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**EXPLANATORY NOTE  
FOR THE GRADUATE THESIS  
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## INTRODUCTION

**Relevance of the topic.** The urgent problem of Ukraine's economy is its development based on the mineral and raw material complex, which results in unbalanced exploitation of natural resources. As a result, the country's natural resource potential is depleted, costs for environmental protection of the population and territories, elimination of the consequences of man-made load and restoration of the natural environment are increasing. A significant part of the damage is caused to the coal industry, especially in today's crisis conditions, when funds for its support are only enough for production needs, the policy of restructuring and closing unprofitable mines is not sufficiently thought out and not financed, and the equipment and facilities of operating enterprises are so outdated that man-made accidents they occur many times more often than two decades ago. The acuteness of these issues activates the scientific search for ways to solve them, which is conducted in many directions, including the direction of developing new and improving existing mechanisms for protecting the environment of territories from man-made and industrial influences. The multifaceted nature of the researched problem implies its solution from the standpoint of ecological and economic analysis and modeling, in the context of solving social and ecological and economic problems of sustainable development of building revitalization areas (BRT).

The question of defining the criteria of regional depression, typology of depressed areas, as well as the development of special measures for their development were studied by M.K. Bandman, S.S. Guzner, V.V. Kurnyshev, A.G. Shelomentsev, M.A. Yagolnitser and others. Analysis and development of strategy, tools, effectiveness of regional economic policy as the basis of balanced socio-economic development were reflected in the works of S.F. Marova, V.V. Bakusheva, B.S. Zhikharevych, G.O. Perova, Zh.V. Podolyako, A.V. Pozdniakova, S.G. Tyalovyh, O.A. Chernysh et al.

The creation of principled innovative approaches, criteria and economic bases for the sustainable development of territories was carried out by G.V. Atamanchuk, K.G. Hoffmann, S.M. Ilyashenko, V.A. Koptuyug, I.S. Ladenko, M.Ya. Lemeshev, L.G. Melnyk, O.V. Prokopenko, A.I. Tatarkin, V.K. Faltzman, N.P. Fedorenko.

Territorial problems of industrial development and issues of nature management were considered in the scientific works of foreign scientists: A. Weber, I. Izard, A. Losha, E. Markusen, A. Marshall, Y.G. von Tunen, J. Friedman, M. Friedman, J. Schumpeter, domestic and Russian scientists: O.M. Alimova, O.I. Amoshi, S.I. Bandura, B.V. Burkynskyi, M.P. Butko, V.M. Geetsya, Z.V. Gerasymchuk, O.H. Granberga, H. Hruby, B.M. Danylyshyn, M.I. Dolishnyi, S.I. Dorohuntsova, O.I. Amoshi, M.E. Basse, Z.S. Varnalia, L.M. Horbach, A.G. Zabolotny, I.A. Karagodova, L.M. Kuzmenko, N.L. Nedodayeva, I.V. Petenko, V.L. Pilyushenka, O.S. Povazhny, I.L. Sinyakevich and others.

Despite the theoretical development and practical significance of solving these issues by domestic and foreign scientists in the scientific field of environmental economics and environmental protection, a complex of topical issues of substantiation of methodological and applied provisions of greening of socio-economic development of building revitalization territories remains beyond the scope of consideration.

The relevance of the subject of the master's research lies in the fact that domestic science has not created a complete methodology for understanding the essence and content of conceptual, theoretical and methodological support for the ecological and economic development and revitalization of BRT and the selection of criteria for the effectiveness of environmental innovations in the coal industry. The above determined the choice of the research topic, determined its purpose and task.

**The purpose and objectives of the study.** The goal of the master's study is to develop theoretical and methodological approaches, scientific and methodological principles and practical recommendations for revitalization and ecologically sustainable socio-economic development of construction revitalization territories.

Achieving the set goal of the research made it necessary to solve the following tasks:

- generalize and reveal the prerequisites of ecological and economic development and revitalization of building territorial systems based on the dialectical principles of the economy of nature use;
  - to determine the essence of the concept of "industrial coal territory" as an object of sustainable development;
  - to develop a concept of ecological and economic development of construction and revitalization of post-industrial revitalization territories;
  - analyze the ecological and economic state and propose an approach to the economic assessment of the consequences of man-made pollution of BRT;
  - justify the ecological and economic policy of ensuring sustainable development in the context of targeted programming of the development and revitalization of BRT;
  - to propose a scientific and methodical approach to the economic assessment of ecologically oriented innovations in BRT.
- **Object of research**– a system of organizational and economic support for revitalization processes and ecologically sustainable socio-economic development of building revitalization territories.
  - **Subject of research**- ecological and economic relations that arise between business entities, state administration and local self-government bodies regarding the formation of concepts and implementation of strategies for ecologically sustainable socio-economic development of building revitalization territories.

**SECTION 1**  
**THEORETICAL AND METHODOLOGICAL PREREQUISITES OF**  
**ECOLOGICAL AND ECONOMIC DEVELOPMENT AND**  
**REVITALIZATION**  
**BUILDING REVITALIZATION TERRITORIES**

**1.1 Analysis of the essence of ecological and economic relations from a dialectical perspective on sustainable development**

Already in the middle of the 20th century, the results of scientific research on the depletion of natural resources, rapid population growth, threats to the environment as a result of increasing anthropological influences on it, proved that irreversible changes began to occur in the surrounding natural environment and humanity faced the problem of a global ecological crisis. The ecological crisis cannot be considered in isolation from the economic crisis. The economy is dependent on natural resources and therefore it cannot exist outside the natural environment. With the deterioration and depletion of natural resources, the reduction of labor productivity, the scale of economic damage can increase significantly. In turn, the growth of productive forces and large-scale commercialization of production cause large-scale environmental damage. As a result, the adverse impact of the environment on the health of the person himself, that is, the main production resource, is increasing. So, modern reality forces humanity to look for a new basis for the relationship between the environment and man.

Society, nature and economic life of society (economy) form an ecological and economic system with a complex structure of internal relationships, where each element directly or indirectly affects other component systems.

In addition, the environment includes two main elements: resource and natural potential, and with the development of production, the components of natural potential can become elements of the first. Such an interaction of the components of the ecological and economic system of

expressed by the presence of ecological and economic relations, the manifestations of which include ecological and economic needs, interests and contradictions.

For a considerable period of time, the ecological component of ecological and economic needs and interests was not taken into account in scientific studies when building models of economic growth. Moreover, economic growth in such studies (primarily, neo-Keynesian and neoclassical models) was considered as an exclusively quantitative value. In the last quarter of the 20th century, it became obvious that this approach has no future, since quantitative economic growth has a number of economic and environmental limitations (for example, the law of diminishing returns and the depletion of natural resources). The concept of "economic growth" is gradually being replaced by a category "economic development", which has not only and not so much quantitative, but qualitative characteristics and parameters. The concept of "ecologically sustainable socio-economic development" also appears, which emphasizes the impossibility of separating the economic component of development from the natural one. This term also means the need to study and take into account not only economic, but also ecological and economic patterns of development: practically every economic process has its consequences for ecology and vice versa.

Thomas Malthus [12] predicted tension in human-environment relations at the end of the 18th century. In his opinion, the dynamics of population growth can be considered in a geometric progression, while food products - only in an arithmetic progression. Therefore, provided the rate of population growth continues, it is likely that humanity may face a food crisis.

On the contrary, according to the views of representatives of the classical school of economics, for example, John Stuart Mill, the stagnant state of capital in the conditions of stagnant population growth is a negative phenomenon at a high level of production, because at the same time there is room for personal improvement in the spiritual and socio-cultural spheres, in art

etc., therefore, the constant growth of the population's well-being is impractical [14, p. 54-76].

Simon Kuznets investigated the man-made consequences of economic development. In 1955, he determined that economic development contributes to the growth of income inequality, which tends to balance out over time [28, p.15-17]. This dependence began to be graphically interpreted as the Kuznets curve, which can also be used when analyzing the impact of economic growth on changes in the environment.

Thus, in the early 90s of the 20th century, the concept of the Kuznets ecological curve appeared in the research of Gene Grossman and Alan Kruger. Scientists determined the impact of the North American Free Trade Area (NAFTA) and popularization in the World Bank's report on world development in 1992 (World Bank Development Report) [28, p. 1419-1439], where they proved that an increase in income per capita will initially lead to an increase in environmental pollution and other types of environmental degradation, but after the population reaches a certain level of well-being, these indicators will begin to decrease.

Changes in the structure of production and/or consumption caused by the growth of incomes; changing the institutions necessary for the internalization of externalities; a change in preferences regarding environmental quality; and/or increasing returns to scale associated with reducing pollution cause a certain U-shaped form of dependence between income and the state of technogenic environmental pollution [28].

The transition from a predominantly agrarian economy to an industrial economy leads to a more intensive use of natural resources along with an increase in polluting emissions, while at higher levels of development, according to supporters of the Kuznets ecological curve, "structural changes in favor of more information-intensive production and services together with growing ecological consciousness, strengthening of environmental regulation, better technologies and higher costs for environmental protection

cause equalization and gradual reduction of ecological degradation rates (Panayotou, 1993, p. 1)" [Ibid]. However, due to the insufficient number of empirical studies, it cannot be claimed that the ecological Kuznets curve is universal for all types of degradation of natural resources. The causes of environmental degradation can also be various differences in environmental regulation and the specifics of the development of different countries.

The members of the Club of Rome, created under the leadership of D. Peccei in 1966, were among the first to draw the attention of the world public to a possible global ecological disaster. The funds of the members of this club were directed to the financing of scientific works on the creation of a predictive model of the development of humanity in the future. Researchers D. Meadows and M. Forester, who led these studies, for the first time questioned the possibility of maintaining the existing rates of economic growth without worsening the ecological situation. The rationale for this point of view is laid out in the first report to the Club of Rome, "The Limits to Growth". Scientists have expressed the opinion that humanity "must implement a controlled, orderly transition from growth to global balance" [17]. But the proposal drew criticism for leaving developing countries at their current level of development. In 1974, in the report "Humanity at the Crossroads" Mykhailo Mesarovych and Eduard Pestel put forward the idea of "organic growth" [28]. They identified 10 regions based on existing differences between countries. In their opinion, development is necessary for some of them, for others it is necessary to achieve balance, and for others even to reduce the level of development in certain areas.

A little later, under the leadership of the director of the World Watch Institute, Lester Brown, the concept of "sustainable development" was developed. Its definition is formulated in the report of the Brundtland Commission as "development that meets the present needs of mankind, while not destroying the ability to meet the needs of future generations."

An essential condition for the existence of sustainable development is the formation of a sustainable economy, which makes it possible to get out of the ecological and economic crisis.

The lack of certain answers in standard economics to today's problems prompted such scientists as Nicolas Georgescu-Roegen, Kenneth Baldwin, Herman Daly, Robert Constantza to create a new scientific approach - ecological economics or the economics of sustainable development. This approach is built on traditional economic laws and concepts, but takes into account certain environmental limitations (irreversibility of environmental changes, the issue of respecting the equality of people, the unpredictability of long-term consequences of human activity, etc.) helps to introduce certain economic concepts into the economy, a number of indicators that take into account more criteria, in particular environmental . Among them are the Index of Sustainable Economic Well-Being (ISEW) by Clifford Cobb, the Human Development Index used by the United Nations Development Program (UNDP), and the Genuine Progress Indicator (GPI) proposed by Herman Daly and John Cobb [27]. The last indicator takes into account not only the traditional real income per capita, but also the equality of distribution in a certain region, the quality of life of the population, the cost of unpaid labor, the degradation of natural resources, and man-made consequences. The use of these development criteria is considered as one of the necessary steps to overcome the ecological and economic crisis, and should contribute to changing the goals of development.

All this leads to the idea that in the future a new order of world economic relations should be formed, which implies that all decisions made in them should take into account the peculiarities of the ecological and economic systems of specific countries, which allows these countries to assess potential threats and, accordingly before that, build a mechanism to counter them.

In domestic literature, sustainable development is defined as a form of such interaction (coevolution) of society and nature, which preserves the biosphere and ensures the survival and indefinite long development of mankind. VV Mantatov considers sustainable development as the law of the universe. This law reflects the fundamental property of all phenomena and processes in the universe:

dynamic equilibrium, characterized by the correspondence between stability and variability. Things are stable not by themselves, but only in relation to certain aggregates of changes (transformations); and, on the contrary, the changes of things necessarily presuppose the stability of being, since the process of changes is nothing but the unfolding of a stable substance [12].

Justice is a cosmic principle that expresses the balanced, measured determination of all things. It is understood as the law of measure, which, in our opinion, is the satisfaction of reasonable human needs in society. Both overconsumption by the rich and underconsumption by the poor are dangerous. Therefore, the main problem of sustainable development of society is a problem of justice.

The law of sustainable development is the law of cosmic justice. Everything in the world is balanced and harmonized, that is, justice or order reigns in the world. And this fair order cannot be violated. As Anaximander said, things must be judged for their injustice according to

"in order of time". But the society in which we live is unstable, disharmonious and unfair. The human order diverged from the cosmic order. It is necessary to harmonize human existence, to harmonize it with the cosmic order, with "the great dynamics of nature, the various parts of which resonate harmoniously with each other" [12].

Sustainable development of society is possible only if there are harmonized relations both within society and with the environment in accordance with the Strategy of the Mind.

In the report of the UN International Commission on Environment and Development, known as

"The Brundtland Report" also emphasizes that "the strategy of sustainable development is aimed at achieving harmony between people and between society and nature" [17]. After the "Brundtland Report", the sustainable development of society is understood as balanced development in all respects, and naturally, such development is unthinkable without accepting the concept of justice. The new approach to the problems of the world system, proposed by the concept of sustainable development, is connected precisely with the understanding of the

place and role of justice in the historical process "Our inability to achieve recognition and acceptance of the concept of common interests, which is necessary for the process of sustainable development," says the report of the UN Commission, "is often the result of a relative disregard for economic and social justice within countries and between countries" [17]. The experience of history confirms: no society can be stable if its foundations are not based on justice. The concept of sustainable development extends the concern for justice to future generations of people, which logically implies also the protection of nature.

A special place in research belongs to the study of the dialectics of sustainable development. Its authors proceed from the fact that the very concept of "sustainable development" is contradictory, and the contradiction lies precisely in the combination of the incompatible: stability (static) and development (dynamics). To level this contradiction, the concept of "sustainable development" can be correlated with more traditional philosophical categories, such as: "change", "quality", "dimension", "becoming", "movement", "distinction", "identity", etc.

Such a correlation, for example, is carried out by V.V. Mantatov, determining that the most common regularity of sustainable development is the bifurcation of the one into opposites and a dynamic balance between them. Sustainable development takes place where opposites do not reach antagonism, where self-organization of the system takes place, "resolving" the situation [12]. This dialectic of sustainable development is most adequately expressed by the concept of harmony (in the Heraclitean interpretation).

Harmony, according to Heraclitus, is an internal connection, a hidden coherence, that is, a balance resulting from the "descent" of an unwavering "disagreements" of opposing forces". "The development process follows, at least, two opposite paths: variability and stability, chaos and order, involution and evolution. In this unity and mutual transition of opposite moments of development, the concept of sustainable development emphasizes evolution, coherence and direction of changes. The process of such development is characterized by order and security, survivability and preservation of structures as opposed to chaos and catastrophe.

In a word, sustainable development is such a creative evolution of a system in which no transformations within the system, no external disturbing factors can lead it out of the abundance of dynamic equilibrium" [16].

Interest in dialectics is also shown by scientists developing a new direction of scientific research - synergetics. In the article "To think synergistically means to think dialectically" O.M. Knyazeva notes: "Synergetics has an open tendency towards universalization and directly borders on philosophy, the subject of which is the general properties and laws of existence. By studying the common laws of complex behavior in nature and society, synergetics deals with the living, real dialectic of natural, human and social processes" [13, p. 113-117].

The discovery of synergetics makes it possible to formulate the laws and categories of dialectics in a new way in accordance with the principles of the philosophy of sustainable development.

The main categories of the philosophy of sustainable development include:

*Development*- an irreversible directed natural change of material and ideal objects. In the process of development, quantitative and qualitative changes of the object occur (change in properties, composition or structure, emergence, transformation or disappearance of elements or connections between them). Expressing, first of all, innovative processes of change, development involves preserving the system quality of developing objects. By direction, development can be both progressive, evolutionary and regressive, involutinal [9].

*Progress*(from the Latin progressus - forward movement, success) - a type, direction of development, which is characterized by a transition from lower to higher, from less perfect to more perfect. involutinal [9].

*Regression*(from the Latin regressus – reverse movement) – type, direction of development, which is characterized by a transition from higher to lower. The content of regression consists of processes of degradation, lowering the level of organization, loss of ability to perform certain or other necessary functions; regression also includes moments of stagnation, a return to previous (obsolete) forms and structures. In its orientation, regression is the opposite of progress. There is a complex multifaceted relationship between them; on the one hand, individual regressive changes

can take place within the framework of joint progressive development of the system; on the other hand, with the growth of regressive changes in the system as a whole, its individual components can keep the progressive direction of development as involutinal [9].

*Evolution*(from the Latin *evolutio* - unfolding) - the development of one form from another, more complex and more perfect form from a simple (embryonic) form, progressive development. The concept of evolution, which was added initially in the narrower field of plant and animal biology, was transferred from the organic world to the inorganic world and acquired the meaning of a comprehensive philosophical principle. involutinal [9].

Under the concept global evolutionism a monistic worldview is understood, which recognizes that a great and unified process of progressive development is carried out throughout the universe, the process of transforming simple forms into more perfect ones, to which all types and forms of phenomena are subject: the origin and movement of heavenly bodies, the formation of the earth's crust and rocks, plant and animal life the world on earth, the life of human societies, all creations of the human spirit: language, literature, religion, morality, law, art. The concept is based on basic philosophical laws that reflect the essence and features of world development [12].

*Law of equilibrium*:"In the process of development, the system seeks to maintain its equilibrium organization and rebuilds it to a new optimal value, counteracting all influences or forces that change the organization. If the compensatory abilities of the system are insufficient, the equilibrium is disturbed, which leads to the destruction of the system or its qualitative change and the establishment of a new equilibrium" [12].

