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# CONTENT

## ECONOMIC SCIENCES

<i>Abdikerimova G., Moldabekov B.</i> THE ROLE OF ANIMAL HUSBANDRY IN THE SUSTAINABLE DEVELOPMENT OF AGRICULTURE FOR FOOD SECURITY AND NUTRITION.....4	<i>Podolanchuk O.</i> ECOLOGICAL TAX: ESSENCE, CALCULATION METHODOLOGY AND ACCOUNTING REPRESENTATION .....12
<i>Abdikerimova G., Kydyrbayeva K.</i> STOCK MARKET INSTRUMENTS AS AN EFFECTIVE CATALYST FOR INCREASING THE INVESTMENT ACTIVITY OF ENTERPRISES .....8	<i>Krasnova I.V., Prymostka L.O., Shevaldina V.G.</i> FINANCIAL INNOVATIONS IN CLIMATE RISK MANAGEMENT.....22

## PEDAGOGICAL SCIENCES

<i>Biesieda V.</i> ROLE OF PSYCHOMOTORICS IN CORRECTION OF THE PHYSICAL DEVELOPMENT OF EARLY AND PRESCHOOL AGE CHILDREN .....27	<i>Tektibayeva D.D., Rakymgaliyeva A.D.</i> THE USE OF THE FACEBOOK SOCIAL NETWORK IN FOREIGN LANGUAGE TEACHING OF STUDENTS OF THE MAIN STAGE OF SECONDARY SCHOOL .....32
--	--

## PHILOLOGICAL SCIENCES

<i>Finiv V., Yaslyk V.</i> DESCRIPTIONS AS AN ANALYTICAL STRUCTURAL MODEL OF ASSUMED NAMES .....35	<i>Mashakova A.K.</i> HISTORICAL AND LITERARY STUDY OF RECEPTION IN KAZAKHSTAN .....37
--	--

## PHILOSOPHICAL SCIENCES

<i>Matkarimova J.</i> INTERPRETATION OF THE CONCEPT OF NON- GOVERNMENTAL ORGANIZATION IN INTERNATIONAL LEGAL DOCUMENTS.....40
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## POLITICAL SCIENCES

<i>Perskaya V.V.</i> A PRINCIPAL CHANGE OF THE FOREIGN POLICY OF THE USA IN THE CONTEXT OF STRENGTHENING ATTENTION TO INTERNATIONAL DEVELOPMENT ASSISTANCE .....43
--

## PSYCHOLOGICAL SCIENCES

<i>Lorena Çadri</i> THE IMPACT OF DIVORCE AND THE STRUCTURE OF THE FAMILY HAS ON THE ACADEMIC PERFORMANCE IN CHILDREN AGED 7-15 .....52
--

### References

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## ECOLOGICAL TAX: ESSENCE, CALCULATION METHODOLOGY AND ACCOUNTING REPRESENTATION

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### Abstract

The article examines the essence of the environmental tax, its components and functions. The interrelation of the main factors in the field of ecological taxation is determined. The state of emissions of pollutants and carbon dioxide into the atmosphere for recent years has been assessed, the dynamics of the ratio of the environmental tax to the indicators of tax revenues and gross domestic product has been analyzed. The low efficiency of the ecological tax and the system of ecological taxation in general has been established. The composition of environmental tax payers is described, the object, tax base, calculation mechanism and the procedure for forming a tax return are revealed. A critical assessment of the essence of environmental accounting and accounting of environmental activities. Taking into account the research of scientists and their own opinion, the objects of accounting for environmental activities are identified and a system of analytical accounts for accounting for environmental tax liabilities is proposed.

**Keywords:** ecological tax, accounting, environmental accounting, Environmental activities, accounting for ecological.

**Formulation of the problem.** The current business conditions of business entities are unbalanced, preference is given to the economic component with the secondary social and environmental relations. The latest technologies and the development of society affect the environmental problems associated with the preservation and restoration of the natural environment. They occupy an important place among the global problems of mankind to ensure compliance with the priorities of sustainable development. One of the traditional and effective tools used by governments around the world to reduce the harmful effects of economic activity on the environment is resource payments, which include environmental taxes and rents.

The environmental tax is currently considered as one of the incentives for the rational use of nature and is the subject of research by scientists in various fields.

**The purpose of the study** is to reveal the essence of the environmental tax, its components and accounting generalization.

**Analysis of recent research and publications.** The study of problematic aspects of environmental taxation, accounting for environmental activities and tax liabilities is devoted to the work of many scientists: Gangal L.S., Gnatieva T.M., Deria V.A., Zamula I.V., Lepetan I.M., Ocheretko L.M., Prokopishina O.S. and others. Taking into consideration the importance of sci-

entific developments, the issues of accounting for environmental tax are relevant, because accounting information is a source of management decisions for sustainable development of the enterprise.

**Presenting main material.** The history of the environmental tax dates back to 1920, when economist A.K. Pigou introduced the idea of environmental taxation. The purpose of this was to influence the behavior of those responsible for environmental pollution through taxes, as well as to stimulate environmental activities through certain subsidies. In 1973, the European Union introduced an environmental action program that provided for the "polluter pays" principle. European countries have begun to actively apply the practice of environmental taxation. In Ukraine, the environmental tax was first introduced in 1992 and has undergone a difficult path of formation, as it was regularly changed and clarified (change of name, object of taxation, rate, intended use, procedure and collection authorities, etc.). During its existence, it was replaced by a fee for environmental pollution and a fee for environmental pollution. After the adoption of the Tax Code of Ukraine, the environmental tax was re-enacted and today we have a clear legal definition of the environmental tax and its basic elements.

