M. Dabrowski (2013), a Europeanized subsectoral management on the part of the EU structural funds, as well as in the suggestion of S. Duhr and A. Muller (2012) strategic spatial planning.

***European multistructuring of the EU environmental policy.*** According to the current structural and institutional set-up of the EU ecological (environmental protection, conservation and preservation) policy is one of horizontal policies (higher ranked) of the EU, which includes a complex of economic, technological, organizational and social measures aimed at the preservation of the environment and harmonization of interrelations between humanity, business and the surrounding natural

environment. Attributing of the EU environmental policy to horizontal policies is made due to the following reasons:

- no industry (sector) targeting of joint activities, while the most important quality is the achievement of presence of systemic effects;
- complementarity in joint activities with other policies;
- regional and local identification of quality and dynamics of natural environment;
- accounting for local, national and supranational hierarchical resources requirements and technologies of their exploitation;
- economic transfers from the EU structural funds (the European Regional Development Fund, the European Social Fund, the European Cohesion Fund) and involvement of local funds, business recoupage and pollution etc.

Thus, the proportion of environmental policy is quite significant in the EU, but its systemic action is not limited to this (Figure 1).

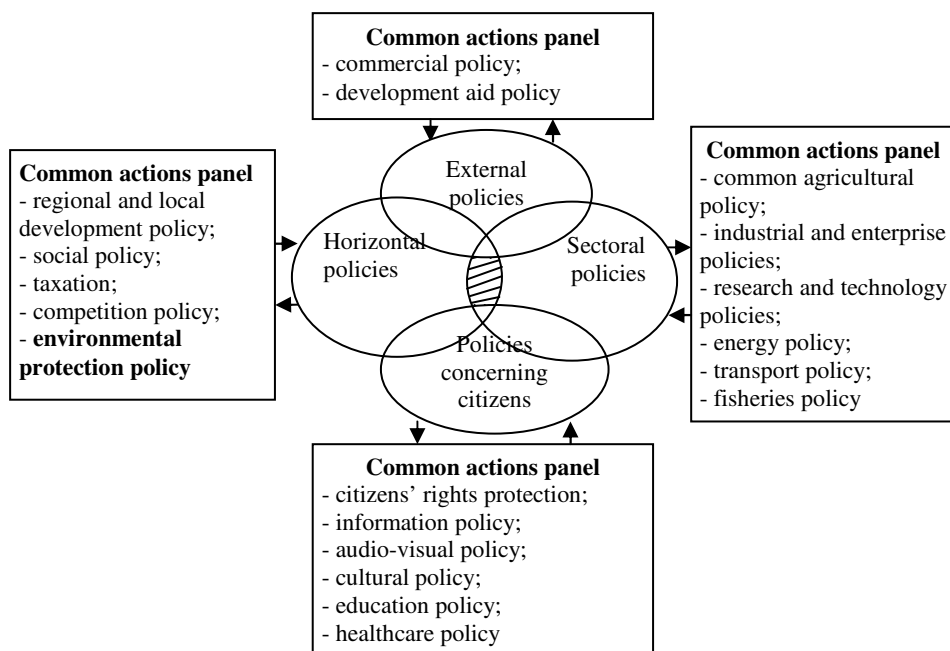


Figure 1. Multistructural model of economic facilitation of the EU environmental policy implementation, authors' own elaboration

In fact, every regulatory initiative in the EU aims to preserve the environment and harmonize human relations with the nature. Hence, the next structural component affecting the environment is a set of the EU sectoral policies, wherein the main polluters are the agricultural, industrial and transport sectors. Numerous areas of environmental integration in agriculture are represented by economic conservation projects, including withdrawal of some land sections from agricultural use, land recultivation, reduction in the number of cattle etc. They are complemented by the emissions control in manufacturing, and the construction of sound-blocking screens along roads, as well as special cross-road underground tunnels for animals.

Joint actions panel covers the areas of international economic relations and development aid. The largest element of interest intersection is international trade regulated by a number of instruments, including the restriction of imports of goods not meeting environmental standards (packaging recyclability, phytosanitary, sanitary and other requirements).

Policies concerning citizens are also differentiated, as they are concerned with human rights protection of people living in the EU, access to information and health-care, which is directly linked to the state of the environment.

The economic component of the EU environmental policy implementation is based not only on the abovementioned tools, but also on the implementation mechanisms, such as fiscal, administrative, social and other regulative tools.

So, multistructural (multisystem) economic model ensuring the implementation of the EU environmental policy is a set of organizational, economic, social, financial and technological measures implemented at supranational, national, sectoral, corporate, regional and local levels through selective mechanisms and tools of environmental management.

**Modelling for Ukraine.** Ukraine, which went through a long way of convergence with the European Union and implementation of complex and controversial reforms, requires a significant updating of economic instruments on environmental management in line with the European ones, as well as positioning of our country within European ecological-economic system of sustainable development. With this in mind, the authors investigate the dependence of Ukraine's GDP and emissions of pollutants into the atmosphere (Table 1).