The first part of the law of equilibrium was formulated by S.G. Fedosin as the law of preservation and change of system organization [21]. Striving to maintain balance, the system forms a countervailing force, neutralizing the influence that brings balance out of abundance. At the same time, quantitative changes occur in the system, its equilibrium organization partially changes.

Consider the typical cases of the first part of the law of equilibrium: Newton's first law (law of inertia): every body maintains rest or uniform rectilinear motion until it is forced by applied forces to change this motion (. Every moving body seeks to maintain its speed and direction of motion, but under the influence of an external force, it deviates from the previous direction.

Newton's third law: the force acting on a system is equal to the opposing force on the part of the system. Under the action of an external force, the direction of movement of the system changes, that is, the equilibrium is disturbed, and the system resists this.

Lenz's rule: the induction current always has such a direction that its magnetic field interferes with the cause that caused this current.

Lechatelier–Brown equilibrium shift principle: a system in a state of equilibrium, under an external action (change in temperature, pressure, concentration of reactants, etc.), tends to return to a state of equilibrium, compensating for the applied action. Thus, when an equilibrium system is heated, changes occur in it (for example, chemical reactions) that go with the absorption of heat, and when it is cooled, changes occur that occur with the release of heat. When the pressure increases, the equilibrium shift is associated with a decrease in the total volume of the system, and a decrease in pressure is accompanied by physical or chemical processes that lead to an increase in volume.

In a state of stable equilibrium, disturbances acting on the system (both external and internal) decay over time, leaving no traces in the system. Disturbances (fluctuations) are events that occur randomly and locally change some of the characteristics and properties of the system. Disturbances cause short-term reversible quantitative changes, are quickly neutralized and the system returns to the previous state of equilibrium.

If we understand the organization of the system as a set of opposite parts taken in their interaction, unity and struggle, then due to the effect of the law of equilibrium during the development of the system, this set will seek to be preserved, opposing all

influences trying to change the relationship between parts of the system or the balance between opposites. In the interval of measure, the quality is not simply preserved when some properties change quantitatively within certain limits, but such a relationship between opposites is preserved that does not change qualitatively when the degree of influence of one or another force changes. In the measure interval, the system develops through quantitative changes.

A system with a small margin of stability is not able to effectively counteract the forces trying to bring it out of equilibrium, to compensate for the action of these forces. If the influences or forces that change the equilibrium organization of the system exceed the margin of stability, the equilibrium of the system is disturbed, which leads to the destruction of the system or its qualitative change and the establishment of a new equilibrium. The mechanism of qualitative change of non-equilibrium systems is studied synergy

According to the laws revealed by synergy, a qualitative change of the system occurs if some forces or reasons bring the system into an unbalanced state to the point of branching of the paths of evolution. In unstable states far from equilibrium, "it is impossible to predict in which direction the further development will take place: whether the state of the system will become chaotic or it will move to a new, higher level of organization" [15]. The choice of a new path of development of an unbalanced system depends weakly on previous changes in the system and is determined by various (often random) reasons that lead to qualitative changes and bring the system to a new steady state of equilibrium.

Qualitative changes are caused by the action of various forces at the time of system imbalance. Quantitative changes are only one of the possible reasons for the disturbance of equilibrium, therefore the widely known law of the transition of quantitative changes to qualitative changes is only a special case of the law of equilibrium. Having reached a certain extreme value, the quantitative changes lead to a disturbance of the equilibrium of the system and the process of restructuring its internal organization, as a result of which a qualitatively new system is formed, characterized by a new, relatively stable dynamic

structure. The process of transition to a new quality is a transition from a system of one type of stability and character of the organization to another.

Let's list the possible causes of the imbalance: gradual quantitative changes in the system; weakening of one of the opposites; destruction of one of the elements of the system; change in external conditions; an irresistible external action that exceeds the margin of resistance; aggravation of internal contradictions; intentional criminal actions of a group of persons. Qualitative change of the non-equilibrium system occurs by displacement.

*The law of substitution*—it is the replacement of the old with the new. Two processes can lead to the replacement or emergence of a qualitatively new system: a rapid qualitative change in the system; disintegration of the old system into its constituent elements and the creation of a new, more perfect system from them. The law of substitution reveals the dialectic of old and new, it replaces the law "denial - denial" and is formulated as follows: "Development proceeds through the constant replacement of the old with a new, more perfect one, the future is born on the potential of the past" [12].

Everything that exists materially is imperfect, but is on its way to perfection. Therefore, everything that is, no matter how good or bad it is, is replaced by something more perfect. The old is replaced by the new, the present by the future. In this process of replacement, there is always a struggle between what is and what will be. This struggle is an inevitable companion of evolution and any progress.

The term "dialectics" was introduced into scientific circulation by the French physicist Le Chatelier when he formulated the principle of equilibrium. It is the best substitute for the term "negation", which was borrowed by H. Hegel from logic. It is not correct to use the logical category "denial" when it is not about the laws of thinking, but about innovative processes of development of material systems.

The law of substitution reflects continuity in development: "Development is characterized by a spiral shape. Any individual development process has a beginning and an end. And already at the beginning, the trend contains the end

development, and the completion of this cycle of development marks the beginning of a new cycle, in which some features of the first are inevitably repeated" [16]. Development is where the new not only interrupts the existence of the old, but removes everything positive and viable from it. The sequence of cycles that makes up the chain of development can be figuratively represented in the form of a spiral. "With such an image, each cycle acts as a turn in development, and the spiral itself - as a turn above the turns, that is, a chain of cycles" [16]. Although the spiral is only an image that expresses the connection between two or more points in the development process, this image successfully reflects its common regularity. The return to what has already been passed is not complete; development seems to repeat the levels already passed, but repeats them differently, at a higher level.

The transition to a new round of the evolutionary spiral is not gradual, but jump-like in nature, at the moment of the transition there is a qualitative change in the system, the old quality is replaced by a new one.

A qualitative change in the system can also be called a change in equilibrium. Within the measure of equilibrium, it occurs through quantitative changes. When the measure is violated, quantitative changes are no longer able to restore equilibrium, so a new equilibrium is achieved by qualitative changes in the system.

In synergy, the moment of a jump-like qualitative change is called a bifurcation point. Rejecting an unambiguous cause-and-effect relationship between the stages of the development of an unbalanced system, synergetics nevertheless claims that at the point of bifurcation, the "choice" of a new trajectory by the system depends to some extent on the way in which it gets to this point: "the behavior of systems depends on their prehistory" [15]. Thus, synergy confirms continuity in the development of physical and social systems.

Long-term existence of the system is possible only with its progressive development. Regressive changes lead to degradation and destruction of the system. Lack of change leads to stagnation and stagnation; the system loses its ability to counteract external and internal influences that disturb its equilibrium, regressive changes inevitably begin in it, and then occurs

destruction of the system. "True preservation of forms in nature is possible only through their progressive development; and without it, "preservation" is inevitably reduced to destruction, even though it is imperceptible in its slowness for ordinary methods of perception and research. And most of the complexes of our environment that are "preserved" are in exactly this position: they slowly, imperceptibly for us are destroyed" [23].

Destruction is justified only in the case when a new, more perfect system is created from the elements of the old destroyed system, which implies a progressive, evolutionary change. According to the concept of global evolutionism, world development has a progressive direction. Relatively short periods of regressive development can be observed in local systems, but this cannot stop the global evolution of nature and society.

*The law of opposites.* The law has the following wording: "In every system there are opposite sides, elements, oppositely directed forces or processes. The unity of opposites reflects the integrity of the system. The struggle of opposites leads to the establishment of equilibrium in the system" [12].

In the dialectics of sustainable development, the interaction of opposites is not called a contradiction, but a dialectical opposition. The term "contradiction" is borrowed from logic, so it has a clear and quite certain logical meaning, different from the dialectical one [15]. Using the incorrect term "contradiction" to denote the dialectical interaction of opposites leads to erroneous conclusions and opinions.

Contradiction was considered in the teachings of H. Hegel as the driving principle of all development and as the central point of his entire philosophy. Criticizing the point of view that contradictions are characteristic only of limited thinking, he showed their supposedly general and objective nature: "There is no subject in which one cannot find contradictions, that is, opposite definitions, since a subject that does not contradict itself is pure the turning away of the mind, which violently holds one of the two sides and which tends to darken and

eliminate the consciousness of another certainty contained in the first" [cit. for: 15]. H. Hegel mistakenly calls opposing definitions a contradiction and builds his dialectical logic on this mistake. He finds contradictions where there are none, does not distinguish contradictions from what was opposed.

The dialectic of sustainable development is based on a formal logic that denies contradiction, declares it a mistake, and thus requires non-contradiction. According to the law of exclusion of contradictions: "Two statements that contradict each other cannot be true at the same time and in the same respect." Any statement logically follows from a contradictory statement. This was known even to Aristotle. The appearance of a contradiction in any theory leads through this law to its destruction. Everything becomes evident in it, the value of such a theory is zero [9].

In formal logic, a relation of contradiction and a relation of opposites are distinguished. The relation of contradiction is the establishment of a mutually exclusive relation. For example, how are the concepts "white" and "non-white" related. The relation of opposites is not a mutually exclusive relation. For example, how are the concepts "white" and "black" related.

Similarly, in dialectics we will distinguish "dialectical opposition" and "irreconcilable contradiction". Two opposites, components of a dialectical opposition, do not exclude, but harmoniously balance each other. The sides of an irreconcilable contradiction cannot replace each other, they cannot be called opposites, they are antagonistic tendencies or processes.

Dialectically, you can contrast: white - black, day - night, winter - summer, north pole - south pole, centrifugal force - centripetal force, attraction - repulsion, action - counteraction, creation - destruction, order - chaos, old - new, matter - consciousness, heredity – variability, enrichment of oligarchs – progressive taxation,

Irreconcilable contradictions: raising the standard of living - destruction of nature, enrichment of oligarchs - poverty of hired workers.

## **1.2. The concept and classification of building revitalization areas as an object of sustainable development**

One of the problems of technological progress is the disruption of the development of industrially developed territories. This phenomenon is especially acute in regions with a concentration of coal and mining and processing industry enterprises, for example, in Donbas.

The scientific solution of these problems involves the substantiation of economic methods and the development of ecological and economic approaches in nature conservation activities in such territories.

Man-made consequences of the industrial activity of revitalization enterprises, as a rule, there is the degradation of landscapes, pollution by industrial waste, the appearance of unauthorized landfills, pollution of surface and underground water.

The functioning of coal mining enterprises is facilitated by almost the largest negative ecological changes in the environment, first of all: subsidence of the earth's surface by an average of 0.2-1.2 m, and in some places up to 5 m, which can cover areas of more than 8 thousand km<sup>2</sup>; the increase of cracks with subsequent destruction of the stability of the soil cover, which is also accompanied by geochemical contamination of soils. An important problem remains air pollution by products of combustion of tericons, namely dust, methane and other emissions. It is dangerous to reduce the level of groundwater and to pollute surface and underground waters with mine waters; the flooding of territories, namely cities and settlements during the closure of mines by flooding, should be considered separately. With such wet conservation, highly mineralized mine waters enter the aquifers and river network at a very fast rate on large areas [26, p. 16-19].

In these conditions, the development of an adapted mechanism for the revitalization of industrial and post-industrial lands with the aim of their integration into the natural environment and economic turnover of cities becomes an important task of the economy of nature use.

Industrial territories can include one or several land plots located within one administrative-territorial unit, within which industrial enterprises have the opportunity (based on the existing natural, resource potential endowed with these territories) to produce products [18].

In the work, construction revitalization territories are proposed to be understood as areas located in cities and urban-type settlements, the administrative boundaries of which include lands where production assets and current assets are located, as well as waste from the production activities of coal industry enterprises, which may be located on at different stages of development - from industrial to post-industrial. Such territories are distinguished by the degree of technogenic influence on the transformation of space on the one hand, and by the consequences of anthropogenic development of such territory on the other (Table 1.1) [22].

Regional and local environmental restoration programs, which as a rule provide for rational nature management, in many cases include a section on the analysis of possible changes in the ecological situation, which is necessary for the identification and ranking of certain environmental consequences and ecological and economic problems.

However, there is no single methodology for researching the ecological and economic condition of construction revitalization areas, so each region is forced to define its own system of ecological indicators and ecological and economic analysis criteria.

Table 1.1

**Criteria for the classification of construction revitalization areas**

<b>Rating factor territories</b>	<b>Factorial characteristics are possible indicators</b>
Location in territory plan	within the city limits outside the city limits
Target use of the site	production funds; infrastructure facilities; recreational facility; housing stock, etc
The degree of land development	industrial building; undeveloped green area; abandoned plots of land, contaminated land; residential areas;
The direction of revitalization	constructional; recreational; commercial; social and cultural
Peculiarities of technogenic influence of mining production	damage by bulk soil; damage by excavation of the soil; atmospheric pollution; violation of the hydrogeological balance; - pollution by heavy metals, oil products, radiation, - the presence of biogas anomalies, sanitary and bacteriological contamination
Availability of indicators of industrial pollution of the territory	heavy metals and arsenic; 3,4 benz(a)pyrene; petroleum products; radiation; active biogas anomaly; sanitary and bacteriological pollution
Assessment of the security level	-potential for emergency prevention; - caused damage; - recovery potential

Today, unfortunately, there is no clear definition of indicators of socio-economic evaluation, which could become criteria for choosing the direction of sustainable ecologically sustainable socio-economic development of the territory. Due to the lack of uniform and effective methods for determining environmental quality parameters, quantitative assessment of the impact is not possible in many cases. Also, comprehensive socio-economic criteria for assessing man-made impact have not been developed, and the methodology of similar economic assessments needs further improvement. This situation is connected with the weak development and incomparability of certain indicators, which should characterize not only the economic, but also the social and ecological consequences of the development of construction revitalization territories. Therefore, as such criteria, we suggest using the criteria for the classification of construction revitalization areas, given in Table 1.1.

Issues related to safety and risk are gaining the most importance, the definition of which should become a way of solving the problem of defining for construction urbanized territories, in particular revitalization regions, the principle directions of increasing the ecological and economic efficiency of the activities of construction revitalization enterprises and the specifics of the implementation of adapted means of optimizing the use of nature .

The study of existing methodological approaches to the analysis of environmental consequences and the formation of predictive scenarios of ecologically sustainable socio-economic development, taking into account the peculiarities of construction revitalization territories, should include the generalization of experience accumulated in domestic and foreign information sources on the assessment of man-made spills on the environment, as well as methodological approaches to strategic planning and methods of forecasting socio-economic development of these territories.

The increase in man-made load on the environment and the related need to analyze the negative environmental consequences of the use of certain technologies and their systems led to the selection of

studies on the assessment of projects of engineering structures from the point of view of their impact on the environment into a relatively independent industry. In parallel, since the beginning of the 1970s, environmental expertise, in particular, the method of environmental impact assessment (EIA) was formed.

According to the terms of the methodology for different groups of consumers and the population, at certain stages of assessing its attractiveness, costs and results are determined, specification, search and comparison of compromise solutions combining different alternatives is carried out. The development and spread of the use of methods of economic assessment of the level of safety and operational management of environmental risk will allow to increase the level of scientific validity of EIA. This concerns both the assessment of the risk of emergency man-made situations and the risk in the conditions of planned operation of the object (risk of negative impact of industry on ecosystems, human health). The multi-criteria assessment of the impact of man-made sources on the environment should be considered more widely than the concept of "ecological expertise".

All identified types of assessments, namely risk assessment, technology assessment and environmental impact assessment, are certainly interrelated. They are different forms of system analysis used depending on the object of research: phenomenon (technological project), process (technological innovation) or problem situation (risk).

A risk management strategy, in particular individual, social, environmental, is formed based on the indicators of risk level assessment in the range from minimal to maximally acceptable.

The characteristics of the level of security in a certain region can be formed based on the main components of the concept of risk, which can be combined into the following groups of indicators: assessment of the potential for preventing an environmental emergency; damage assessment; assessment of recovery potential. This approach also applies to urbanized construction revitalization areas. The sequence of risk assessment is primarily based on the identification of the most serious risk factors, as well as sources of danger, then it is carried out

their ranking in terms of system stability. The analysis is based on the methods of building risk maps; formation of scenarios of emergency situations and approaches to determining system stability thresholds; where the use of mathematical methods such as simulation modeling becomes effective; methods of "idealized experiment".

The first group of indicators is designed to reflect a change in the share of the influence of a destabilizing factor (Table 1.2) [22], for example, "production of dangerous products" or "use of physically worn-out funds", because the deterioration of the existing structure of the economy in a certain way increases the risk of instability in both natural and man-made , as well as in social systems.

The resulting indicators of this group can be distinguished as follows: social - mortality, morbidity; ecological - deterioration of the quality of the environment (pollution, deforestation), increasing load on the surrounding natural environment (for example, exceeding the assimilation potential of the environment or land alienation); economic - loss of national wealth or forced additional costs of society.

The second group of indicators reflects the system of damage minimization measures. It includes, for example, indicators characterizing the relationship between costs directed at disaster prevention and the total amount of estimated and compensatory costs; as well as by changing the share of these costs in the total amount of costs for overcoming and preventing emergency situations.

A comprehensive analysis of the consequences of the coal industry's impact on the state of the environment (NS) in combination with existing methods of its assessment demonstrates that the most widespread methods of determining the man-made impact of production processes on the environment are based on natural indicators. First of all, these are the indicators of the concentration of harmful impurities in the environment that enter the national emergency during the year, and their compliance with the norms (GDC, GDV, GDS, etc.).

*Table 1.2*

**The influence of the destabilizing factor of the industrial coal territory on indicators of sustainable development (systematized by the author based on the results of studies of the peculiarities of the development of BRT)**

Characteristics BRT	Components of sustainable development		
	Economical	Ecological	Social
Industrial building	Profitability production	zero waste possibility of recovery of resources	Mortality, employment, morbidity, life expectancy of the population
Undeveloped green area	Cost Natural capital	Recreational potential	Density population
Neglected plots of land	Cost of revitalization	Resource recovery potential and danger to the environment territory	Influence on the conditions of rest and restoration of working capacity
Residential estates	Housing and utility expenses, Profitability construction	Degree of anthropogenic pollution	The level of improvement
Contaminated lands	Cost of revitalization	Risk environmental disasters	Degree Activity community

Integral indicators of technogenic load on the environment (for example, pollution indices) can be used as quantitative estimates [40, pp. 21-25]. To optimize the level of safety, the expected duration can be a criterion, since it is precisely this criterion that is affected by man-made and natural processes. But separate scientific studies prove that when assessing the consequences of nature management, the use of one generalizing ecological and economic indicator is not always appropriate.