According to Art. 14.1.57 of the Tax Code of Ukraine (TCU), environmental tax - is a national obligation payment, which copes with the actual volume of

emissions into the atmosphere, discharges of pollutants into water bodies, waste disposal, the actual amount of radioactive waste temporarily stored producers, the actual amount of generated radioactive waste and the actual amount of radioactive waste accumulated before April 1, 2009 [15]. This definition shows that this tax has different rates, which depend directly on the type of negative impact on the environment.

The essence of any economic category can be considered through the prism of the functions they perform. And the ecological tax realizes the maintenance during performance of functions. Among scientists and practitioners, it is distinguished from two or more functions, which are divided into basic and additional (Table 1).

Table 1

<b>Functions of the ecological tax</b>	
Functions	Characteristic
<b>Basic</b>	
Fiscal	consists in state stimulation of emissions and wastes at a favorable low level.
Regulatory	providing state budget revenues is a secondary function, as the share in the structure of revenues from this tax is insignificant.
<b>Additional</b>	
Distributive	is that they can be considered as a special state tool for redistribution of gross domestic product of the country to ensure the solution of environmental problems and achieve efficient and rational use of natural resources.
Stimulating	is seen as an opportunity to influence the development of environmentally and energy efficient or reduce hazardous industries.
Control	manifested in their use by the state to respond in a timely manner to the balance, efficiency and effectiveness of existing tax rates and benefits.
Social	these two functions are closely interrelated and are to ensure safe living and working conditions of the population, increase environmental awareness of citizens, increase the level of environmental friendliness of production.
Ecological	

Source: formed for [13, p. 109; 20, p. 112]

We believe that the most inherent in the environmental tax are two functions:

1) regulatory - it lays down the ideology of the environmental tax and is to provide opportunities for the state to stimulate or discourage certain areas of life, including the level of man-made load;

2) distribution - designed to accumulate funds for the restoration of resources used.

These functions provide research of efficiency of the ecological tax:

- study of the dynamics of emissions (analysis of the regulatory function);
- study of the state budget revenues of Ukraine

(analysis of the distribution function).

According to the functions of the environmental tax, revenues from its payment should be a source of funding for environmental measures, and its amount should be sufficient to implement measures to compensate for the damage caused to the environment by polluters. Therefore, the state is interested, on the one hand, in maximizing the revenues of the environmental tax, as it is one of the sources of budget revenues, and on the other hand, in minimizing pollution that worsens the state of the environment. This contradiction is due to the influence of the factors presented in table 2.

Table 2

<b>The relationship of the main factors in the field of environmental taxation</b>		
Factor	Relation to:	
	Volumes of environmental tax revenues	The state of the environment
Number of businesses that carry out activities that are subject to environmental taxation	Direct	Converse
The intensity of such activities	Direct	Converse
Application of technologies and equipment that reduce the negative impact of activities on the environment	Converse	Direct
Environmental tax rates	Direct	Direct*

\* an increase in environmental tax rates will improve the state of the environment, provided a) spending these revenues on environmental measures and b) encouraging polluters to reduce the tax burden by modernizing production.

Source: [9, p. 8]

In Ukraine, the environmental issue is still open. Emissions of pollutants and carbon dioxide into the atmosphere in recent years (Table 3), although it has a dynamic to decrease, are still too high.

Table 3

**Air emissions total and carbon dioxide emissions**

Year	Air emissions total			Carbon dioxide emissions		
	total, thsd.t	including		total, mln.t	including	
		stationary sources	mobile sources <sup>1</sup>		stationary sources	mobile sources <sup>1</sup>
2016	4686,6	3078,1	1608,5	150,6	150,6	...
2017	4230,6	2584,9	1645,7	124,2	124,2	...
2018	4121,2	2508,3	1612,9	126,4	126,4	...
2019	4108,3	2459,5	1648,8	121,3	121,3	...
2020	4017,3	2238,6	1778,7	109,1	109,1	...

<sup>1</sup> since 2016 - on road transport

Source: [4]

At the same time, today we have a situation where environmental tax rates are rising sharply every year and budget revenues are growing. Despite the fact that revenues from this tax are growing, the share in the structure of budget revenues and GDP is very low (Table 4).

Table 4

**Dynamics of the ratio of environmental tax for 2015-2019**

Indicator	Year					2020
	2015	2016	2017	2018	2019	
Revenues of the environmental tax to the state budget, UAH million	1105,4	1619,2	1720,8	2779,6	3854,4	*
Tax revenues to the state budget, UAH million	409417,5	503879,4	627153,7	753815,6	799776,0	851115,6
Tax revenues to the consolidated budget, UAH million	507635,9	650781,7	828158,8	986348,5	1070321,8	1136687,2
GDP, UAH million (at actual prices)	1979458,0	2383182,0	2982920,0	3558706,0	3974564,0	4194102,0
The share of environmental tax in the structure of state budget revenues, %	0,27	0,32	0,27	0,37	0,48	*
The share of environmental tax in the structure of consolidated budget revenues, %	0,23	0,23	0,21	0,28	0,36	*
The share of environmental tax in GDP, %	0,06	0,07	0,06	0,08	0,1	*

\* there are no data for calculation

Source: [12; 16]

The analyzed data show that the system of ecological taxation in Ukraine is inefficient and does not meet all the needs of the state in terms of environmental protection. Also, the costs of environmental protection are at a low level, as evidenced by statistics [12]: in 2016 they amounted to 32488702.1 thousand UAH, in 2017 - 31491958.5 thousand UAH, in 2018 - 34392270.3 thousand UAH, in 2019 - 43735862.1 thousand UAH, in 2020 - 41332201.7 thousand UAH.