**Table 1. Initial data for the analysis of the dependence between emissions the dynamics of Ukraine's GDP**

	GDP, bln USD	CO <sub>2</sub> emissions, kilotons	Harmful emissions, ths tons
2000	31.3	n/a	5908.6
2001	38.0	n/a	6049.5
2002	42.4	n/a	6101.9
2003	50.1	n/a	6191.3
2004	64.9	n/a	6325.9
2005	86.1	333.869	6615.6
2006	107.8	326.480	7027.6
2007	142.7	327.595	7380.0
2008	180.0	323.459	7210.3
2009	117.2	261.813	6442.9
2010	136.4	304.805	6678.0
2011	163.4	n/a	6877.3
2012	176.6	n/a	6821.1
2013	177.4	n/a	6719.8

Source: authors' own calculations on the data of the State Statistical Service of Ukraine (2014) and World Bank (2014).

Regression (Pearson correlation coefficient) analysis revealed that harmful atmospheric emissions growth was closely connected to GDP dynamics during 2000–2013, correlation coefficient amounting to 0.829. At the same time, Pearson correlation coefficient for the interrelation between CO<sub>2</sub> emissions and GDP during

2005–2010 was close to zero (0.022), reflecting the absence of stochastic relations between the indicators.

The visual model of correlation analysis, presented in Figure 2, led to the following conclusions:

- 68.7% of air pollution dynamics in Ukraine is defined by GDP growth (determination coefficient  $R^2$  for linear approximation equation amounted to 0.687), which reveals quite a negative phenomenon of economic growth "coupled" with harmful substances discharge. This contradicts the basic principle of ecologisation of the EU economic development – the so-called «decoupling», which means the supersession of the cause-and-effect connection between the rates of economic growth and the level of natural resources exhaustion, and consequently, with volumes of environmental pollution;

- deficiency of statistical connection between CO<sub>2</sub> emissions and economic dynamics, in our opinion, should not be regarded as a positive achievement, as the gross volume of carbon emissions in Ukraine is 2.5 times as low as the one in Germany, whereas Ukraine's GDP 25 times lower than the relevant indicator of this European country.

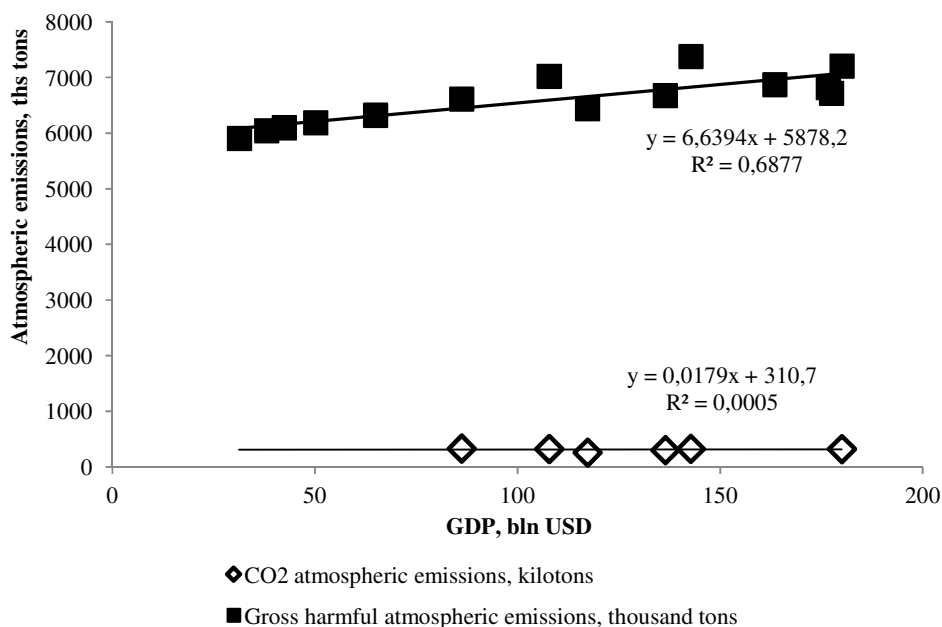


Figure 2. Regression analysis of the gross harmful air emissions and CO<sub>2</sub> emissions as a result of GDP growth in Ukraine, authors' own calculations on the base of (State Statistical Service of Ukraine, 2014; World Bank, 2014)

Environmental rehabilitation in Ukraine will be facilitated not only through public investing in infrastructure, but also via the introduction of new energy saving and environmentally friendly technologies, which on the one hand, can improve the environment, and on the other hand – will contribute to the rise of production.

Our analysis and estimates lead to the following **conclusions**:

1. Contemporary studies of the European ecological and economic model is based on the use of traditional approaches to the evaluation of the state of environment and natural resources management, which were prevalent at the turn of the millennium (the impact of the environment on humanity, marginal social cost, marginal private cost, taxation of polluters' economic activities) and the new ones (upgrading the environmental policies, regional monitoring of CO<sub>2</sub> emissions, spatial planning and development of environmental innovations).

2. Multistructural model of economic facilitation of the EU environmental policy implementation is a system of joint (intra-community) organizational, economic, social, financial and technological measures, applied on regional-hierarchical, sectoral and corporate levels through European mechanisms and environmental management instruments.

3. Ukraine belongs to the group of states spending quite a lot of own natural resources, especially the energy ones, per unit of GDP. This requires the introduction of energy-saving and environmentally friendly technologies, as well as gradual implementation of the EU legislative framework in the field of natural resources conservation and environment rehabilitation.

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