A common practice is to study the impact of coal production on the environment through a quantitative characterization of the economic loss.

In order to establish an appropriate and acceptable level of safety and risk for society in the conditions of sustainable development, approaches to multi-criteria analysis are defined, where parameters such as gross national product (GNP) are considered criteria; quality of life of the population.

Taking into account the costs of increasing the reliability of technical systems and indicators of product quality, social effects and the time factor, methods are developed based on the comparison of two values, for example, the costs of ensuring reliability and cost indicators of various types of damage.

The level of safety of society, its scientific, technical and economic possibilities are characterized, on the one hand, by the probability of man-made accidents, catastrophes, dangerous natural phenomena and possible damage during these events, on the other hand, by the degree of negative impact on man and the environment of man-made and natural processes; as well as the probability of the ecological situation becoming crisis and catastrophic.

It is impossible to manage ecological security without taking into account the current trends in the development of ecosystems [23, p. 205-210].

Ecological and economic forecasting should become a mandatory component of complex management of socio-economic development of certain territories. Formation of the scenarios of these forecasts allows not only to assess the state and prospects of changes in the natural environment of a certain region under various variants of its development, but also to determine the dominant connections between the ecological subsystem and others. The development of ecological and economic forecast scenarios for a specific region boils down to solving three main tasks:

- socio-economic assessment of the real state of the natural environment in the region at the present time and in the future, as well as the development on its basis of a system of measures for maximum mitigation or

complete prevention of the consequences of the negative impact of economic activity on the environment;

- determination and consideration of the possible consequences of changes in the environment as a result of economic activity and anthropogenic processes, their impact on the specialization of production and comprehensive development of the territory's economy;

- taking into account forecasts of the development of ecological and economic processes when determining the general comprehensive forecast of the socio-economic development of the region through the formation of criteria and restrictions on nature use and assessment of the qualitative state of the natural environment.

Thus, the task of determining trends in the development of ecosystems in different regions is reduced to establishing the degree of agreement of ecological parameters with indicators of projected socio-economic changes, where the main initial parameters of the ecological block are such indicators as the use of land resources, the assessment of the impact of the economic activities of enterprises on the air swimming pool, pollution of the water environment, assessment of the state of flora and fauna, soil, etc.

Also, during forecasting, it is advisable to use the most diverse analytical methods - simulation, game theory methods, mathematical modeling, network methods. The priority of the approach is determined by the level of structuring of the problem, which may include well-structured, weakly structured or unstructured tasks. The issues of forecasting ecosystems are weakly structured and are characterized by such parameters as: unreliability, uncertainty and incomplete information. The risk associated with them is also subject to determination; a large number of goals and multi-criteria assessments, as well as flexibility and adaptability of options; resource limitation [23, p. 205-210].

The spread of the use of formalized approaches in the processes of preparing and making strategic decisions is due to specific factors

properties of the ecological system, which, as a rule, is characterized by the uncertainty of the relationship between internal and external factors.

For example, this applies to modeling methods, where, as an exception, it is possible to consider the execution of individual stages: forecasting of individual characteristics or objects of resource redistribution during the execution of work at the final stages of designing system elements.

Attempts to formalize complex systems quite often lead to rigid model structures or incorrect assumptions that do not clearly reflect the diversity and peculiarities of real situations.

In recent years, the development of scientists has shown a qualitative leap in the development of computing equipment and software. So, for example, computer networks are widespread, databases are being improved, dialog management tools and specialized application software are being developed. All this makes it possible to use modeling to solve the urgent tasks of ecologically sustainable socio-economic development.

The development of a strategy for social and ecologically sustainable socio-economic development of an industrial area requires the use of both informal and formal (calculation) procedures. The application of simulation modeling in combination with informal decision-making methods (expert assessments, qualitative analysis, ranking by priorities) can be defined as appropriate for solving tasks.

With the expansion of the production area and the development of environmental policy, there was a need to form a management system for ecological rehabilitation of disturbed areas, based on the concept of sustainable development and aimed at preserving the quality of the environment. Depending on the category and objects of violations, measures are developed for their rehabilitation and revitalization; the economic damage from land degradation and pollution and the cost of restoration and rehabilitation of degraded land are determined

vacant lands; assessment of ecological risks of loss of quality characteristics of soils and soils, as a basis for the creation of ecologically favorable territories, and as a result - the risk of the death of the ecosystem as a whole is carried out.

Thus, in the aspect of the economy of nature use, it is appropriate to consider industrial coal territories as an object of sustainable socio-economic development, interpreted as an area of administrative distribution of natural resource potential, where production assets and production waste of revitalization enterprises that are users of natural resources are located and potential sources of man-made load and ecological danger. Based on the above, in order to determine the existing ecological and economic condition of construction revitalization territories, it is necessary to carry out a critical analysis of the condition of its components: atmosphere, ecological-hydrogeological balance, land resources and subsoil.

### **1.3 Formation of the concept of ecologically sustainable socio-economic development and revitalization of construction revitalization territories**

The full functioning of natural ecosystems is the key to a dignified human life. Despite, at first glance, the organic unity of the economic and ecological systems of the territory, until now, in practice, the solution of regional economic and ecological problems remains out of consideration of the ecological component on the part of local state authorities when preparing a regional development strategy.

In order to clarify the content, forms and methods of the interaction of the economy and ecology, the assessment of the impact of structural changes in the economy on changes in the ecological situation becomes essential, the results of which should be taken into account when developing recommendations for improving the mechanisms of state management of nature use.

We will consider these issues in the context of neoclassical theory and some other concepts (ecological economics, evolutionary economics), in order to identify and further analyze the principles of effective use of natural resources, the mechanisms of the state's environmental protection activities, and the structure of its environmental protection policy.

In the approaches of the neoclassical theory, it is appropriate to define the following points: natural factors are considered only as one of the elements of production, which are assigned a secondary role in the formation of the economic system. The essence of state macroeconomic policy in the field of nature management comes down to the optimization of the use of natural resources (from the point of view of preserving the Pareto criterion), as well as the internalization of external costs through taxes or trading of emission rights. As for structural transformations in the economy or public administration, ecologically oriented innovations are not considered in the neoclassical theory.

For effective ecologically sustainable socio-economic development, representatives of this school are supporters of the maximum liberalization of management. In the field of nature management, this can be manifested through the privatization of natural resources or through free pricing of water resources and electricity, etc.

The school of ecological economics is characterized by an alternative position, where man and ecology are considered as part of the economic system, which is built on a strict form of state regulation in the field of nature use, and traditional tools are used in management. But the concept of ecological economy in modern conditions is close to the ideas of zero growth, so it is not suitable for application in Ukraine.

Although the ideas of representatives of the neoclassical school are recognized as leading in modern economic theory, they are not very suitable for developed industrial countries, including Ukraine [19].

The action of specific mechanisms of the functioning of economic and natural systems in the conditions of a transforming economy demonstrates the significant role of the institutional environment and allows to single out the factors of uncertainty and underestimation of future benefits. Therefore, taking into account the existing specifics, appropriate recommendations regarding the macro-economic policy of the state should be developed. But the recommendations of the neoclassical theory are actually not acceptable for practical application. This is due to the fact that, provided that the state does not implement a certain selective policy to support advanced ecological industries and industries, the country acquires accelerated development of industries related to the raw material sector, where due to the exploitation of natural resource potential, profit.

Despite this, the neoclassical concept is often considered as basic when analyzing and solving issues of the formation of a static economic system. It contains the justification of the principles of effective use of natural resources, economic mechanisms of tax regulation, as well as certain principles of trading rights to emissions of pollutants. However, representatives of this school limit the role of the state in the regulation of public life, deny points directly related to structural policy. Among them, underestimation of the state's influence on the economy, limitation of the role of innovation and assessment of the real state of the institutional environment are identified. But the methodological approaches of the institutional school can be successfully used to study the mechanisms of state management of changes in the ecological situation, as well as to develop recommendations for improving the mechanism of nature use.

The socio-ecological and economic policy of the state is, as a rule, based on the following basic principles: the principle of taking precautionary measures, the principle of sustainability, the principle of "the polluter pays", the principle of sharing responsibility, because an essential condition for achieving results is the agreement of actions

all responsible groups of society. A promising direction of environmental policy should be the development of an approach to economic development, in which the biosphere will be considered not as one of the resources, but as the basis of life. The spread of such an approach should be facilitated by the timely development of methods for assessing the capacities of local and industrial ecosystems, as well as the assessment of the permissible level of industrial development of the economy and anthropogenic impact of the population on a certain territory of Ukraine.

Ukraine's transition to a market economy and the related further reform of the industrial complex change the emphasis in the system of prerequisites and factors that definitely affect the development and placement of productive forces. Unfortunately, Ukraine belongs to the countries where the level of negative consequences of economic activity is very high, therefore the issues of environmental protection and rational use of natural resources become important because they affect the state of productive forces.

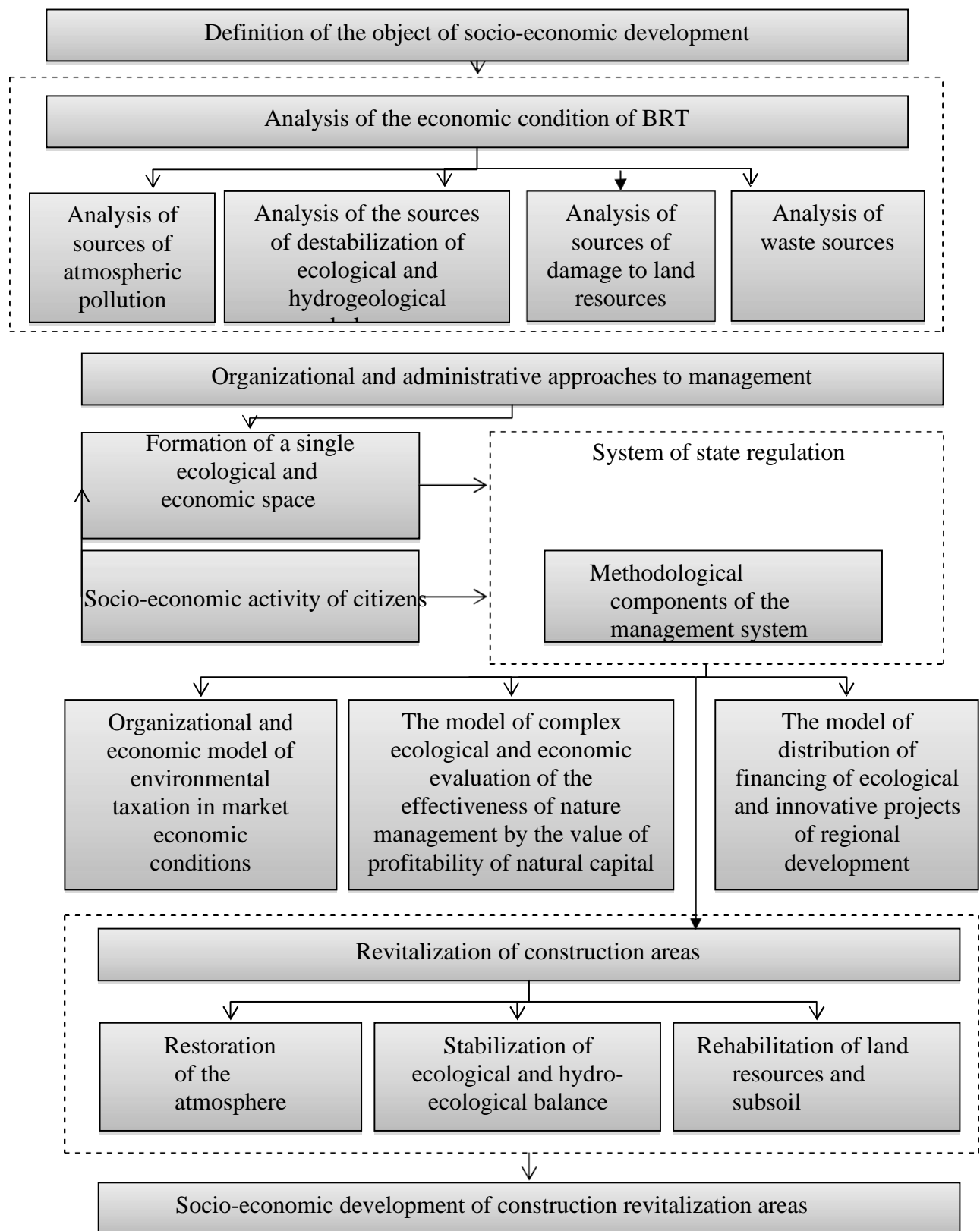
Assessment of the effectiveness of the state's socio-ecological-economic policy is based on three components: minimization of anthropogenic changes; phased elimination of their negative consequences; a selective approach to the implementation of environmental protection measures and increasing their efficiency. The results of research into the ecological and economic condition of the construction revitalization areas of the Donetsk region demonstrated the achievement of a critical level of technogenic load on the environment, which determines the immediate need for intervention through the renewal of ecological and economic components, namely the atmosphere, stabilization of ecological and hydrogeological balance, reclamation of land resources and subsoil. Thus, we should talk about the need to green the socio-economic development of construction revitalization areas.

Greening is understood as the process of gradual and consistent implementation of systems of management, technological and other solutions that

will contribute to the improvement of the efficiency of the use of natural resources of certain territories along with the improvement of the quality of the natural environment.

In the socio-economic aspect, greening should be based on the transition to management using nature-preserving methods, while in the technical aspect, it should be based on the greening of production technologies [6, p. 86-98], that is, on a set of measures to prevent man-made impact of production processes on the natural environment. The priority areas of production greening reflect the applied tasks of ecotechnology [11, p. 12-16].

The socio-economic development of construction revitalization territories involves a balanced solution of socio-economic tasks, ecological problems of preserving the favorable state of the environment and restoration of the natural resource potential of the territories, which meets the conditions of sustainable development, namely, contributes to the satisfaction of the vital needs of present and future generations [10, with. 90-97; 11, p. 133-142]. These and other tasks are specified in the conceptual scheme of the mechanism of greening of the socio-economic development of the productive forces of the industrial region (Fig. 1.1). The greening of socio-economic development in construction revitalization territories is depicted in the scheme as a complex, multi-faceted process of improvement and improvement of production-technical, economic, ecological and social characteristics of the territory through the use of management levers of various nature and the formation of organizational and economic transformations that should contribute to social and ecological - economically efficient management in these territories. As we can see from the scheme, the priority direction is the use of more ecologically efficient means of production that correspond to the defined goals of socio-economic development.



Rice. 1.1. Conceptual scheme of the mechanism of greening of socio-economic development of productive forces (on the example of construction revitalization areas)

In fig. 1.2. the classification of public costs related to the quality of the environment is presented. It should be emphasized that greening not only contributes to the growth of material production, but also stimulates the distribution, circulation and consumption of its results in certain connected sectors of the economy. This increases the intensity and effective use of all factors of production at a higher quality level.

A comprehensive approach to solving environmental problems of socio-economic and ecological development in construction revitalization territories should take into account the peculiarities of regional management in accordance with the principles that reflect the specifics of the functioning of the relevant natural ecosystems. Therefore, it is proposed to apply the principles of economic (financial) and environmental efficiency in combination with the principle of entrepreneurial activity and the need to comply with environmental requirements, as well as the principle of territoriality, because the development of regional programs and projects for the greening of polluting industries should not be tied so much to specific industries, how much to the respective territories (regions). This approach will make it possible to systematically take into account the needs of a specific region on the basis of the interconnection and interdependence of production, social and natural processes.

The ecological and economic basis of nature management is the organizational forms, methods and mechanisms that are components of the complex anthropogenic impact on certain ecosystems with the aim of increasing land productivity through the use of levers of differential rent, as well as legal regulation.

Insufficiently scientifically substantiated ecological scales of the consequences of the exploitation of natural resources, imperfect hydromelioration, agricultural and industrial technologies become the causes of excessive pollution of both the atmosphere and surface waters and soils, shallowing and drying of rivers, and with the rest the loss of potential productivity of natural ecosystems associated with oversaturation compared to standards

Public costs associated with the environmental effects of economic activity and the need to stabilize natural conditions and maintain environmental quality

Preventive costs to prevent negative environmental effects and consequences

Environmental education, upbringing, personnel training, environmental advocacy

Development of legal, normative and methodological materials and documents

Organizational improvement of environmental management systems and environmental control systems

R&D, development and testing of new technologies, devices and controls

Control of environmental regulations: engineering and environmental investigations, monitoring, environmental expertise

Organization and updating of regional banks of ecological and economic information

Ecological modernization of the industry structure and technical rearmament of production complexes

Economic losses caused by incomplete prevention of negative environmental effects

Economic losses from increased morbidity of the population

Economic losses to the population, related to everyday life and recreation

Economic losses from increased migration and increased staff turnover

Economic losses of industry and transport

Economic losses to forestry and agriculture

Economic losses to fisheries

Economic losses to the housing and communal economy

Economic losses from cross-border transferencepollution

Prohibitions on the reduction or compensation of economic losses

Public health support, medical and environmental insurance

Elimination of hygienic, medical-biological and ecological consequences of accidents

Technical means for achieving regulatory costs and emissions; sanitation of the environment, territories, natural objects

Reclamation, restoration of destroyed natural complexes and environmental quality standards

Maintaining the sustainability of natural complexes and environmental quality standards

Compensation costs for environmental claims

plant and animal products with nitrates, radionuclides, heavy metals, etc.

It is difficult to predict the possible scale and consequences of environmental disasters. Leading in the economy of a particular region are industries closely related to the use of natural raw materials of forests, fields, and water basins.

Adverse effects of natural and anthropogenic processes significantly complicate production activities in the field of forestry and agriculture, as well as construction and engineering works.

Environmental protection activities accelerate the output of finished products, lead to a partial increase in the cost price and a proportional decrease in labor productivity. This determines the need to take into account the principles of social-ecological-economic efficiency instead of traditional economic efficiency. The goal of the ecological-economic approach as a new scientific direction is the reconciliation of ecological (that is, oriented towards the preservation of the integrity of natural ecosystems) and economic costs aimed at the development of the "nature-production" system.