The results of research indicate a low efficiency of the environmental tax and, as a consequence, the system of environmental taxation in Ukraine in general, because:

- the introduction of the environmental tax did not lead to significant reductions in emissions (reduction of this indicator after 2014 is a consequence of the reduction of total industrial production in Ukraine);

- the amount of revenues to the state budget from the environmental tax is insignificant, does not cover the full loss due to environmental degradation and is not a significant source of filling the state budget (nei-

ther the regulatory nor fiscal functions of the environmental tax are fully implemented) [13, p. 109].

Scientists note that with the effective functioning of the environmental tax, the state cares not only about the welfare of direct market participants, but also about the welfare of those who have suffered from the negative effects of environmental damage [19, p. 162].

First, the environmental tax directly implements the internalization of external effects on the environment. Compared to general instruments of environmental regulation, the environmental tax directly increases the cost of production of market economies, and then reduces their rate of return, forcing businesses with high energy consumption, high emissions and high levels of environmental pollution to use effective means to develop environmental production [19, p. 162].

Second, the environmental tax is based on the actual emission of pollutants, which is practical and effective. Some Western countries use emissions rights and carbon trading as tools to economically stimulate environmental regulation based on total future pollutant

emissions. The complexity of operation is mainly focused on how to determine the total amount of pollutant emissions and how to control market economy entities that do not meet pollution standards. The environmental tax is levied on the basis of the actual discharge into wastewater, as well as for the behavior of environmental pollution of most businesses, which compensates for the lack of general economic incentives for environmental regulation [19, p. 162].

Third, legislation and the application of the environmental tax are stronger and its impact wider. Compared to the administrative means of environmental regulation, environmental taxes in most countries have established specific content and rules for the implementation of environmental tax through legislation, such as the object of tax collection, tax rate, tax reduction and return mechanism. Implementing the standard of quantitative collection, determining the collection process and assessing the effect of collection, the environmental tax provides strong legal support to the relevant government administrative departments for special work to improve environmental management [19, p. 163].

Taxpayers [15] are business entities, legal entities that do not conduct economic (business) activities, budgetary institutions, public and other enterprises, institutions and organizations, permanent representations of non-residents, including those who perform agency (representative) functions in relation to such non-residents or their founders, during the activities of which on the territory of Ukraine and within its continental shelf and exclusive (marine) economic zone are carried out:

- emissions of pollutants into the atmosphere by stationary sources of pollution;
- discharges of pollutants directly into water bodies;
- waste disposal (except for the disposal of certain types (classes) of waste as secondary raw materials, which are placed on their own territories (objects) of economic entities);
- generation of radioactive waste (including already accumulated);
- temporary storage of radioactive waste by their producers beyond the period established by the special conditions of the license.

Thus, ordinary businesses will act as payers of environmental tax only when they carry out:

- 1) emissions of pollutants into the atmosphere by stationary sources of pollution (paragraph 240.1.1 TCU).

It should be noted that from January 1, 2019, entities that emit CO<sub>2</sub> into the atmosphere in the amount not exceeding 500 tons per year are not payers of the environmental tax (paragraph 240.7 of the TCU). However, as soon as the amount of CO<sub>2</sub> emissions exceeds the 500-ton limit, such entities are required to register as a taxpayer in the tax period (quarter) in which the excess occurred, and prepare and file tax returns).

Thus, a separate group of environmental taxpayers includes businesses that emit CO<sub>2</sub>. However, in practice, entities that operate stationary sources of pollution (domestic boilers, boiler rooms, etc.) emit various pollutants at the same time, including CO<sub>2</sub>. And for all

these pollutants, the environmental tax has been paid since ancient times. Therefore, such entities will still be considered a payer of environmental tax for pollutant emissions. Therefore, the condition of separate registration by the environmental taxpayer for CO<sub>2</sub> emissions of more than 500 tons is unrealistic in practice. It can only be used if the subject has a stationary source that emits only CO<sub>2</sub> (which is not realistic).

At the same time, the business entity will have to pay the environmental tax for CO<sub>2</sub> emissions only after reaching the 500-ton limit. And for other emissions - in each period in which such other emissions were made;

2) discharges of pollutants directly into water bodies (paragraph 240.1.2 of the TCU);

3) waste disposal, except for the disposal of waste as a secondary raw material on its own territories (paragraph 240.1.3 of the TCU). Usually this type of environmental tax is paid only by special organizations that actually carry out waste disposal in the sense of p. 14.1.223 TCU.

An enterprise that only generates waste and temporarily stores waste until such time as the transfer of waste to such a special institution is not a payer of environmental tax.

The object and basis of taxation are [15]:

- volumes and types of pollutants emitted into the atmosphere by stationary sources;
- volumes and types of pollutants that are discharged directly into water bodies;
- volumes and types (classes) of disposed waste, except for volumes and types (classes) of waste as secondary raw materials, which are disposed of on their own territories (objects) of economic entities;
- volumes and category of radioactive waste generated as a result of the activity of economic entities and / or temporarily stored by their producers beyond the term established by the special conditions of the license;
- volumes of electric energy produced by operating organizations of nuclear installations (nuclear power plants).

At the same time, the tax base for carbon dioxide emissions according to the results of the tax (reporting) year is reduced by the amount of such emissions in the amount of 500 tons per year [15].

Environmental tax rates are determined (Articles 243-248 of the TCU) by types of harmful substances and emissions that adversely affect the environment in UAH per 1 ton of pollutant emissions.

The tax reporting period for environmental tax is a calendar quarter. If the taxpayer in the course of economic activity carries out different types of environmental pollution or pollution with different types of pollutants, he is obliged to determine the amount of tax separately for each type of pollution and for each type of pollutant.

The mechanism for calculating the environmental tax is defined in the TCU by Article 249 "Procedure for calculating the tax".

Consider the example of calculating the environmental tax for air pollutants, because there are not many representatives of the categories of payers who discharge pollutants directly into water bodies and waste



disposal.

In order to calculate the environmental tax it is necessary:

- 1) multiply two values for each of the pollutants emitted into the atmosphere: volume and rate;
- 2) determine the amount of calculated products.

For example, we will calculate the tax for the four quarters of 2020 for over-limit emissions of carbon dioxide (Table 5). It should be noted that the TCU does not contain detailed information on how to calculate 500 tons to reduce the tax base, or in the enterprise as a

whole, or separately for each stationary source of pollution. Paragraph 249.2 of the TCU states that: if during the economic activity the taxpayer carries out different types of environmental pollution or pollution with different types of pollutants, such taxpayer is obliged to determine the amount of tax separately for each type of pollution or for each type pollutant. However, in the comments of the tax authorities, the 500-ton reduction affects the totality of CO<sub>2</sub> emissions from all its sources of pollution.

Table 5

**The procedure for determining the amount of CO<sub>2</sub> emissions for which the environmental tax is paid**

Quarters of 2020	CO <sub>2</sub> emissions for the quarter, t	CO <sub>2</sub> emissions from the beginning of the year, t	Exceeding the limit, t	Tax base (tax payable for the quarter), t	Tax rate, UAH for 1 t	Tax amount, UAH.
I	200	200	-	-	10,00	0,00
II	150	350	-	-		0,00
III	220	570	70	70		700,00
IV	180	750	250	180=750-500-70		1800,00
In a year	750	750	250	-		2500,00

Source: formed by the author

It would seem that the calculation is simple. However, the question arises: how and where to get data on emissions of pollutants. Information on which pollutants are emitted by a stationary source, as well as their hazard class is prescribed in special emission permits. Practice confirms that such permits are usually not available in most businesses that operate domestic gas or solid fuel boilers. They must pay the environmental tax even without a permit for emissions (prescribed in the Knowledge Base 120.05). Thus, taxpayers calculate the environmental tax on a quarterly basis, taking into account the actual emissions of each of the air pollutants. And the very definition of these volumes is the most difficult for accountants, because the mechanism is not prescribed in the TCU. However, practitioners have developed recommendations for determining the actual volumes of pollutants for different types of fuel on which stationary sources of pollution can operate.

Business entities that are payers of environmental tax form a quarterly Environmental Tax Return (Declaration) (without using the cumulative total), which also contains 6 annexes:

- Annex 1 "Calculation for emissions of pollutants into the atmosphere by stationary sources of pollution";
- Annex 2 "Calculation for discharges of pollutants directly into water bodies";
- Annex 3 "Calculation for the disposal of waste in specially designated places or facilities";
- Annex 4 "Calculation for the generation of radioactive waste (including already accumulated)";
- Annex 5 "Calculation for the generation of radioactive waste and paid for the purchase of sources (a) of ionizing radiation";
- Annex 6 "Calculation for temporary storage of radioactive waste by their producers beyond the period established by the special conditions of the license".

It is necessary to single out the peculiarities of submitting the Declaration to the controlling bodies:

- 1) the absence of emissions does not release from

the obligation to submit the Declaration, if it was previously submitted;

- 2) in order to terminate the filing of the Declaration, it is necessary to submit a statement on the absence of the object of taxation;

- 3) The declaration for emissions into the atmosphere, for discharges into water bodies is submitted at the location of pollution sources;

- 4) if there are several stationary sources of pollution within one settlement (village, settlement or city) or outside it (the code according to COATUU is the same), it is possible to submit one Declaration for such sources of pollution.

- 5) if the place of submission of the Declaration does not coincide with the main place of tax registration, the original of the Declaration should be submitted at the location of the source of pollution, and a copy - at the main place of registration.

The declaration is submitted within 40 calendar days following the last calendar day of the tax quarter. The tax is paid within 10 calendar days following the last day of the reporting deadline. At the same time, it should be taken into account that: the environmental tax for CO<sub>2</sub> is paid separately from the environmental tax for other pollutants, to a separate account in the Treasury (these payments have different budget classification codes).

It should be noted that the key role in reflecting the summary data in the Declaration is given to the objective formation of information about the objects and the tax base. And, as has been repeatedly proven, accounting is a system of forming a reliable and complete information base.

The urgency of the problems and areas of management of sustainable development of enterprises affect the organization and design of environmental management systems. Scientific research addresses the need for accounting for environmental costs and environ-

mental revenues, environmental accounting or accounting for environmental activities. None of these concepts currently have a normative definition, so in the scientific literature they are identified or complementary. It is also worth noting that most publications contain theoretical aspects, the practice of accounting is ignored.

To characterize the process of accumulation of information about the environment, the concepts of "environmental accounting", "environmental accounting in the enterprise", etc. are used (Table 6).