Greening of production is considered by specialists in two main directions:

1) the introduction of conditionally clean technologies (in this case, along with the main production, which is a source of pollution, special treatment facilities designed for the disposal of man-made waste and their processing are created), this makes it possible to increase the production of the main products;

2) low-waste technological processes (when waste is included in the technological chain in advance in order to use it consistently in production) [14, p. 15].

Therefore, treatment facilities, low-waste technologies, special installations for waste processing, etc., are considered attributes of environmentalization of industrial production. The fairest principle for establishing ecological and economic incentives is the principle "the polluter pays", while the most effective

payments for environmental pollution, as well as for the use of natural resources, should be the new form of its implementation. The named components are important components of the greening mechanism, but they are far from exhausting it.

Thus, actions regarding the greening of the socio-economic development of construction revitalization territories should be considered taking into account all stages of its technological cycle, namely, starting with coal mining and ending with the involvement of large-tonnage emissions and waste in the economic turnover and, of course, taking into account space-time intervals . Associated products formed at various stages of the reproductive cycle of natural resources also make sense to include when assessing the impact on the effectiveness of the revitalization of territories.

Developing the concept of a systemic approach to state regulation of technogenic impact on the environment, the work considers the solution to the problems of greening, which means ensuring the unity of the main elements of certain factors, among which we can single out resource-saving, ecological, social and economic factors, etc.:

- setting the goals of greening, the achievement of which includes the determination of: the composition of the tasks to be solved (what to do?); resources needed to solve the above-mentioned tasks (to whom and what to do?); efficiency criteria that determine the choice of approaches to achieving goals and the way to use available resources (how to do?) and components of the goal-setting procedure;
- selection of regulatory, legal, economic, informational and socio-psychological tools for the realization of goals;
- taking into account certain features of different systemic levels of environmentalization: individuals or enterprises as the main subjects of environmental management activity; as well as the region and settlement as territorial socio-ecological and economic systems.

We propose to present the structure of the greening process in the space of three coordinates, which are considered as aspects of greening, in particular "goal setting-tools of greening"; "goal setting - system levels of greening", "tools of greening - system levels".

In the table 1.3 presents the block "goals - tools of greening". For each tool, we have formulated the tasks of greening the socio-economic development of construction revitalization territories, defined the subjects of these tasks and the criteria for evaluating their effectiveness.

*Table 1.3*

**Aspects of greening: "goal setting - tools of greening"**

Greening tools	Elements of goal setting		
	Task	Resource	Performance criteria
1	2	3	4
Normative and legal	Development and use of normative legal acts, laws, resolutions, decrees, regulations	Bodies of legislative and executive power, judicial system, scientific, public organizations and institutions	Necessity and sufficiency; non-contradiction; transparency and direct action.
Economical	Structural restructuring of the economy; decrease in the nature intensity of exports. Implementation of environmental protection investment policy. Creation and improvement of the system of economic regulation of environmental protection activities.	Budget system of different levels; banking system; system of investment funds and innovative companies; non-budgetary and charitable funds; state system of nature protection bodies, state standard; executive authorities of various levels; managing subjects	Increasing the full use of natural resources; the "friendliness" of technologies to the environment, modified taking into account environmental and social factors, including public health.

Continuation of the table. 1.3

1	2	3	4
Informational	Determination of tasks of the scientific and technical policy of creation and development of low-waste, resource- and energy-saving technologies; formation of the information service system, development of scientific methods and other information materials on greening.	Scientific and technical organizations, commercial structures (implementation, consulting, enterprises specializing in the production of environmental protection and similar equipment); state bodies of nature protection at various levels; innovative, financial organizations (funds, companies, banks).	The level of scientific and technical developments; quality of information service (intensity of updating information, accessibility to information of interested users, accuracy of scientific and technical forecasts).
Social and psychological	Public support for greening; supporting the reduction of irrational consumption; creating a favorable "ecological image" of greening in the eyes of the local population.	System of environmental education and upbringing; mass media; advertising agencies; consulting firms; centers for the study of public opinion.	Positive changes in public opinion.

The structuring of the greening process allows to systematize the directions and methods of its socio-economic development in the building revitalization territories by system levels (Table 1.4).

In the context of the greening of socio-economic development, the effectiveness of environmental protection measures is the ecological, social, economic and resource efficiency of greening measures, which consists in the scientific analysis and synthesis of ecological, environmental, social and economic priorities. In this regard, the meaningful essence of the instrumental and methodological solution to greening the socio-economic development of industrial revitalization territories can be presented as the choice of an alternative long-term environmental protection course using a unified

Table 1.4

### Directions and methods of greening of socio-economic development of building revitalization territories at system levels

(systematized by the author on the basis of [9], [15], [16])

stem level	Directions of greening	Methods of greening	Environmental and economic efficiency
1	2	3	4
Territories	Environmental audit and environmental certification of enterprises	Use of environmental certification (GOST 17.0.0.06-2000), environmental management standards (ISO 14000), auditing procedures according to standards (ISO 14010-14012) in construction revitalization areas	Formation of reliable ideas about the level of influence of construction revitalization areas on the environment, reducing the risk of unacceptable production situations and their consequences.
	Change in the technological structure of production in construction revitalization territories	Organizational, economic and technical improvement of coal beneficiation processes. Creation of organizational, economic and financial conditions for the improvement of technological processes, chains and complexes of disposal of large-tonnage waste and emissions of construction revitalization territories, processing technologies and the use of secondary material resources, resource conservation.	Integrated use of coal fuel, reduction of environmental pollution by waste and emissions, production of commercial products from secondary raw materials, reduction of gross environmental pollution due to increasing the degree of fuel use
	Territorial organization of nature polluter production	Creation of sanitary and protective zones, relocation of energy enterprises to other industrial coal territories.	The level of formation of gross pollutants does not change, but the concentration of pollutants changes due to their dispersion in environment.

## Continuation of the table. 1.4

1	2	3	4
Territories	Program and target planning of sustainable development of the region	Comprehensive target regional programs for the development of the region determine the tools of rationalization of resource use, environmental protection activities, financing of projects of construction revitalization territories, taking into account regional ecological and economic features.	Formation of a system of goals and innovative environmental management actions (measures) to achieve ecologically sustainable development of construction revitalization territories.
	Information provision of greening of construction revitalization territories	Creation of an information base ("catalog", "bank") with data on the types and volumes of waste at industrial enterprises, the production capacity of waste processing, potential consumers of secondary resources.	Maximization of the involvement of secondary resources in economic turnover, which indirectly reduces the formation of gross pollution in construction revitalization projects territories
Industrial enterprises	Effective use of waste and emissions in the production sphere	Implementation of technological chains and complexes of disposal and processing of large-tonnage emissions and waste of construction revitalization areas. Organizational and economic solutions for the production of goods from secondary resources.	Increasing the competitiveness and greening of construction revitalization areas, reducing emissions of SO <sub>2</sub> and NO <sub>x</sub> into the atmosphere, reducing environmental payments, engaging in cooperative production and economic relations of connected branches of the region's economy contribute to the increase gross regional product.
	Implementation of energy-saving technologies	Optimization of operating modes of existing building revitalization areas.	Reduction of the formation of gross pollution.
	Reduction of emissions into the atmosphere pollutants	Modernization of equipment for catching pollutants in flue gases construction revitalization areas.	Reduction of emissions into the atmosphere of ash, SO <sub>2</sub> and NO <sub>x</sub> , reduction of environmental payments.

of the iterative procedure of finding a way of cost-effective investment of capital, which allows to reproduce the financial-investment, social and environmental aspects of the design and operation of production-technological innovations and organizational-economic solutions on the basis of specific functional-cost and ecological equivalents.

The effectiveness of greening of socio-economic development, being a systemic concept, includes two main components:

1) economic, reflects the expediency of financial and investment costs in the social, environmental and economic aspect;

2) ecological, objectifying the ecological attractiveness of economic innovations according to the level of ecological impact on the natural environment as a whole or on its individual components.

The mechanism of greening of the socio-economic development of construction revitalization territories is considered in the work as a set of organizational and economic methods of state, regional and sectoral management of the ecological and economic system, thanks to which interests (economic, ecological, social) are realized and the planned goals of balanced development of territories are achieved.

In the conditions of a market economy, it is called to combine the forms and methods of state management of the economy along with strengthening the effect of market instruments of regulation on the economic system. Thus, the leading role in the mechanism of greening is played by state policy, which determines the conditions for rational use of available natural resources, improvement of environmental quality indicators, and also creates institutional support for greening the processes of socio-economic development of building revitalization areas. The role of specific market principles and methods in the sectoral system of environmentalization of production is also growing, which includes differentiated environmental taxation, stimulation and dissemination of resource-saving, low-waste technologies, consolidated financing of innovative activities in the field of environmental protection, implementation

promotion of ecologically innovative projects on the market of ecological services, certification of ecologically clean productions and goods, and development of ecological entrepreneurship.

Greening of the socio-economic development of construction revitalization areas should become an integral part of the national policy of improving people's quality of life and, accordingly, the subject of special attention of state authorities.

Therefore, there is a need to develop organizational and administrative approaches to the management of rational nature management in construction revitalization territories, which would take into account the methodological features of the management system of rational nature management.

The above allows, within the framework of organizational and administrative approaches to the management of rational nature use, based on the results of the analysis of the ecological and economic condition of construction areas, to formulate the goal and task of organizing a single ecological and economic space of the country, as well as to identify what needs to be changed in the structure of the management of the national economy for its harmonization.

Greening of the technological development of a certain production is a structured process, within which several alternative, but mutually complementary directions are distinguished, where each of them changes over time under the certain influence of natural-scientific and socio-economic prerequisites for their implementation. The result is the formation of fundamentally new production technologies based on structural changes in the objects of work. Unlike traditional technologies, such technologies are characterized by higher resource efficiency and zero waste. Therefore, it contributes to the creation of conditions for the formation of ecologically clean and economically efficient production, where technologies have low energy consumption and at the same time sufficient closedness and strong interdependence: namely, waste from one type of production becomes raw material for another. Similar groups in the future

interconnected productions should be replaced by individual production branches [25, p. 87-90].

According to Fig. 1.3, project work can be broken down into five typical options, which differ from each other: by the nature of the assigned tasks; volume, labor intensity of the assigned tasks; ways of making managerial decisions; according to the specifics of the applied methods [15].

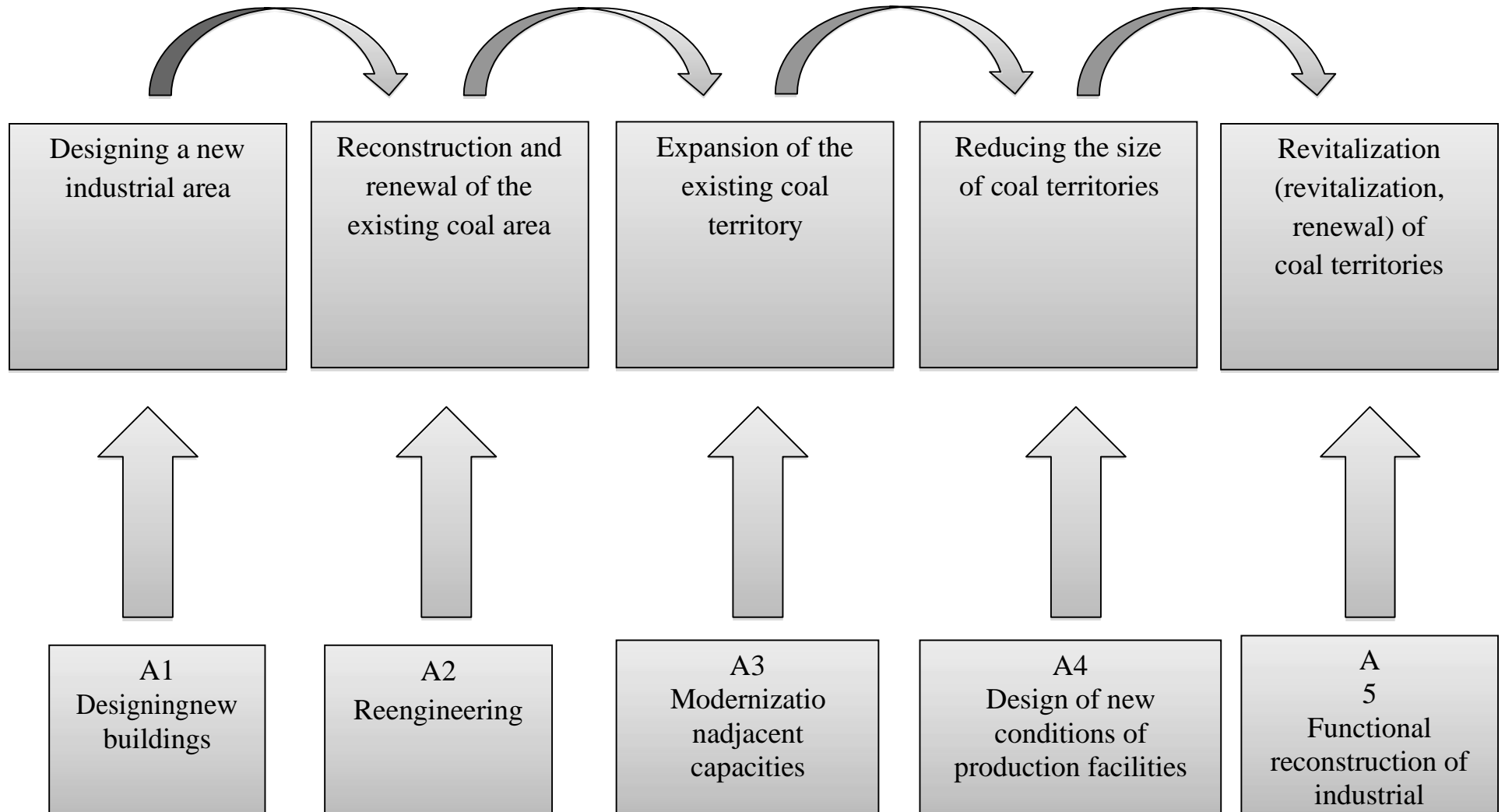


Fig. 1.3. Approaches to the design of ecologically oriented revitalization construction areas

Option "A1": designing a new territory of the coal industry. The design of a new building is a classic (ideal) case of designing an industrial area (creation of production in a "clean field"), which has the following features:

- the preparatory period is long in terms of time and large in scope of work;
  - consolidated forecasts regarding the production program, as well as its further development;
  - mandatory selection of the optimal location, including the order of connection to infrastructure elements;
- development of a master plan for the development of a specific land plot;
  - development of optimal solutions due to a high degree of freedom in the design process.

The share of design works according to the typical variant "A1" in the total number of orders for the design of construction enterprises is insignificant. However, in the conditions of globalization of markets and location of production (transfer, decentralization, concentration), an increase in the share of project works of this category is clearly visible.

Option "A2": reconstruction and renewal of existing revitalization areas (reengineering). For the first time, the concept of reengineering was introduced into scientific circulation by American specialists M. Hammer, a professor at the Harvard University Business School, a professor at the Harvard University Business School, who is the developer of the concept of reengineering, and J. Champi (a leading expert on the implementation of reengineering ideas, the head of a consulting firm CSC Index) [15].

. The dominant part of design work falls into this category, which, as a rule, is of a long-term nature (for example, "continuous design"). Among the distinctive features of this option, we can highlight:

- the purpose of such design is to rationalize production complexes and/or update their structure (modernization);

- the possibility of making relatively accurate forecasts regarding the production program, as well as the terms of its implementation;
- continuous adjustment of production complexes, necessarily taking into account changes in the production program (under the influence of the market), or the impact of innovations in production processes and equipment due to cost reduction.

Option "A3": expansion of existing revitalization areas. Specialists usually encounter this category of design when it comes primarily to increasing production capacity. In particular, in connection with the growth of orders along with the increase in product sales. Such design is usually aimed at modernization or rationalization of adjacent, existing production facilities or their expansion. Its features are:

- expansion most often entails the intensification of the use of areas and premises within a specific territory;
- as a rule, it is possible to make accurate forecast estimates regarding the implementation of the production program and the terms of its implementation;
- expansion can be connected both with the selection of a new construction site to increase production capacity, and with the development of a master development plan;
- in exceptional cases, expansion may require changes in the location of the enterprise, that is, its relocation or the transfer of a certain part of it to a new territory.

Option "A4": reducing the size of revitalization areas.

This category of design is used when there is a need to reduce sales, reduce the depth of processing or relocate production sites, as well as in the case of focusing on the production of the main product. In essence, such design consists in establishing relationships in relation to the new conditions of production capacities between the structures of the main production and service units (for example, repair services,

supply and disposal) or auxiliary production (for example, production preparation, manufacturing of devices and mechanisms). The characteristic features of this design are:

- renewal structures production programs on conditions in clusion new or additional products;
- a change in parameters (namely, a reduction in production capacity);
  - development of new parameters of production equipment (or reduction of system dimensions);
- restructuring (or reconstruction of production facilities);
  - renewal structures configurations and organizations production complexes

Option "A5": revitalization (revitalization, renewal) of revitalization territories. This type of design is used if it is necessary to establish a new production in non-working territories.

Revitalization means the reconstruction of construction buildings and structures with a change in the function of the object itself, that is, the purpose that caused the reason for construction. At the same time, the economic side of the issue is a factor influencing the development of the revitalization process.

The characteristics of such design are: use of the territory for new purposes (repurposing); consolidated / detailed forecasts regarding the production program; demolition / revitalization of production areas and premises; restructuring / reconfiguration of production complexes, structure of buildings; making optimal decisions due to a high degree of freedom in design.

One of the most recognized specialists in the step-by-step transformation of the industrial area on the way to revitalization was Jack Welch, who applied the model of step-by-step revitalization to the territory of the General Electrics plant. His approach was based on the fact that the success of any organizational transformation of the enterprise depends on two things: on the capacity of each production unit and on the efficiency of the integration of these units on the path of revitalization of the industrial area. Therefore, in the course of research, we proved that the process of revitalization of building revitalization areas should include the following stages: full diagnosis of revitalization building areas, analysis and development of the revitalization concept, development of the revitalization program, and implementation of the revitalization program.