Table 6

**Scientists' approaches to the disclosure of the concept of "environmental accounting"**

Source	Definition
Ilyichova O.V.	Environmental accounting is a system that can be used to identify, organize, regulate and present data and information on the state of the environment in kind and value.
Kirsanova T.O., Kirsanova E.V., Lukyanykhin V.O.	Environmental accounting at the enterprise - a system of detection, measurement, registration, accumulation, generalization, storage, processing and preparation of relevant information on the activities of the enterprise in the field of nature management and environmental protection in order to justify management decisions
Kozhukhova O.S.	Ecological accounting is an independent direction of accounting and its wide implementation will allow at the level of enterprises-nature users to intensify practical nature protection activity and to carry out information support of ecological controlling.
Laziness V.S.	Environmental accounting is the process of recognizing, evaluating and transmitting environmental information, which enables users of such information to make competent decisions and form opinion.
Lizogub R.P.	Environmental accounting at the enterprise is a system of identification, measurement, registration, accumulation, generalization, storage, processing and preparation of relevant information about the enterprise in the field of nature management in order to transfer it to internal and external users for optimal decisions.
Rubanova N.M.	Environmental accounting is the process of collecting, registering generalizations and reflecting in the system of environmental costs, natural assets, environmental funds, reserves and liabilities, as well as the results of economic entities to manage and determine the environmental potential of the enterprise
Sannikov I.M.	Environmental accounting - a systematic and documented process of obtaining and processing environmental data in order to manage and comply with the law
Sakhno L.A.	Environmental accounting at the enterprise is a system of detection, measurement, registration, accumulation, generalization, storage, processing and preparation of relevant information about the enterprise in the field of nature management in order to transfer it to internal and external users for optimal decisions
Taranicheva O.V.	Environmental accounting is a system that should be used to identify, organize, regulate and present data and information on the state of the environment in kind and value.

Source: [11, p. 51]

The analysis of scientific opinions shows a duplication of the definition of "environmental accounting" of the content of the normative interpretation of "accounting". The difference is only in the information about the field of nature management. This confirms that environmental accounting is a subspecies of accounting. Therefore, we completely agree with the idea of the expediency to use the concept of accounting of environmental activities of the business entity to denote the system of detection, measurement, registration, accumulation, generalization, storage and transmission of information to users about the impact of the entity's activities on the environment [5, with. 98]. Thus, the accounting of environmental activities is part of the accounting system of the entity.

Environmental activities in the enterprise are associated with the corresponding costs that directly or indirectly affect the economic performance of the enterprise. The amount of such costs in most enterprises is significant, but today the accounting of environmental costs is conducted unsystematically, they are not separated from the total cost, because they are not allocated to a separate object of accounting. This leads to a lack of reliable accounting data on the size, direction and

types of environmental costs of enterprises, which is impossible to do with the existing organization of accounting [2, p. 32].

From the point of view of Deriya V.A., ecological activity of the enterprise is a corresponding segment of its operational activity which should provide balance between public interests and interests of the enterprise as a result of which functioning the natural environment in that condition in which it was until [3, p. 195]. The scientist characterizes the ecological activity as part of the operating room. However, in scientific research, some objects are characterized by types of operating, investment [6] and financial [14, p. 53] activities. We agree with this opinion, because businesses can not only have business transactions related to the main activity, but also to buy and sell environmental facilities, have financial transactions to repay loans for capital investments of this nature, and so on.

Thus, among the objects of environmental activity that should be reflected in accounting, scientists have proposed to distinguish two groups:

- facilities that ensure the economic activity of the enterprise (environmental costs, natural resource potential, genetically modified organisms, industrial waste,

non-current assets for environmental protection, environmental liabilities, environmental income);

- objects that form the economic activity of the enterprise (ecological economic operations, ecological effect (profit, loss).

Environmental accounting should form information about:

- availability (in quantitative and cost terms), degree of development and ecological condition (quality) of natural resources;

- the presence of impacts (positive and negative) of the business entity on the environment;

- measures taken by the business entity to protect the environment, as well as their effectiveness [5, p. 98].

A large number of environmental problems requires the direction of environmental policy and activities of enterprises to address them and encourages the search for effective tools. One of such tools is the accounting of environmental activities of the enterprise, as it is necessary to measure and reflect the negative impact of man on the environment. In accounting, business operations of the enterprise are recorded, which are carried out using natural resources or lead to environmental consequences [11, p. 51].

It is worth noting if the current accounting system does not provide a sufficient systematic reflection of the impact of economic entities on the environment.

In this regard, scientists propose to supplement the system of accounting accounts.

If the scale of environmental activities at the enterprise is small, it is not structurally isolated, environmental services "on the side" are not provided, it is advisable to keep records of environmental costs in the 8th class of accounts on a separate account "Environmental activities" with the following sub-accounts:

- material costs;
- labor costs of colleagues working in the field of environmental protection;
- costs of social insurance for employees employed in the field of environment;
- depreciation of fixed assets for environmental purposes;
- environmental fees and charges;
- other environmental costs [21, p. 119].

In branch enterprises with a significant amount of environmental activity, which have specialized shops, provide other enterprises with environmental services, in addition to the specified separate account, it is advis-

able, in our opinion, to introduce the following sub-accounts, in particular:

- in the first class of accounts: fixed assets for environmental purposes; depreciation of fixed assets for environmental purposes; acquisition of fixed assets for environmental purposes;

- in the second class of accounts: natural resources (raw materials);

- in the fourth class of accounts: financing of environmental protection measures; reserve capital for investments in the field of environmental protection;

- in the 5th class of accounts: long-term environmental liabilities;

- in the 6th class of accounts: environmental fees and charges; environmental insurance calculations; remuneration of personnel employed in the field of environmental protection; calculations on social insurance of employees employed in the field of environmental protection;

- in the 7th class of accounts: income from the sale of environmental funds; income from the provision of environmental services;

- in the 8th class of accounts - a separate account "Environmental activities" with the allocation of the following sub-accounts: material costs; labor costs of employees employed in the field of environmental protection; social insurance costs of employees employed in the field of environmental protection; depreciation of fixed assets for environmental purposes; environmental fees and charges; other environmental costs [21, p. 119].

Returning to the main purpose of the study, we present the characteristics of the environmental tax and its mechanism for reducing environmental impact (Fig. 1).

Thus, the accounting of the environmental tax and calculations related to the determination of the tax base are an important element of the accounting process of economic entities that are payers of this tax. As already mentioned, one of the objects of accounting for environmental activities is environmental obligations.

The question of the essence of environmental obligations, as well as other objects of accounting for environmental activities, is thoroughly covered in the research of many scientists. The authors note that in the scientific literature, the concept of "environmental obligations" has an ambiguous interpretation: either there is an identification of environmental obligations with environmental costs, or they are determined by the consequences of environmental nature.

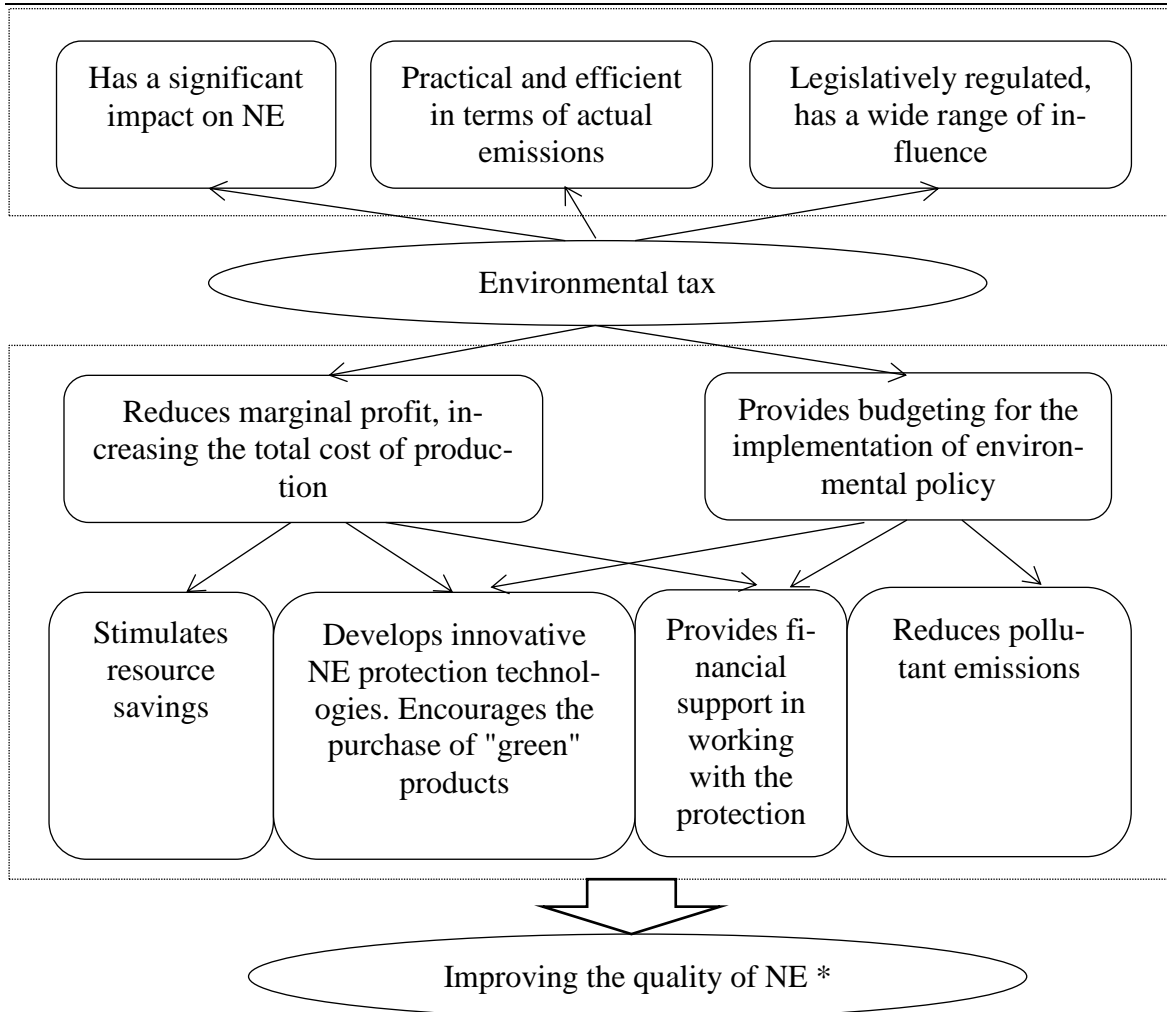


Fig. 1.

*Characteristics of the environmental tax and the mechanism of its interaction with the state of the environment*

\* NE – the natural environment

Source: [19, p. 162]

For example, some authors define "environmental obligations" as a consequence of the environmental nature, due to the interaction of enterprises with the environment, which can significantly affect the financial condition [1]. Others - is the environmental debt of the enterprise to the state and the social sphere for the damage to nature and at the same time an indicator that reflects the amount of damage in monetary terms [18, p. 80].

Currently, the unprecedented fact of confirmation of environmental obligations is the tax reporting of enterprises. At the same time, in the domestic accounting practice there is still no clear distinction between environmental costs and environmental obligations [18, p. 80].