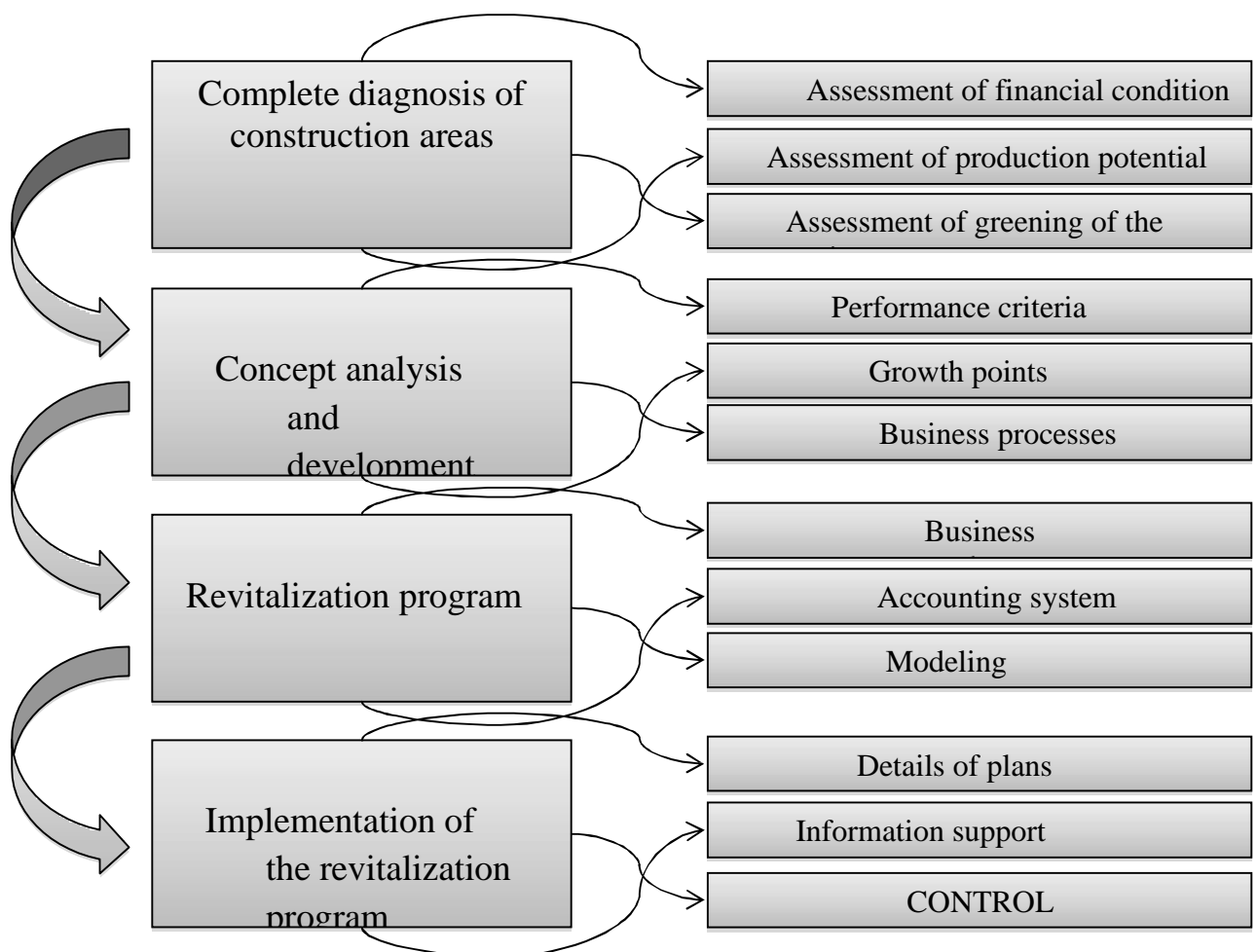
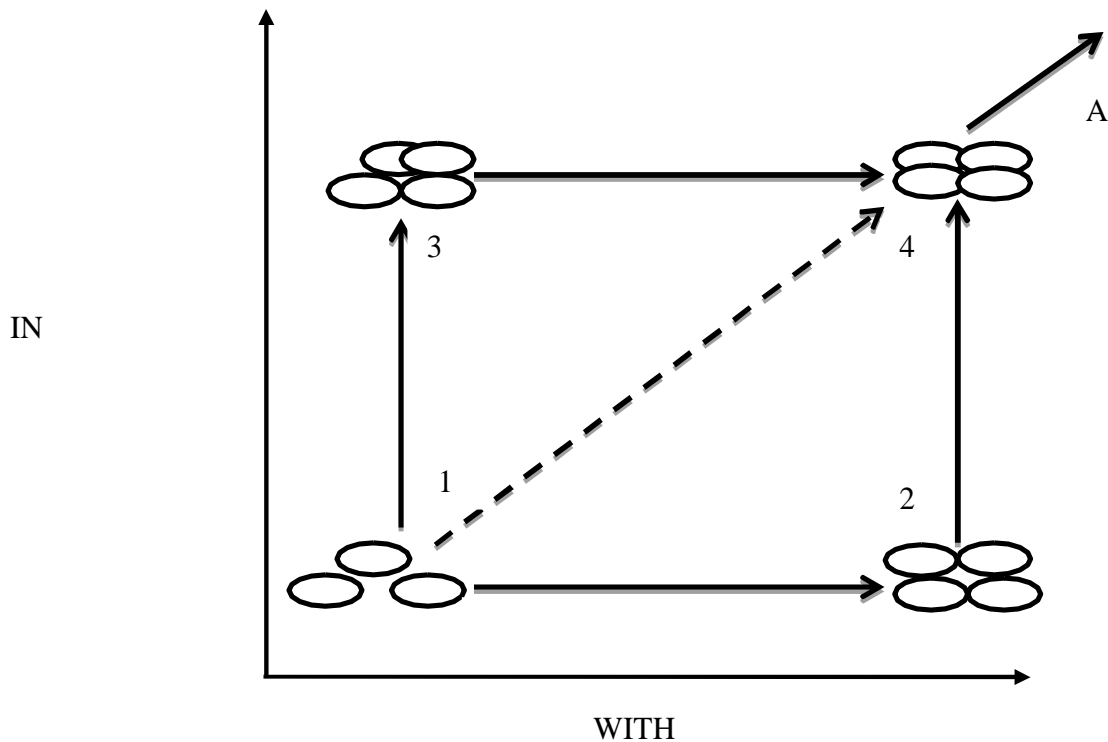


Fig. 1.5. Basic model of revitalization of revitalization building areas (author's development)

This assumption determines two axes of the corporate recovery model (Fig. 1.6). The structure of the model is built under the influence of three factors:

1. The type of proposed changes within the framework of the revitalization process of the territory.
2. Types of means of future restructuring of production enterprises located in the industrial area.
3. Real possibilities of the territory for recovery (revitalization). Different enterprises can choose different paths and sequences of revitalization stages, but the emphasis of the sequence presented in the model is not on choosing a specific path, but on achieving the planned goal of revitalization of the territory.



- A – the path of revitalization through achieving simultaneous balance in quadrants 2, 3;  
 B - the path of revitalization, in which production units should "push" neighboring ones for integration in the process of revitalization by achieving better interaction between enterprises located close to the territory;  
 C - the path of revitalization, which involves a step-by-step sequence of reconstruction of adjacent enterprises and their restoration

Fig. 1.6. Stages of revitalization of revitalization construction areas  
 (the author has identified possible ways of organizing the stages of revitalization)

Faced with the problem of restoration, most enterprises at the preparatory stage choose the most favorable option for revitalization, based on the system of economic relations available in the given industrial area:

- 1) a group of production units that are completely unrelated to each other (quadrant 1);
- 2) if there are several most powerful but independent enterprises in the industrial area (closely adjacent circles in quadrant 2 that do not have a common intersection segment);
- 3) if there are enterprises on the territory, the functional affiliation of which also does not depend on operations, despite their more complete integration, which also act individually from each other (quadrant 3).

The general goal of the presented model of phased revitalization of the territory is the transition of construction enterprises located in the territory from the quadrants listed above to quadrant 4. When this transition occurs, the strategic goal is also to find means to prevent the return of production units to the old mode of operation.

## **2.1 Assessment of the consequences of man-made pollution by mining enterprises of the surrounding territories for their ecologically sustainable socio-economic development**

An important component of ensuring the management of enterprises on the basis of an innovative development model is the reduction of the eco-destructive impact of the production activities of business entities on the surrounding natural environment. For Ukraine, this problem is quite urgent due to the complex ecological situation: in the industrially saturated regions of our country, the man-made load on nature is 4-5 times higher than this indicator in the developed countries of the world [14, p. 7-8]. The improvement of the ecological situation will be facilitated by the greening of construction enterprises - the main polluters of the surrounding natural environment - through the introduction and development of integrated environmental management systems.

Many Ukrainian and foreign scientists deal with the problems of greening the

activities of construction enterprises: I.A. Aleksandrov, V.G. Hlushkova, S.M. Ilyashenko, V.V. Bozhkova, O.V. Prokopenko, O.M. Tsarenko, A.A. Sadekov, N.N. Andreeva, O.Yu. Popova, S.O. Bila and many others. At the same time, in view of the extremely important role of ecologically based activities of the enterprise, it is necessary to develop tools for evaluating the effectiveness of environmental management at the enterprise. At the same time, the stage of determining the goals of ecological and economic orientation and their quantitative measurement, which is preceded by the collection and analysis of information, remains very important.

In the work of construction companies, several hundreds of parameters are measured and controlled daily, especially those related to the normal functioning of the technological process. Guided by the Pareto principle, according to which the concentration of 20% of significant information ensures 80% of the success of management activities [28], it is possible to assert the need to create an information system of indicators that would provide an opportunity to present the most important

information about the state of the environmental and economic management system at the enterprise.

Such information in the form of a system of ecological and economic indicators should be concise (compact), on the one hand, but on the other - reflect all the main environmental aspects of the enterprise's activity. The main requirement for this system is to ensure the possibility of quantitative measurement of the implementation of strategic goals of environmental and economic orientation. For this purpose, it is proposed to develop measurable environmental and economic indicators that will form the basis for tracking the achievement of goals in the environmental management system at the industrial enterprise.

The process of forming an information system of ecological and economic indicators begins with the procedure of describing the measured values: the definition of the indicator is given, the calculation formula is proposed, the parameters necessary for the calculation are determined. If individual ecological and economic values are already measured in the practice of the enterprise, it is necessary to find out the possibility of their use in the construction of the

information system. At the same time, it is necessary to clarify the sources of information collection, approve the frequency of data processing, and determine the availability of planned indicators. The next step should be a decision to include the indicator in the information system. In this regard, it is necessary to pay attention to the possible costs for measuring the value, positive perception, informativeness, the possibility of formalization and inclusion in environmental reporting, setting the frequency of measurement. Ideally, each of the indicators included in the system should correspond to the achievement of one strategic goal in the field of environmental management. To simplify the procedure for analyzing the calculated indicators, the procedure for setting target values (criteria), as a rule, in dynamics, is no less important. The information system of environmental and economic indicators should include indicators that relate to all strategically important aspects of the enterprise's environmental activities; the cause-and-effect relationship of all ecological and economic should be traced values and goals of the enterprise in the field of environmental management, as well as ecological and economic indicators [13, p. 672-679].

The development of an information system of ecological and economic indicators for measuring the environmental performance of the enterprise is an iterative process that requires constant improvement in parallel with the development of the environmental management system at the enterprise.

Taking into account the above, recommendations are proposed for the formation of an information system of ecological and economic indicators for assessing the environmental consequences of the production activity of a mining enterprise, taking into account the specifics of its technological processes and their impact on the environment.

Technological processes in the coal industry are characterized by fairly high indicators of consumption of material and energy resources. Against the general background of imperfection of technologies, wear and tear of production assets and insufficient investments in their renewal, problems of irrational use of material and energy resources, generation of waste and the possibility of their secondary processing are acutely emerging in the coal industry of Ukraine. These issues have become especially important recently due to the reduction of raw material reserves

and the shortage of energy sources.

The specified environmental aspects in the form of unproductive losses of raw materials and energy resources must be paid attention in order to find ways to reduce their negative impact on the final economic results of the coal mining enterprise and reduce the environmental damage associated with these aspects.

It is proposed to combine the indicators of the evaluation of production processes according to classification characteristics into several groups:

- by properties — economic, ecological and safety indicators;
  - according to the method of expression - those expressed in dimensional units, dimensionless, valuable;
- by the number of characteristics, which are defined as single, complex;
- by application — basic, relative;
- according to the stage of definition — design, production, operational.

Economic indicators characterize the total value of natural resources used in production, the value of natural resources per unit of output, the amount of fees for environmental pollution with emissions, effluents, waste, etc., expenses for environmental protection measures and compensation for damages.

Ecological indicators characterize the level of harmful effects on the environment as a result of the extraction of natural resources from it and the pollution of the environment by emissions, runoff, and waste. Environmental indicators also include the amount and concentration of harmful substances in emissions, effluents, and waste, as well as the probability of emergency emissions, effluents, and waste during production operation. Quantitative, value and relative indicators of the use of natural resources and environmental pollution can be determined using the equations of material and energy balances. The relative production indicators of the assessment of environmental pollution are determined by the formulas of the ratio of the coefficients of the useful use of the relevant natural resources, pollution of the atmosphere, water basins, soils to the amount of natural resources used in the production of a certain type of product, the mass of natural resources that have been converted into emissions, effluents and waste, respectively. Other indicators of ecological and economic evaluation of processes and productions are the probability of pollution of natural complexes, the danger of

disturbing the ecological balance in the environment, the possibility of degradation of natural complexes, the probability of disease of people and animals from pollution of natural complexes.

At the level of individual construction territories, we suggest considering the indicator of the completeness of the use of  $K_{pvv}$  of water resources, which should be determined as follows:

$$To_{pvv} = \frac{\text{Загальна кількість стічних вод}}{\text{Обсяг реалізованої продукції}} \quad (2.1)$$

The environmental friendliness of the production technology (waste-free, low-waste, open) is evaluated according to the mass of natural resources that are transformed into finished products. Emissions, effluents, and waste must be cleaned with the simultaneous extraction of useful substances from them, which can be used for the production of new products. The degree of purification of emissions, effluents and waste from harmful substances characterizes the cleanliness and environmental friendliness of the technological process and the enterprise.

In order to assess the impact of ecological cycles on the ecological and economic component of the production of the coal industry, it is proposed to use the  $K_{nc}$  indicator of the non-closure of cycles of water resources use, which should reflect the dependence between the ecological consequences of production in places of technological gaps in resource cycles and the economic results of production activities in a certain industrial area:

$$K_{nts} = \frac{\text{Скидання забруднених зворотних вод у поверхневі водні об'єкти}}{\text{Обсяг реалізованої продукції}} \quad (2.2)$$

The degree of purity of production processes can be estimated using dimensionless coefficients. According to the values of purity coefficients, technological processes are classified as follows:  $K_{ch} = 0$  — isolated relative to the atmosphere, water basins, soils;  $K_{ch} \leq 0.9$  — clean;  $K_{ch} = 0.9-1$  — semi-pure;  $K_{ch} > 1$  - dirty.

In order to take into account the man-made impact of the activities of mining enterprises on atmospheric air, we proposed to determine the indicator of the

external impact of production on the atmosphere, which demonstrates the dependence of production volumes and emissions of pollutants into the air in a certain industrial area:

$$Kch = \frac{\text{Викиди забруднюючих речовин в атмосферне повітря від стаціонарних джерел}}{\text{Обсяг реалізованої продукції}} \quad (2.3)$$

And also the indicator of waste of production processes, which should reflect the dependence of the amount of waste that remains on a certain territory after the sale of production products:

$$Kch = \frac{\text{Утворення відходів I–IV класів}}{\text{Обсяг реалізованої продукції}} \quad (2.4)$$

In order to manage the most significant environmental aspects of a coal mining enterprise, the information system of ecological and economic indicators includes indicators that characterize the effectiveness of the use of financial resources within the framework of environmental protection activities and rationalization of environmental management. Environmental statistical reporting data serve as information support for the calculation of these indicators. It is advisable to evaluate the specified ecological and economic aspects using the following economic and ecological indicators of the development of construction areas

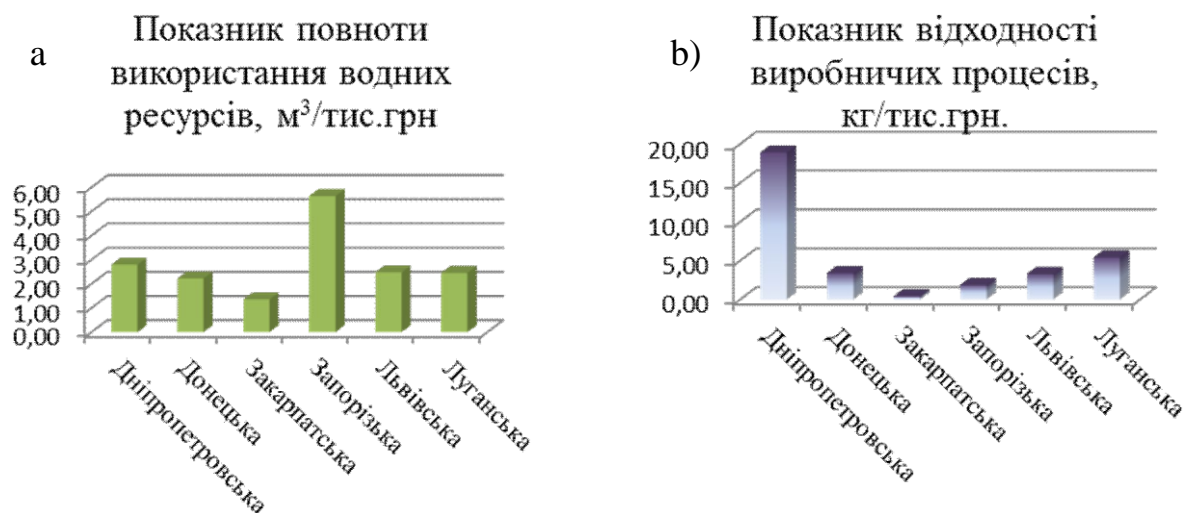
Table 2.14 groups the calculations based on the indicated indicators in the Dnipropetrovsk, Donetsk, Zakarpattia, Zaporizhzhya, Lviv, and Luhansk regions.