Environmental commitments may arise as a result of [6]:

- implementation of the main activity (payment for the use of natural resources);
- non-compliance with the norms of environmental legislation, which causes compensation for damage, payment of legal costs, fines, etc. ;
- voluntary actions of the enterprise to eliminate negative impacts on the environment, taking into account the concern for its reputation.

Environmental obligations can be of two types: contingent and real. They are also divided into long-term and current. At the same time, real current environmental liabilities should be recorded in the accounts of the sixth class, and long-term real environmental liabilities should be recorded in the accounts of the fifth class.

Current environmental liabilities are divided into groups - liabilities that arise: 1) during the use of natural resources; 2) during compensation of damage, fines; 3) during the elimination of negative impacts on the environment - and the relevant subgroups in order to determine the sections of information for the preparation of internal and external reporting of the enterprise [7, p. 121].

The first and second of the selected groups include environmental taxes provided by the legislation of the country. With regard to the third group of liabilities - liabilities arising from the elimination of negative environmental impacts - they arise on the basis of an agreement with counterparties to eliminate the negative effects of the enterprise on the environment, and may include other obligations, provided that the consequences of self-pollution of the enterprise are eliminated [7, p. 121-122].

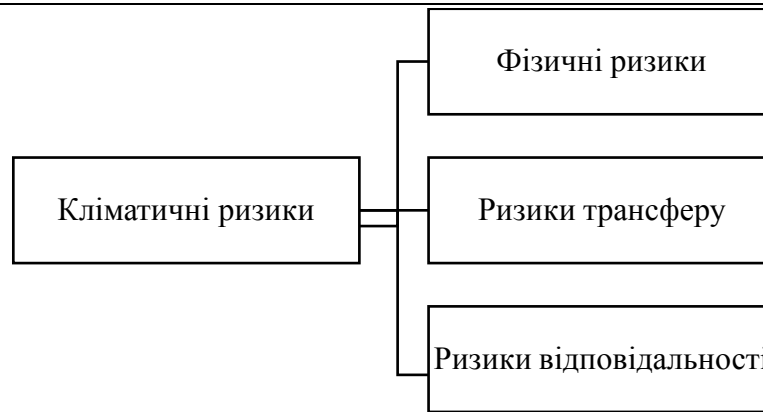


Рис. 1. Види кліматичних ризиків

Все це відбивається на зміні ідеології управління. В березні 2018 року Європейська комісія з фінансування сталого розвитку затвердила План дій, яким передбачено [7]:

- переорієнтація потоків капіталу на сталі інвестиції для досягнення сталого та інклюзивного зростання;
- управління фінансовими ризиками, які можуть реалізуватися внаслідок зміни клімату, погіршення стану навколишнього середовища і поглиблення соціальних проблем;
- підвищення прозорості та довгостроковості економічної і фінансової діяльності.

Визначені зміни зумовлюють необхідність змін в стратегії управління та розвитку соціально відповідального інвестування (ESG), яке є логічним розвитком концепції сталого розвитку. [8] Якщо остання визнавала за критерії економічні, соціальні та екологічні складові, то сучасна ESG концепція робить акцент на екологічній, соціальній та управлінській складових. Тим самим визнається, що економічний ефект – це результат управлінських рішень, що приймаються фахівцями, які мають нести відповідальність за прийняті рішення, а екологічний ефект передбачає упередження зміни клімату, адаптацію до змін клімату, які відбулися, та врахування впливу інших екологічних проблем. [9] Отже, має місце дуалістичність: з одного боку, важливо отримати економічно позитивний ефект, а з іншого - забезпечити дотримання ESG-критеріїв. Це означає, що всі фінансові рішення мають базуватись на етичних (G), екологічних (E) та соціальних (S) параметрах, або результатах скринінгу.

Розвинуті країни вже мають сформовану спільноту індивідуальних та інституціональних інвесторів, які прагнуть дотримуватися стратегії, форм і методів ESG. Стратегії ESG — це методи, що застосовуються інвесторами для формування портфелю спеціально відібраних активів, у відповідності до нефінансових критеріїв відповідальних інвесторів, які прагнуть отримати не тільки прибуток, але й забезпечити вирішення нагальних проблем сучасного суспільства.

Кліматичні ризики через ефекти (канали) вторинних наслідків (перетікання волатильності) та канали зараження впливають на діяльність банків, обумовлюючи фінансові втрати від зміни вартості

активів. Тим самим вони трансформуються у фінансовий ризик такими способами [10]:

- кредитний ризик: ризики, пов'язані зі зміною клімату здатні спричинити через прямий чи непрямий вплив погіршення здатності позичальників погашати свої борги, що приводить до зростання ймовірності дефолту (*PD*) та збитків з урахуванням дефолту (*LGD*);
- ринковий ризик: за різкого сценарію переходу на інші види ресурсів фінансові активи можуть зазнати змін у сприйнятті інвесторами прибутковості. Ця втрата ринкової вартості потенційно може призвести до «гарячих» продажів активів, що потенційно може спричинити фінансову кризу;
- ризик ліквідності: впливає на банки та небанківські фінансові установи. Наприклад, банк, чий баланс зазнає впливу кредитних та ринкових ризиків, може виявитися нездатним до рефінансування (ребалансування) в короткостроковій перспективі, що потенційно може призвести до напруженості на ринку міжбанківського кредитування;
- операційний ризик: цей ризик здається менш значним, але за певних обставин фінансові установи також можуть наражатися на цей ризик. Наприклад, на офіс (будівлю) банку можуть вплинути фізичні ризики (ураган, повінь, тощо), то це відіб'ється на його операційних процедурах;
- страховий ризик: внаслідок фізичних ризиків сектори страхування та перестраховування можуть опинитися у ситуації більших страхових виплат, ніж очікувалося, крім того наслідком перехідних ризиків може бути потенційне заниження цін на нові страхові продукти, що охоплюють зелені технології [11].