Table 2.14

**Relative ecological and economic indicators of environmental pollution assessment,**

Territory	The indicator of the completeness of the use of water resources, m <sup>3</sup> /thousand hryvnias	Indicator of non-closure of water resource use cycles, m <sup>3</sup> /thousand hryvnias	Indicator of the external impact of production on the atmosphere, t/thousand hryvnias	Waste rate of production processes, kg/thousand hryvnias.
Ukraine as a whole	2.02	0.40	1.09	0.19
Dnipropetrovsk	2.80	1.02	2.06	18.91
Zakarpattia	1.37	0.11	0.65	0.41
Zaporizhzhia	5.65	0.56	1.84	1.89
Lviv	2.48	0.14	6.41	3.28
Luhansk	2.46	0.68	3.70	5.43

In fig. 2.6 (a, b) presents a visual comparative analysis of the identified ecological and economic indicators based on the data of statistical accounting in the selected construction territories.



Rice. 2.6. Comparative analysis of relative ecological and economic indicators

Natural damage caused by the environment in the form of pollution of the atmosphere, water bodies, and land resources is transformed into enterprise costs in the form of investments in environmental protection activities and paid fees for emissions, discharges, waste disposal, as well as fines in case of exceeding established environmental standards and violating requirements environmental legislation.

Thus, in order to determine the degree of social responsibility of nature users, we consider it appropriate to use the indicator of financing industrial revitalization by enterprises in the volume of sold products ( $K_f$ ) as a starting factor reflecting the participation of enterprises in the prevention of negative impacts on the surrounding natural environment and its protection, the rationalization of nature use through investment mechanisms in dependence from production volumes:

$$C_f = \frac{\text{Капітальні інвестиції підприємств на охорону та раціональне використання природних ресурсів, +} \\ \text{Інвестиції підприємств у капремонт основних фондів природоохоронного призначення +} \\ \text{Операційні витрати підприємств на охорону та раціональне використання природних ресурсів}}{\text{Обсяг реалізованої продукції}} \quad (2.5)$$

In our opinion, the indicator of the share of environmental sanctions in the volume of sold products ( $K_{es}$ ) will reflect the level of violations of the requirements of environmental legislation in a certain industrial area in relation to the volume of production:

$$K_{es} = \frac{\text{Екологічні платежі, фактично сплачені підприємствами за забруднення НПС}}{\text{Обсяг реалізованої продукції}} \quad (2.6)$$

Also, among the financial ecological and economic indicators proposed by us, it is reasonable to use the indicator of the ecological cost of production in the volume of products sold, which will determine the share of enterprises' expenses for environmental needs:

$$S_q = \frac{\text{Капітальні інвестиції підприємств на охорону та раціональне використання природних ресурсів, +} \\ \text{Інвестиції підприємств у капітальні фонди природоохоронного призначення +} \\ \text{Операційні витрати підприємств на охорону та раціональне використання природних ресурсів +} \\ \text{Екологічні збитки, фактично знячені підприємствами за забруднення НПС}}{\text{Обсяг реалізованої продукції}}$$

(2.7)

The results of calculations based on the specified indicators are summarized in Table 2.15.

Table 2.15

**Indicators of the effectiveness of the use of financial instruments in the framework of nature protection activities and rationalization of nature use according to the data of 2013**

<b>Territory</b>	<b>Indicator of financing of industrial revitalization by enterprises in the volume of sold products, %</b>	<b>Indicator of the share of environmental sanctions in the volume of sold products, %</b>	<b>Indicator of ecological cost of production in the volume of sold products, %</b>
Ukraine as a whole	0.48	0.005	0.5
Dnipropetrovsk	1.07	0.038	1.1
Donetsk	0.48	0.067	0.6
Zakarpattia	0.25	0.011	0.3
Zaporizhzhia	1.16	0.209	1.4
Lviv	1.15	0.330	1.5
Luhansk	1.04	0.127	1,2

With the help of the proposed information system of environmental and economic indicators, depending on the goals of the analysis, it is possible to compare environmental indicators for different time periods (retrospective analysis), compare the environmental performance of individual production branches, etc. The information accumulated in this way about the environmental performance of production activities will provide a basis for making appropriate management decisions regarding the regulation of negative environmental consequences.

### SECTION 3

## THEORETICAL AND METHODOLOGICAL PRINCIPLES FOR ENVIRONMENTAL ENVIRONMENT AND REVITALIZATION OF BUILDING REVITALIZATION AREAS

### 1.2 Institutional support for the greening of economic development and the activation of environmental protection activities in construction revitalization territories

Many developed countries have accumulated considerable experience in the use of various economic and organizational methods of environmental quality management [3; 15]. Experts count 153 different economic methods, including 81 different fines, 41 different subsidies and 31

– other measures [2; 12; 13], which are active tools of economic and ecological balance in society.

The main ones can be combined into the following groups (Fig. 3.1.) [67]:

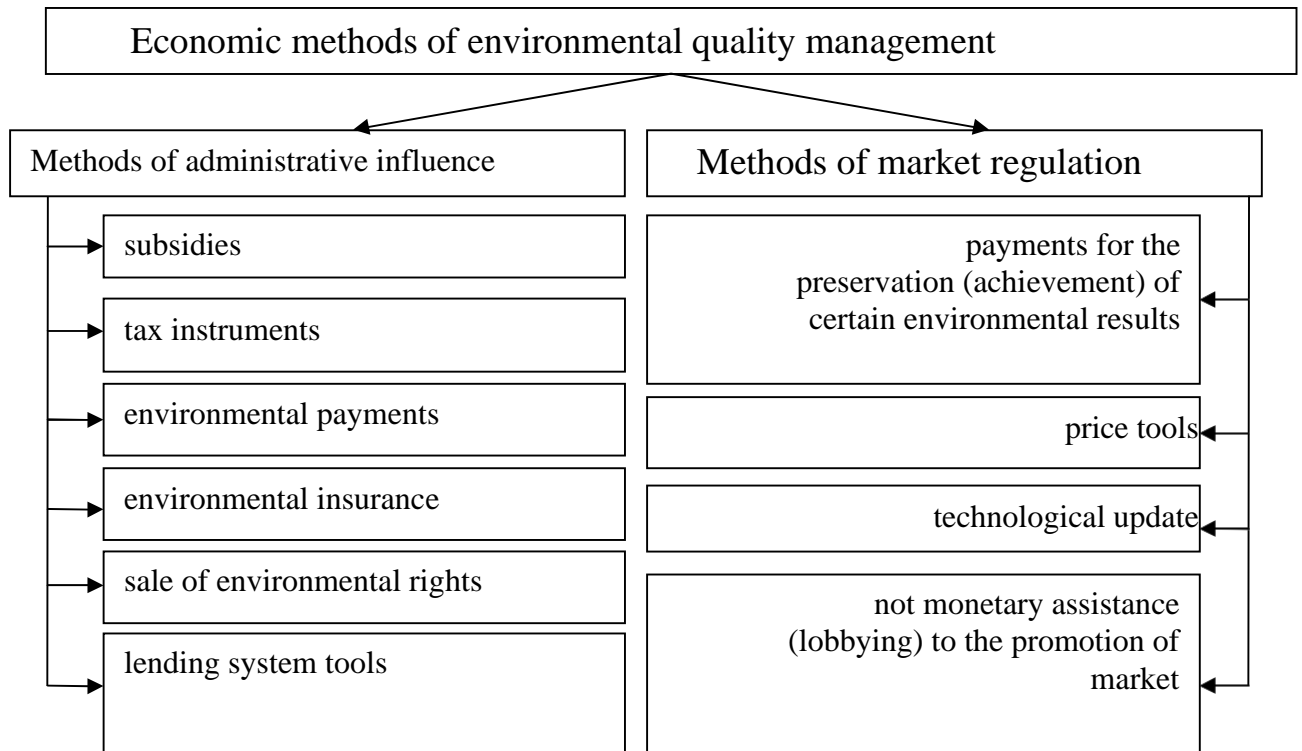
*administrative influence:*

– subsidies (direct and indirect): for state environmental projects; on responsibility for part of the risk with enterprises on pilot ecological projects; for nature protection work with the population; subsidies for ecological improvement of products, compensation for accelerated depreciation of ecological technologies;

– tax instruments (preferential or discriminatory): on products; on types of activities; on pollution sources; on the content of harmful components; for the use of resources; for investments;

– environmental payments: for emissions (discharges) of harmful substances into the atmosphere, water sources, soil; on storage (burial) of harmful substances in natural landscapes; on physical types of environmental pollution (noise, electromagnetic pollution, etc.); biological types of pollution;

– tools of the lending system (preferential or discriminatory): by areas of activity; at credit rates; by volumes and terms;



Rice. 3.1. Economic methods of environmental quality management

*market regulation:*

- payments for preserving (achieving) certain environmental results: to recipients (addressees of investments and loans) for improving the quality of the environment;
- price tools: eco-price programming; eco-price regulation; eco-price stimulation;
- technological update and payments; recipients (addressees of investments and loans): for achievements in the field of rational use of natural resources; for preserving (achieving) the optimal state of the natural environment (for example, swamps, rivers, forests, other natural objects);
- non-monetary assistance (lobbying) promotion to the market: ecological trade operations; expansion of ecologically oriented sectors of the economy;

- sale of environmental rights: for emissions (discharges); for further sale of emissions quotas (discounts); on environmentally harmful technological activity; market certificates: ecological quotas; permits for the manufacture (sale) of certain volumes of products (providing services, conducting work, etc.);
- environmental insurance: types of activities; entrepreneurial risk; ecological and economic consequences.

The main postulate of effective regulation in the field of environmental protection is that the rates of payment for pollution should correspond to the amount of ecological damage from environmental pollution of each individual type.

However, the Western experience also shows that the implementation of the "polluter pays" principle as an economic tool does not exhaust effective means of greening. That is, as an economic tool, it has a limited field of effectiveness. The same applies to the administrative regulation of environmental pollution in the form of setting mandatory norms or emission quotas. The impossibility of accurately establishing a connection between emissions and the resulting damages has led in industrialized countries to an increasing spread of taxes on factors that lead to destabilization and pollution of the environment [11, p. 17-21; 174].

The normalization of these factors in the world is being developed in two directions: the first is the normalization of the possibility of human contact with the elements

natural environment (vegetation cover, water bodies, birds and animals) within the limits of human habitation, primarily in urbanized areas. This direction is actively developing in Japan;

the second is the regulation of the possibility of human contact with natural landscapes (forests, fields, mountains) outside the residential area, but within the limits of maximum achievement, for example, with the help of vehicles, etc. This approach is very developed in Germany [42, p. 21-23; 270].

Currently, innovative processes of environmental protection and rational use of natural resources are

a complex peculiar symbiosis of administrative and market ecological and economic mechanisms and regulators, the search for opportunities for improvement and optimization of which is now actively continuing. Therefore, it is possible to talk about the main principles and approaches to the creation of a new economic mechanism of society's relationship with nature. A functionally perfected and well-adjusted universal model of such a mechanism, which would fully take into account the specifics of various countries and regions, does not exist in the world. State and market approaches have their own specifics, their strengths and weaknesses. World experience has shown the ineffectiveness of using any of these approaches in their "pure" form. That is why Ukraine needs a reasonable, balanced combination of them, the application of analysis criteria commensurate with ecological and economic realities and ecologically responsible activities.

Naturally, in the conditions of competition, restructuring, possible bankruptcies, and a tough financial situation for enterprises, nature becomes one of the first victims of the struggle for survival. Enterprises try to save money on environmental protection measures and the purchase of environmental equipment, since environmental costs do not increase the production of basic production products. Emissions and discharges of polluting substances, waste burial sites are hidden, subjects of economic activity seek to avoid paying fines for this.

For the sake of the future, the state can facilitate the ecological and economic transition to a market economy with the help of ecologically balanced socio-economic reforms and the creation of a suitable macroeconomic environment for ecological entrepreneurship. The legal basis of ecological entrepreneurship in modern Ukraine are the laws "On enterprise and entrepreneurial activity", "On environmental protection" and "On waste". These documents define the responsibility and terms of compensation for damage caused by environmental pollution, and formulate the principles of protection against environmental risks.

In the interests of strengthening the social motivation of ecological entrepreneurship, providing these processes with economic purposefulness and social dynamism, the following measures should become a priority [18, p. 125-134].

First, the preparation and adoption of a package of legislative projects aimed at creating economic foundations and further stimulating ecological entrepreneurship in Ukraine: on preferential taxation of enterprises with an ecological profile; on the introduction of incentive prices and allowances for environmentally friendly products and services; on the procedure for preferential lending to enterprises of various forms of ownership that operate in the field of improving the state of the natural environment; on taxation of environmentally hazardous productions; on the procedure for using environmental funds to subsidize the execution of works, production of goods and provision of environmental services.

Secondly, the creation of organizational structures in the form of regional centers and the preparation of regulatory and methodological documentation that regulates their activities for the regulation and economic stimulation of the production of goods, the performance of works and the provision of environmental services.

Thirdly, the organizational formation of industry centers for environmental auditing, environmental standardization, environmental licensing of various types of economic activity, environmental certification of goods and products, environmental and metrological control, accreditation of environmental entrepreneurship entities that produce products, perform work, and provide environmental services orientation

Fourth, legislative and regulatory provision of industry centers for environmental audit, environmental standardization, environmental licensing of various types of economic activity, environmental certification of goods and products, environmental and metrological control, accreditation of environmental business entities that produce products, perform work and provide ecological services.

Fifth, state support for the organization of industrial production of equipment for small enterprises of an ecological profile.

Sixth, the development of marketing in the sphere of ecological entrepreneurship and business.

In the context of the creation of socio-economic mechanisms for the implementation of the national environmental policy in the conditions of the formation of market relations, three mechanisms for the implementation of ecological and economic goals are possible - direct regulation, economic stimulation and mixed mechanisms, which take into account the above-mentioned. The policy and practice of their combination is an important condition on the way to overcome the factors of inefficiency and relapses of the former administrative-command state environmental policy, the search for modern effective market and state regulators, the use of optimal ratio models from the experience of world economic practice.

The ineffectiveness of the "pure" use of any of the indicated approaches means that now for Ukraine, their balanced combination based on the application of analysis criteria commensurate with the ecological and economic realities of the country and corresponding activities, mutual determination of the tasks of greening the economy is extremely necessary for Ukraine and creating a market environment. It is also worth emphasizing that already at the initial stages of any reforms, it is necessary to create models and real systems of environmental protection against anthropotechnogenic risk, foreseeing strict ecological limits of possible development options.

In the context of the formation of the market environment in Ukraine, the development of ecological entrepreneurship is objectively extremely important. In this regard, it is important to take into account two groups of economic measures, the level, scale and limits of their influence: macroeconomic measures and measures that have an ecological orientation at the microeconomic level as priority components of the national environmental policy. Formation of economic mechanisms of nature use and implementation of nature protection

tasks makes the development and implementation of targeted environmental programs in priority areas in Ukraine, its participation in the activities of the Global Environmental Fund under the conditions of globalization of world integration processes significant.

The study of the problems proves that in the transition period it is very important for the state to solve the tasks and ensure the stimulating value of the integration of the economic tools of the latest national environmental policy with the processes of tax reform. In this regard, the policy of a simplified procedure for charging fees for the special use of natural resources, disregarding the ecological and economic assessment of many important components of the natural environment, is ineffective.

The development of the paid nature of nature use contributes to a more adequate consideration of environmental factors in the context of economic development, rationalization of the use of natural resources. Environmental issues should be organically integrated into the overall process of reforming the entire tax system in Ukraine. After all, in general, in countries with a transitional economy and a distorted tax system [18], which restrains and deforms the development of the national economy with its destructive influence, the introduction of new or strengthening of traditional environmental taxes, as a rule, gives a double benefit. First, reforming the tax system leads to the improvement of the natural environment. Secondly, positive socio-economic consequences appear as a result of weakening the negative destructive influence of extremely high and distorted taxes on the economy and the social sphere. This concept of reforming the tax system was called "double dividends" and is a promising political and economic trend for Ukraine [9; 19; 37]. It is in its context that it is necessary to consider the task of improving the national tax system, in particular, the problems of taxes on environmentally harmful products for consumption, environmental sanctions, fines, technological premiums for the introduction of environmentally friendly technologies,

tax benefits, environmental pricing, fees for returned emissions, development of off-budget environmental funds, take into account factors for increasing the efficiency of their functioning, etc.

In the context of the manifestation of the potential of market mechanisms for the development of modern nature management, a prominent place should be occupied by both innovative economic instruments, including the sale of quotas and pollution rights, environmental insurance, international and national systems of ecological labeling and ecological certification, etc., as well as traditionally proven ones, for example, the "deposit-return" system as a mechanism for reducing the flow of waste into the environment due to their mass disposal, etc.

Recently, it is expedient to analyze the methods of management of environmental protection activities using a systemic approach, which makes it possible to determine the conditions that could direct and maintain the development of production, economic stabilization in the course of taking into account environmental requirements, through the study of the interaction of production, population and the environment. At the same time, it is necessary to take into account the current state of production, the expected dynamics of pollution not only in the sphere of production, but also in the sphere of consumption with the expected economic growth. With a systemic approach, opportunities for comprehensive accounting of social, environmental and economic factors appear. Analysis of the impact of the main management parameters on individual systems allows the most qualitative approach to the study of relationships in the "enterprise-population-environment" system. When studying the specified system, it is important to understand that it is not only a union of parts, but a system coverage, system ideas, system organization. The interaction between the elements of this system has a different nature and is expressed by different functions.

On the basis of the basic model of management of environmental protection activities, some contradictions arising in the system "enterprise - population - environment" are traced. The needs of the population are growing,

and not always in proportion to the growth of its number, but at a higher rate due to the expansion of the assortment, quantitative and qualitative growth of consumption. These needs can be met through the development of production. The development of production is associated with an impact on the environment, which may exceed the standards established for a specific enterprise. There is a need to carry out environmental protection measures, which are associated with certain costs and can affect the increase in the cost of production, the volume of sales and, as a result, lead to a decrease in the company's profit.

All this places an objective requirement before the state, society and individual workers – to take into account the impact of production and consumption on the environment. It is impossible to exceed the thresholds of sustainability of ecological systems, so as not to cause irreversible processes in nature that can lead to its critical degradation and the death of all living things on Earth. Smart, rational use of nature, which allows meeting the vital needs of people in combination with the protection and reproduction of the natural environment.

In general, we can distinguish three different types of economic mechanisms of nature use and protection of the natural environment [16, p. 19-24]:

*soft or catchy*- liberal in environmental terms, sets the most general restrictive environmental limits for the economic development of industries and sectors, practically not inhibiting it. This type of economic mechanism is aimed mainly at the elimination of already existing environmental deformations and certain negative environmental consequences, and not at the socio-economic causes of their occurrence, having a weak impact on the pace and scale of social development. The specified nature management mechanism is characteristic of the man-made type of economic development. It is this type of economic mechanism of nature management that currently operates in Ukraine;

*stimulating or developing-* contributes to the economic rise of ecologically balanced and specialized environmental protection industries and activities. Market levers form the basis of the functioning of such a nature management mechanism. It stimulates the growth of social production on the basis of new technologies, makes it possible to significantly improve the use and protection of natural resources. For example, significant prospects for the development of a stimulating mechanism of nature use in Ukraine are currently associated with the processes of environmentalization of agriculture. This type of mechanism is characteristic of an unstable and weak socio-economic community;

*hard or oppressive-* uses market and administrative instruments and, through strict tax, credit, penalty and other types of policies, pressures and restrains the development of certain industries and complexes in order to limit their natural basis, promotes economy in the use of natural resources.

This type of mechanism is characteristic of a stable and strong socio-economic community. In a pure form, in reality, the specified types of economic mechanisms of nature use and protection of the natural environment do not exist. But they clearly manifest themselves in the corresponding trends, are closely intertwined, being correlated with specific production technologies and types of socio-economic activity. From the point of view of the urgent needs of greening economic development and getting out of the modern ecological and economic crisis in Ukraine, an organic combination of stimulating and rigid types of the mechanism of nature use and protection of the natural environment is already necessary as an organic component of the general economic mechanism, which regulates the functioning of individual industries and is oriented towards the final social the results

Among the factors of economic growth, as evidenced by the studies of economists, the leading ones are investment and innovation activity, the ability to create and widely use competitive

technologies in the spheres of national goods production, services, infrastructure and the market. This also applies to eco-technologies, for the development of which an average of 5-10% of the total financing of innovative activities of highly developed countries is allocated annually.

A restraining factor in the effective use of Ukraine's natural resources is the simplified procedure for charging fees for their special use, which does not take into account the ecological and economic assessment of individual components. If, for example, in Canada, more than 200 specialists are engaged in the economic assessment of forests in one province alone, then in Ukraine, practically no one is engaged in this problem according to modern methods. Of all components of forest resources, payment is made only for wood and resin, and even then according to forest taxes, the concept of the construction of which was sharply criticized even during the time of operation administrative and command systems management. A similar situation with minerals and water resources [30; 51]. In order to pay for the special use of natural resources influential economic stimulants ecologically politicians it is necessary: to ensure proper scientific justification of the fee for special use natural resources; to expand the network preparation highly qualified specialists in the economic evaluation of natural resources; to create organizational structures that would ensure effective collection of fees for the special use of natural resources [19; 48, p. 69-76]. For the first time introduction pay by pollution surrounding natural of the environment was reviewed and approved by the Presidium of the Verkhovna Rada of Ukraine on March 26, 1991 and by the resolution of the Verkhovna Rada of Ukraine. The next step in this direction was the Law of the Ukrainian SSR "On Environmental Protection", adopted on June 25, 1991 at the session of the Verkhovna Rada [85], which became an important stage in the creation of a balanced system of environmental law in Ukraine, the basic document for the formation of the package legislative and regulatory acts.

The principle point in this Law was the orientation towards the creation of a new economic mechanism, designed in the conditions of the transition to market relations to optimize ecologically sustainable socio-economic development by means of economic stimulation of environmental protection activities in the form of certain tax benefits, provision of interest-bearing targeted loans, etc. The legislation enshrines paid nature use for the use of natural resources in the economic sphere and free use for meeting cultural and spiritual-aesthetic needs. Environmental insurance and the payment of compensations, the provision of benefits to those living in zones of ecological tension are foreseen, although the mechanism of compensations is not disclosed and no clear definition of zones of ecological disaster, etc., is provided. Provisions on environmental safety, the creation of a mechanism for bringing violators of environmental protection legislation to justice, compensation for moral damages, etc., remain imperfect. The law not only proclaimed, but actually provided for a system of guarantees of human environmental safety, regulated the management system in the field of nature management, the subjects of which are both state structures and public associations, laid the foundations for the implementation of a unified scientific and technical policy in the field of coordination of environmental tasks with the interests of economic development.

In some cases, taxes may not be collected at all. For example, environmental funds, enterprises that have income from the disposal of various secondary resources and waste, as well as grants for environmental purposes, etc., should be exempt from taxation.

We will single out the following important elements of the formation of the economic mechanism of nature use in the conditions of the transition to the market: payment for nature use; fee for environmental pollution; a system of economic stimulation of environmental protection activities: taxes, subsidies, preferential lending for environmental protection activities, accelerated depreciation of environmental protection funds, etc.;

formation of the market of natural resources; improvement of pricing taking into account the environmental factor, especially for products of nature exploitation industries; environmental funds; environmental programs; sale of pollution rights; "deposit - return" system; environmental insurance.

In Ukrainian society, economic sanctions for environmental damage are often equated with environmental taxes, ignoring the fact that these mechanisms perform different functions in the context of environmental policy. Therefore, it is worth emphasizing that the environmental tax performs stimulating and planning and accounting functions, economic sanctions - stimulating, deterring and the function of economic punishment.

In the economically developed countries of the world, the stimulating effect of environmental taxes on the development of the economy is growing. They are designed to solve a two-fold task: firstly, to make the cost of products more adequate in relation to costs and losses, including the cost of natural resources and damage to the environment, and secondly, to contribute to the compensation of environmental damage by the polluter himself, and not by the entire society. After all, the "polluter pays" principle is one of the main principles of the market economy. [22, p. 160-166].

In Ukraine, there is currently a tendency to abandon systems of administrative and supervisory control in favor of measures of economic influence and stimulation of ecological entrepreneurship, regulated by means of special taxes. In the context of measures to form the economic mechanism of environmental policy in Ukraine, it is necessary to make certain changes in the existing methodological base and introduce new, more effective regulators of nature use.

At the current stage in Ukraine, the following economic tools for the integration of economic and environmental solutions are operating: taxes on land, mineral resources and water use; fee for geological exploration; fee for discharges of pollutants into water, air emissions and soil pollution;

incentives in the form of reduced fees and taxes (reduced basic tariffs), the effect of which is limited in time and which are subsidies for the production of energy, mineral resources and water use; fines for exploration (search) and mining of mineral resources and pollution of the environment without permission; for exceeding limits on the use of resources and discharges of pollutants; for violating environmental legislation and causing damage to the environment; user fees for tap water, sewerage and wastewater treatment, for collection and removal of municipal waste; grants for environmental training, education, feasibility assessment of environmental measures, research or project initiation; excise and customs fees for mineral resources, fuel and cars [1, 22].

In the interests of improving already developed ecological and economic instruments, the authorities are considering the possibility of applying the following measures concerning economic instruments in the near future:

- cancellation of subsidies for the use of resources, in particular energy, mineral resources and water;
- carrying out an environmental audit,
  - aimed at identifying potentially environmentally hazardous activities.

It is expected that an environmental audit will be mandatory during the privatization of construction enterprises; environmental insurance for the elimination of the consequences of environmental accidents and disasters, as well as for the rehabilitation of territories after the end of work in mines and quarries; fees and fines for pollution to be paid to the State Environmental Protection Fund. The fund will have financial, administrative and management capabilities to dispose of the proceeds [11].

According to specialists, it would be necessary to radically change the proportions of the tax system in the direction of increasing the number, and therefore the size

taxes related to nature use, primarily fees for the right to use natural resources. According to expert estimates, the share of such taxes should increase and make up 30-50% of the revenue part of the State Budget. In Ukraine, in 2011-2013, funds from environmental taxes amounted to only 0.06-0.08% of the total amount of state taxes [49]. Thus, to a certain extent, nature-destroying, destructive anthropotechnogenic activity is stimulated.

Therefore, precisely such a tax ideology would allow to more adequately take into account and regulate the anthropogenic impact on the environment, reduce the degradation of natural resources, and stimulate the reduction of the resource intensity of the economy.

The socio-economic efficiency of the pollution charge depends on many factors. The ecological and economic conditions that have developed in Ukraine today require a change in the very ideology of substantiating the real size of pollution charges. It is necessary to scientifically develop and establish as a basis for calculations the ideology of the dependence of the amount of the payment for pollution on the amount of the total expenses of enterprises-users of nature to reduce pollution. The experience of developed countries shows that the effectiveness of the environmental tax and pollution charge depends on the average marginal costs of the producer to reduce pollution. Where pollution charges and environmental taxes have not "worked" as economic regulators, the main reason has been the inability to set the corresponding charges and taxes higher than the average marginal cost of reducing pollution. If the charges do not exceed these costs, then the incentive to take measures to reduce pollution and prevent this charge is lost. And vice versa, the influence of payments for pollution calculated in a progressive manner on their specific real volumes, that is, their "direct" ecological and economic effect will be much more noticeable.

It is necessary to abandon the method used in Ukraine for calculating the payment for pollution, as well as the environmental tax, according to which these funds are used

refer to the cost of the product, are included in its price and are actually returned to the enterprise from the consumer of this product. Funds from profit are collected only when calculating the fee for over-limit pollution. It is advisable to establish the procedure for deducting the fee for limit and over-limit pollution precisely from the profit that remains at the disposal of the nature user. Politicians should support the opinion of specialists about the need for scientific development, legislative consolidation and economic implementation of the offsetting system at the expense of payments for pollution of those funds that the nature-user enterprise spends on environmental protection measures. The legal basis for the defined financial responsibility for the receipt of payments, as well as for their offsetting, should be an agreement between enterprises as nature users and state bodies of environmental regulation [61].

It would be worthwhile at the political-legislative level to change the procedure for collecting the environmental tax and its economic philosophy, assuming: firstly, that the amount of the tax is calculated not from the cost of environmentally destructive products, that is, not to include it in the price and not to transfer everything to the consumer's budget, but from the producer's profit and in this way economically stimulate him to ecologically constructive changes in production technologies, and therefore to the reduction of environmental pollution; secondly, the basis of environmental tax calculations is the principle of dependence on the average marginal costs of the producer of man-made pollution reduction; thirdly, the introduction of coefficients for adjusting the amount of the environmental tax depending on the increase or decrease in the concentration of toxic substances in the taxed products, that is, progressive or regressive environmental taxation should be established. Thanks to these measures, it is necessary to expect an increase in the effectiveness of this tool as a stimulator of limiting the production and consumption of environmentally hazardous or resource-intensive products.

An extremely important political point is the need to change the targeting of environmental tax revenue. It is necessary to direct these funds not to the general State budget, but to the accounts of extrabudgetary nature protection funds, as is customary in other countries with a transition economy. After all, thanks to them, in the conditions of the unsatisfactory economic and financial state of environmental regulation and the chronic lack of public investment in Ukraine, it is possible to compensate for the lack of budgetary investment in environmental programs.

The proposed scheme and direction of the targeted return of funds from the environmental tax, through extra-budgetary environmental funds, makes it possible to accumulate financial resources also at the local level and directly direct the income from the environmental tax to subsidize or credit environmental protection measures of enterprises producing goods in the same industry. Thanks to this mechanism of redistribution of funds from the environmental tax, financial flows of the so-called "reinvestment of income" are formed, which in a number of countries have proven their high ecological and economic effect and dispelled suspicions that the alleged environmental tax is just another of many ways of increasing payments for the benefit state. Therefore, precisely in view of the difficult transitional socio-economic conditions, the core of environmental policy in Ukraine should be the stimulation of environmental protection activities through the development and implementation of a financial system of mutual complementation (substitution) of the environmental tax. The importance of implementing a reverse address mechanism of environmental taxation is obvious [18].

A clear recognition of the priority of environmental goals for the development and reform of the economy, political will and proper preparation are important for the introduction of economic and tax incentives for nature use. Thanks to the improved economic mechanism of environmental regulation, we have a chance to stabilize the ecological state of Ukraine.

Such an economic instrument of environmental policy as a tax on environmentally harmful products, introduced in most industrialized countries of the world and which must also be applied in Ukraine, deserves special attention. European experience shows that environmental taxes, including a tax on environmentally harmful products in consumption, act as effective instruments of environmental policy when the standards of payment for environmental pollution exceed the funds necessary to prevent environmental damage [27]. This environmental tax on leaded gasoline in Sweden during 1988-1993 led to a 20% reduction in environmental pollution by leaded gasoline combustion products [28]. In Germany, environmental strategy is closely related to tax policy. The basic principles of the German Ministry of Environmental Protection and Reactor Safety are that the polluter pays; it is cheaper to prevent than to eliminate the consequences; production should be environmentally oriented, etc. Suffice it to say that thanks to fines over the past 12 years, the number of vehicle emissions in Germany has decreased by 90% [20]. Real consideration by companies of the requirements of nature protection contributes to their winning leading positions on the European market.

At the same time, it should be remembered that it is necessary to experiment with taxes very carefully, because careless reforming of the tax system often leads to undesirable changes in the economy and social spheres, which policy authors and reformers, as a rule, do not expect. It is expedient to take the ecological tax in the amount of ecological damage caused to the environment and natural resources, within the requirements of ecological standards [7, p.184-194].

Economic sanctions for the irrational use of natural resources and the state of the environment have traditionally been included in the legal mechanisms of environmental policy for a long time. In recent years, in a number of scientific works, the authors correctly interpret economic sanctions for

environmental damage as an economic tool of environmental policy [19, p. 27-34]. We agree that economic sanctions for environmental damage should be applied more actively against violations of the requirements of environmental standards, providing for compensation (partial at the initial stages, and then full) of the environmental damage caused. Fines are also an important component of economic sanctions for environmental violations.

The existing system of fines in Ukraine is in most cases established in absolute terms or is based on the calculation of the tax-free minimum income of the population. Therefore, it does not perform an ecological positive regulatory function at all. That is why it is necessary to change the method of calculating this type of fines, which should include: the dependence of the indicators of fines for environmental violations on the size of the pollution fee rate; economic losses from environmental violations; the amount of possible expenses of the offending enterprise for environmental protection measures, the failure of which led to an environmental violation; the cost of activities aimed at solving an environmental problem. Fines calculated in this way are able to perform the function of a preventive economic regulator of nature use.

Most of the proposed measures are effective methods of improving the already existing economic instruments of environmental regulation in Ukraine, they can be implemented without any significant increase in state costs or changes in the control procedure in the field of nature management.

In global practice, tax discounts are widely practiced as a form of economic stimulation of ecological entrepreneurship. All subsidies for environmental pollution control programs are provided to enterprises from the state budget or from special funds of ministries dealing with nature protection issues.

The system of taxation according to ecological criteria should be regulated at the state and regional levels, in accordance with the competence of the governing bodies. Preferential taxation should be applied

primarily in territories with a large environmental load, including in construction revitalization territories, and it is here that all profit from economic activity should remain without deduction to the State budget. Losses of budget funds due to the introduction of tax benefits can be compensated by revenues from additional taxation of enterprises with environmentally hazardous technology or those that produce environmentally hazardous products [18; 19].

In the context of the formation of a motivational and stimulating basis for ecologically oriented management methods in Ukraine, it is necessary to carry out a price reform. Thanks to the differentiation of prices for ecologically dirty and ecologically clean products in other countries, positive results have been achieved in reducing man-made pollution of nature. Experts say that it is advisable to set market prices for production waste. In general, it is necessary to emphasize the special complexity and, at the same time, the importance of solving pricing problems as a direction of stimulating the production of safe products in Ukraine.

A new economic mechanism of environmental policy, which is now actively proposed in developed countries as compensation, is a fee for returned emissions, which provides for the allocation of funds from special funds to those enterprises and organizations that, due to the improvement of production, have achieved a reduction of harmful emissions into the environment [12, p. . 54-58]. Fees for returned emissions and technological premiums for the use of nature-saving technologies are "soft" market economic instruments of environmental policy, which are used today in the most developed countries of the world - the USA, Japan, Sweden and a number of others. They did not receive wide recognition and development in Europe.

The ideology and practice of off-budget environmental funds (nature protection funds) should play an important role in improving the financing of nature protection measures. The main purpose of their formation – creation of funding opportunities independent of the state budget

nature protection needs. Thanks to such environmental funds, material resources are accumulated for the implementation of environmental programs, joint share financing of environmental improvement costs is carried out.

In our opinion, it will be expedient to introduce in Ukraine the following three principles of functioning of the financial mechanism of extrabudgetary funds in their expenditure items. First, part of the funds of the fund should be directed to the implementation of regional measures that prevent negative impact on nature or compensate for its consequences. The free part of them should be given to enterprises as a loan for the implementation of environmental protection measures. Secondly, the company can receive a loan on preferential terms, namely, if during the crediting period the company reduces or (at least) stabilizes the flow of harmful substances into the environment, then the funds deducted from the credit are considered to have been used in accordance with the purpose and are not returned to the fund. Thirdly, when suppliers of low-quality raw materials or enterprises participating in the technological cycle are responsible for the increase in pollutant emissions at a particular enterprise, then economic claims are made against them, which are satisfied by compensation for that part of the payments of this enterprise that was caused by the fault of others [ 18].

The system of environmental insurance funds must inevitably become one of the effective mechanisms for stimulating the development of ecological entrepreneurship and financing various types of environmental protection activities in Ukraine. In our opinion, the main sources of their formation should be: insurance contributions of enterprises whose activities are associated with the risk of environmentally dangerous situations and accidents; deductions from the profits of enterprises, other incomes that are not subject to taxation. International and national environmental labeling of products and environmental certification of manufacturing companies should be included in the category of effective tools of ecological entrepreneurship.

Given the domestic realities and projected trends in the functioning of the national economy in the transition period, there are no sufficient social conditions in Ukraine for the implementation of the method of buying and selling pollution rights, creating banks and pollution licenses, environmental insurance, etc. The market-based methods of environmental regulation can only be speculated about, because the full economic mechanism of nature management in Ukraine can be created only after the painful transformational market processes are completed. After all, it is the effectiveness of the deployment of environmental protection programs that today and in the future determines the prospects of national socio-economic development.