Нова парадигма ставить певні завдання, рішення яких базується на розвитку фінансових інновацій, пошуку нових механізмів та інструментів їх вирішення. Одним з напрямів є розвиток «зелених» інвестицій. Інструментом інвестицій виступають «зелені» облігації.

«Зелені» облігації – це цільовий емісійний борговий фінансовий інструмент, за допомогою емісії якого залучаються кошти для фінансування екологічних проектів або проектів, пов'язаних з адаптацією до кліматичних змін. Тобто гроші від продажу таких облігацій спрямовуються на фінансування «екопроектів» і проектів із зниження кліматичних

ризиків в економіці. В останні роки інституційні інвестори збільшили свої інвестиції в акціонерний капітал і боргові зобов'язання за низьковуглецевими проєктами. Наприклад, Пенсійний фонд Швеції виділив 21,8% свого глобального портфеля акцій для розміщення у низьковуглецеві проєкти. Проте, порівняно з масштабом обсягу активів таких інвесторів, ці вкладення залишаються мінімальними. Якщо розглядати тільки великі пенсійні фонди країн ОЕСР, то у 2013 році прямі інвестиції в інфраструктурні проєкти всіх типів становили 1% від загального обсягу їх інвестицій.

Впровадження таких фінансових інструментів для нашої країни є цілком прийнятним та необхідним. Умовами розвитку інвестицій класу «зелених» облігацій вважаємо: формування нормативної бази в частині правового визнання такого інструменту; створення ринку «зелених» облігацій; створення інституту незалежної екологічної експертизи, правила та вимоги якої є зрозумілими та визнаними у світі; проведення аудиту за цим напрямом; розвиток біржового обігу таких цінних паперів шляхом визначення правил торгівлі та стандартизації верифікації торгівлі; складання рейтингів емітентів та фінансових інструментів; розкриття інвесторами інформації з цих питань; вивчення досвіду інших країн, зокрема Китаю, щодо формування «зеленої» фінансової системи.

Посилення кліматичних ризиків та низькі процентні ставки сприяють розвитку облігацій катастроф, які забезпечують трансфер ризиків емітента на ринки капіталів, забезпечуючи підвищену дохідність для інвестора. Спочатку такі технології запобігання ризиків, відомі як *ART* (*alternative risk transfer*), були поширені в сегменті страхування ризиків природних катастроф, страхуючи компанії від надзвичайних подій. Згодом ці технології набули розвитку в діяльності банків. [12] *ART* визначають як фінансову програму, або програму управління ризиками, де одночасно використовуються техніка страхового та перестрахового ринків в поєднанні з банківськими методами хеджування та методами управління активами (сек'юритизація) на ринку капіталів.

Основні напрями альтернативного трансферу ризиків включають сек'юритизацію ризиків через облігації катастроф, пов'язані зі страхуванням цінних паперів і перестрахованням пулу активів, торгівлю ризиками і погодними деривативами. Інші методи, які іноді розглядаються як частина *ART*, включають в себе страхування життя, пов'язане з сек'юритизацією перенесення ризиків довголіття. Іншими словами, це трансфер страхових ризиків на ринок капіталів. Таке взаємопоєднання продуктів страхового ринку, ринку перестраховання, банківських методів ризик-менеджменту та методів ринку капіталів для захисту від негативного впливу ризиків на природу, бізнесу та суспільства в цілому варто розглядати як один з найбільш помітних проявів конвергенції у фінансовій сфері. Ключова відмінність *ART* від традиційного страхового ринку в тому, що страхові ринки та ринки перестраховання

надають захист від ризиків, а ринки капіталів надають додаткове покриття за рахунок самостійності. Отже, *ART* - це інтегрований спосіб управління ризиками додатково до перестраховання.

В основу цієї конвергенції покладено облігації катастроф, які, на наш погляд, є універсальною фінансовою інновацією, котра може розглядатися з різних позицій. А саме: 1) як поширення технології сек'юритизації на сферу страхування і створення принципово нового типу сек'юритизації – сек'юритизації ризиків катастроф, що сприятиме збільшенню грошових потоків та ємності ринку; 2) новий механізм фінансування збитків, що зменшує навантаження на бюджет (емітентом можуть виступати державні установи); 3) як новий клас фінансових активів, що формує новий сегмент ІФР; 4) як можливий напрям розширення можливостей портфельної диверсифікації, оскільки його дохідність практично не корелює з ринками традиційних фінансових активів, крім того їхнє ціноутворення і ризик дефолту прямо не пов'язані з кредитним та процентним ризиками; 5) як екзотичний інструмент соціально-відповідальних інвестицій, оскільки їх різновидом є благодійні облігації катастроф. За даними *Financial Times* станом на початок вересня 2018 року загальний обсяг таких облігацій постійно зростає і досяг рівня 30 млрд дол., а емісія за 2018 рік становила 11,08 млрд дол. США.

**Висновки.** Вважаємо, що цей спосіб набуває найбільшого поширення на фінансовому ринку з огляду на те, що він дозволяє інвестору диверсифікувати ризики. Зважаючи на посилення турбулентності розвитку економіки, можна стверджувати, що потреба в такому методі буде тільки зростати, особливо в умовах, коли посилюється ефект перетікання волатильності на фінансових ринках.

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