### **1.3 Organizational principles of ensuring environmental safety in construction revitalization territories based on the application of a process-oriented approach**

Society's search for forms of interaction with nature in the form of rational nature use and protection of natural objects led to the discovery of various factors of danger and their associated features and, as a result, to the development of a new form of organization by society of its natural coexistence - ensuring environmental safety (ES) of the individual, population, territory.

Today, ecological safety is understood as such a state of the environment, when it is guaranteed to prevent the deterioration of the ecological situation and the occurrence of danger to human health [52, p. 70-71].

Environmental safety is also the absence of threats to the environment while simultaneously respecting the vital interests of citizens, society, the state, and the biosphere as a whole. If it is possible to manage some natural emergencies and their consequences

only at the state level due to their scale, the economic entities (enterprises) themselves can prevent and eliminate the consequences of human economic activity.

It is at the enterprise that the step-by-step process of its interaction with the ecosystem begins and is implemented. Before determining the mechanism of this interaction, let's consider the essence of the concept of "environmental safety of the enterprise". At the level of an industrial enterprise, environmental safety should be understood as such a state of its production and economic activity that does not pose a threat to the natural environment and humans, meets the needs of people, and excludes any danger to their health and future generations [12, p.15- 18].

This definition, firstly, specifies the source of environmental danger - the production and economic activity of the enterprise, and secondly, it emphasizes that the results of the enterprise's activities must meet the needs of people, that is, in order to minimize the negative impact on the environment of production processes, one should look for more perfect production methods and technologies, and not to stop the production of the desired products.

Traditionally, when providing EB at enterprises, the main attention was paid to technical and technological aspects. However, as practice shows, to increase the level of EB production of technical and technological solutions is not enough, more attention should be paid to organizational and managerial issues of EB provision, which find their expression in the management system, styles and methods of leadership.

In order to form any management system, it is necessary to first define the object to which management action will be directed. Thus, the production activity of enterprises can negatively affect both the natural environment and human health and life.

The direct impact on human health occurs in the production process at each workplace. Indirect - manifests itself in the employees of the enterprise after a certain period of time in the form of occupational diseases, and in the population - in the deterioration of environmental conditions in the territory where it

lives The enterprise affects the environment (ES) directly if it uses dangerous materials, equipment, outdated technologies in production, and indirectly if its products leave waste after consumption or use that must be disposed of.

It should be noted that there is a direct relationship between the problems of human protection and emergencies from the negative impact of the technosphere at the enterprise level, which is manifested in the fact that dangerous and harmful substances, formed at workplaces, first negatively affect the employee, then enter the sanitary and protective zone enterprise (SZZ) and only after that - directly into the environment.

If we consider an industrial enterprise as a system consisting of a set of subsystems, then three levels of EB management can be distinguished in it: the lower level - at the workplace, the middle level - in workshops, services (departments), and the higher level - throughout the enterprise. The efficiency of management at the following levels largely depends on the effectiveness of EB management at each previous level, since eliminating the cause of danger at the workplace is much easier and more economical than eliminating its consequences at the enterprise level. Thus, EB management at the enterprise includes two aspects - industrial safety management and emergency management.

The State Committee of Ukraine for Standardization, Metrology and Certification establishes the rules for the application of standards on the territory of Ukraine. Compliance with environmental standards is mandatory and protected by current legislation.

Environmental standards are a system of environmental management, which includes:

a) environmental safety standards (maximum permissible concentrations (MPC) of pollutants in the natural environment, maximum permissible levels of acoustic, electromagnetic, radiation and other harmful effects on

natural environment, maximum permissible content of harmful substances in food products;

b) maximum permissible emissions (VAT) and discharges into the natural environment of polluting chemical substances, levels of harmful effects of physical and biological factors.

The legislation of Ukraine may also establish standards for the use of natural resources and other environmental standards.

Two selected directions are the object of international standardization. Today, international standards for management systems in the field of environmental protection ISO 14000 and industrial safety ON-SAS 18000 (industrial safety and occupational safety management system (SMPBIOT) [55; 155] are widely spread.

The ISO 14000 system of environmental standards is not focused on quantitative parameters (volume of emissions, concentrations of harmful substances, etc.), not on technical characteristics or technological solutions (for example, to use or not to use certain technologies), but on the principle of continuous improvement. In particular, according to these standards, there is a requirement to use "best available technology". The main documents of the ISO 14000 series do not contain absolute requirements for the enterprise's impact on the environment, except that the enterprise must declare its desire to comply with national standards in a special document. The similar nature of international standards is due, firstly, to the fact that they should not contradict the spheres of action of specific national standards; secondly, by the fact that they are not aimed at achieving a certain absolute level, but at constant relative improvement; thirdly, by the fact that these are, after all, standards not of technical conditions, but of economic procedures. ISO 14000 standards are grouped into three areas: regulation of general principles; formation of tools; environmental quality management of products [5; 15]..

The list of ISO 14000 standards looks like this [29]:

- principles of environmental management:

ISO 14001: Environmental Management System (EMS) - Specifications and User Guide.

ISO 14004: EMS - General guide to principles, systems and methods.

ISO 14014: Guide to determining the "entry level" of environmental performance of production.

- environmental monitoring and assessment tools:

ISO 14010: Guide to eco-auditing. General principles.

ISO 14011: Eco-audit manual - audit procedures, audit of environmental management systems.

ISO 14012: Eco-auditing manual - qualification criteria for environmental auditors.

ISO 14031: Manual with evaluations ecological indicators activity organizations

- standards of product requirements:

ISO 14020: Principles of environmental labeling of products.

ISO 14040: Life cycle assessment methodology – assessment (series) of the environmental impact associated with a product at all stages of its life cycle.

ISO 14050: Glossary of environmental management terms.

ISO 14060: Guide to accounting for environmental aspects in product standards.

Officially, the ISO 14000 standards are voluntary. They do not replace legislative requirements and serve as a kind of guide to companies regarding self-commitments in the field of environmental management. However, more and more companies are adopting these standards – and for good reason.

First, there is mild pressure from international organizations. For example, the main banks of Switzerland and Germany do not allocate loans without environmental justification of projects. In this regard, the specified system of standards is one of the few recognized by banks, while the EU

announced its intention to admit only ISO-certified companies to its markets.

Secondly, the implementation of the environmental management system provides companies with additional advantages. Of course, the following advantages of implementing ISO standards are mentioned:

- solving environmental problems is facilitated, responsibility increases, a clear division of responsibilities is achieved;
- a systematic approach is provided;
  - the opportunity to reduce costs is created due to more rational use of water, raw materials, energy, and waste reduction;
  - compliance with the requirements of environmental legislation is guaranteed, the risk of being brought to court is minimized;
  - the relations between the company's employees and the public are improving (the interests of the enterprise and adjacent objects are converging);
  - the company's position on the market improves (its reputation and competitiveness increase);
  - improvement of the environment and production processes at the enterprise itself is achieved;
  - the prerequisites for attracting highly qualified labor force are created;
- there are opportunities to conquer the markets of "green" products;
  - the estimated value of fixed assets increases (this is useful because it creates the possibility of obtaining additional loans) [18].

At one time, in connection with Ukraine's decision to join the General Agreement on Tariffs and Trade (GATT) and join the World Trade Organization (WTO), it was the first of the countries of the former Soviet Union to introduce ISO 14000 series standards on its territory on January 1, 1998 as voluntary standards operating in the field of environmental management (DSTU, 1997).

Subject these standards there are systematization requirements to activity organizations in specific areas of management (Table 3.1).

*Table 3.1*

**The subject and purpose of international standards ISO 14001 and OHSAS 18001**

<b>Standard</b>	<b>ISO 14001</b>	<b>OHSAS 18000</b>
Namesystems management	Environmental Management System (EMS)	Systemindustrial safety management and labor protection
Definition of the management system according to the standard	SEM is a part of a joint management system, which includes organizational structure, activity planning, division of responsibilities, procedures, processes and resources for development, implementation, evaluation of achieved results and improvement environmental policy	SMPBIOT is a part of the joint management system of the organization, which ensures the management of risks in the field of occupational health and safety related to the activities of the organization
The purpose of the system	Fulfillment of social and legislative requirements for the production of products and for any by-products: waste, sewage and emissions into the atmosphere	Prevention of accidents at work, prevention of health disorders caused by the working environment, provision of working conditions corresponding to the current norms and laws

In general, the structure of the standards suggests the following sequence of actions

- 1) development of the organization's policy (policy in the field of emergency protection (ONS) and industrial safety must be equal and agreed parts of the general policy and strategy of the organization's development);
- 2) planning of activities in the field of ecology and production safety, determination of legislative and other requirements, determination of target and planned indicators (dangers and risks, environmental friendliness of products), development of a program for the management of emergency situations and labor protection;
- 3) implementation and ensuring the functioning of the management system, including defining the structure and responsibility, providing training,

ensuring communication, developing system documentation, managing documentation, operations, ensuring preparedness for emergency situations (accidents) and methods (methods) of responding to them;

4) conducting inspections and corrective actions, monitoring and measurements, elimination of inconsistencies, system audit;

5) management system analysis and its continuous improvement.

The implementation of these management systems at the enterprise provides a number of advantages, which we have grouped in the table. 3.2. The analysis of modern management systems allows us to conclude that the development trends of SEM and SMPBIOT have common features:

- nature of development: from control of indicators at the final stage of production to a process approach in environmental control during the technological process;
- combination of technical and organizational solutions;
- focus on improving the management of the production process;
- cooperation of various links within the technological chain;
  - the need to take into account trends in changes in the organization's external environment.

Since the considered management systems have a lot in common and mutually overlap, it is most effective to create an integrated management system (IMS) at the enterprise, consisting of two parts: SEM and SMPBIOT. In the work, it is suggested that ISM should be understood as an environmental safety management system (ESMS).

An integrated SUEB is a subsystem of an enterprise, the purpose of which is to support at all stages of the life cycle of products such characteristics of the environment and production environment that meet the needs of people, do not pose a threat to their health and the environment, and meet the long-term goals of the enterprise [56].

Table 3.2

**Advantages of implementing SEM, SMPBIOT**  
(systematized by the author based on data [56])

<b>Kinds of advantage</b>	<b>Advantage</b>
Organizational	regular management; clear division of responsibility and authority between employees; coordinated interaction of processes and functions; ensuring compliance with legal requirements.
Economical	reduction of risks and related losses, including environmental payments and fines; control and optimization of resource use; increase in labor productivity; reducing the cost of eliminating non-conformities.
Reputations	advantages when participating in tenders, concluding contracts; simplification of obtaining various licenses and permits; more favorable terms of lending, insurance; increasing investment attractiveness; improvement of reputation in the eyes of consumers, suppliers, and partners.

In this definition, it is emphasized that the creation of the SUEB combines the environmental interests of society and the goals of the enterprise as a business entity focused on the production of products and making a profit.

From the point of view of the system approach, each of the two directions is an independent but interconnected part (subsystem). In addition, we substantiated the following advantages of an integrated management system:

- the integrated system ensures greater consistency of actions within the organization, thus enhancing the synergistic effect;
- the integrated system minimizes the functional disconnection in the organization that occurs when developing autonomous management systems;
- creating an integrated system, as a rule, is much less time-consuming than organizing several parallel systems;
- the search for more effective ways of performing work excludes their duplication;

- the number of internal and external connections in the integrated system is less than the total number of these connections in several systems;
- the volume of documents in the integrated system is much smaller than the total volume of documents in several parallel systems;
- in the integrated system, a higher effect of personnel involvement in improving the organization's activities is achieved;
- the ability of the integrated system to take into account the balance of interests of external parties of the organization is higher than in the presence of parallel systems;
- costs for the development, operation and certification of an integrated system are lower than the total costs of several management systems.

The implementation of the ISMS should be based on the following principles established in the considered international standards, namely [56]:

- 1) a systematic approach allows you to connect different aspects of activity into one whole;
- 2) a comprehensive approach is an approach to management that covers various aspects of the enterprise's activities and ensures the effect of synergy of all elements;
- 3) the process approach considers all activities of the organization as a set of interconnected processes;
- 4) the principle of strategicness and agreement means that the system must develop according to a certain strategy, which determines the agreement of the goals of all management systems;
- 5) self-organization - employees of all levels independently monitor the process and take corrective measures;
- 6) the principle of prevention in solving problems - the entire management mechanism of EB should be oriented to preventive measures of crisis situations;
- 7) the principle of economy - the use of the minimum amount of all types of resources during the implementation of the process;

8) leadership of the manager - it is necessary to appoint an authoritative manager at the highest level of management, responsible for the implementation and functioning of ISM;

9) the principle of professionalism - it is necessary to train employees in the field of EB.

The SES, like any management system, should include a set of management bodies, divisions and executives performing the functions assigned to them, as well as a set of methods by which management action is carried out.

Individual elements of the SUEB are present in modern construction enterprises in various forms. Thus, depending on the degree of integration of occupational health and safety (OSH) and OH&S processes, as well as the nature of measures taken to reduce production hazards, four strategies can be distinguished that are used by industrial enterprises in solving the problems of EB provision (Table 3.3).

Today, strategies 1 and 3 prevail in the construction enterprises of Ukraine, that is, the problems of nature protection (OP) and environmental protection (ENS) are solved separately, moreover, they are in the competence of different managers. And even if there is a division at the enterprise that is responsible for both labor protection and environmental protection, in most cases the head of this division has two deputies for each of the directions, who, solving each of their tasks, are unable to assess the level of EB production in as a whole for the enterprise.

Analyzing the practice of emergency management and labor protection at enterprises, four main types of organizational structures dealing with issues of EB provision can be distinguished.

For example, services engaged in environmental protection activities have the following structures:

Table 3.3

**Classification of the types of strategies of the enterprise to ensure EB [58]**

No	Description of the strategy	Example
1	At the enterprise, the problems of OP and ONS are solved by extensive methods by separate units, often under the leadership of different managers	Use of personal protective equipment, overalls, special footwear (responsible for the labor protection department); installation of cleaning equipment and facilities, reuse of water (taken care of security department)
2	The problems of OP and ONS are considered as interrelated and are solved by extensive methods	Installation of ventilation systems and gas and dust cleaning equipment taking into account the requirements of labor protection and the National Emergency Service (within the competence Department of Environmental Safety).
3	Protection of workers and emergency situations by preventive methods, but the measures are aimed at solving only one of the problems of emergency situations and emergency situations	The use of safe processes and materials or the use of low-waste and zero-waste technology (competence of the production department)
4	OP and ONS are considered as interrelated problems and are solved by comprehensive measures of a preventive nature	The use of safe processes and materials, methods of processing materials, the use of low-waste and zero-waste technology, which is the basis safe production

1) a structure in which there is no security service

NS;

2) a structure in which the department of the National Security Service (SNS) is combined with any other

a division of the enterprise;

3) a structure in which VONS is allocated to a separate unit, but at the same time does not have sufficient weight in the hierarchical structure of the enterprise;

4) a structure in which VONS is separated into a separate unit with a head equal in rank to the deputy director of the enterprise.

The structure of management of environmental protection activities of the first type is typical for small enterprises, which have a minimal harmful effect on natural resources. Solving environmental protection tasks in this case is assigned to one or another official as an additional burden, and all this activity mainly boils down to fulfilling the formal requirements of the current legislation, for example, filling out the necessary reporting.

The structure of the second type is characterized by the existence of an individual employee or a group of specialists dealing with issues of national security within any division of the enterprise. The number of such employees depends on the degree of production danger and the scale of the enterprise. Such structures are characterized by the following disadvantages: low efficiency of environmental protection activities; lack of time and resources; high workload of VONS employees.

In the third type of structures for management of environmental protection activities, the OVNS is allocated to a separate unit of the enterprise, has its own manager, but at the same time does not have sufficient weight in the hierarchical structure of the enterprise. The disadvantage of such a structure is that the State Emergency Service, as a rule, lacks management resources, without which it is impossible to effectively regulate the level of the enterprise's influence on emergency situations. At the same time, this type of management structure can more rationally combine production and environmental goals and objectives.

The fourth type of structures, in which VONS is separated into a separate unit, and its head, depending on the size of the enterprise, has the status of deputy director or deputy chief engineer, is the most effective for the implementation of environmental protection tasks. In this case, although the costs for the maintenance of the National Environmental Protection Agency increase, there is an opportunity to more comprehensively and comprehensively carry out environmental protection activities due to the use of management resources (material, informational, human, financial and economic).

As a result of the analysis of the existing structures for the ONS, we identified the following main shortcomings:

- subdivisions, which to one degree or another are engaged in environmental activities, act separately;
- rational forms of their interconnection and subordination have not been found;
  - the rights and capabilities of such divisions are limited, they cannot directly influence the activities of shops and services, as they are under different subordination;
  - the creation and development of EB management structures is a consequence of the strengthening of legislative requirements and is not based on such important scientific principles of designing management structures as systematicity, methodological justification, effectiveness, continuous development and improvement.

To date, attempts are being made at some domestic enterprises to supplement the existing system of organization and management with elements of environmental management, safety and occupational health management - in this way, an adaptive and functional approach is implemented. But its capabilities are limited, as outdated structures prevent the implementation of the company's new strategy, aimed at increasing the level of EB production.

From the above, it follows the expediency of creating a new algorithm for choosing the form of EB management organization, based on the concept adopted at the enterprise. We offer the following option:

- 1) analysis of the existing state of the EB management organization and formulation of the functions performed at the enterprise to ensure the EB ( $F_{\text{isn}}$ );
- 2) formation of a set of functions that the enterprise must perform in order to maintain a certain level of EB established by law ( $\Phi_{\text{min}}$ );
- 3) selection of a set of functions to achieve a certain level of EB in accordance with the company's strategy ( $F_{\text{strat}}$ );
- 4) determination of the optimal way of performing the accepted set of functions:

- if  $F_{isn} > F_{min} + F_{strat}$ , then the company can offer EB services to third-party organizations, or reduce EB management services;
- if  $F_{isn} < F_{min} + F_{strat}$ , then the management must decide on the issue of allocation of resources for the performance of EB support functions either by using the services of third-party organizations, or by hiring additional employees, organization of EB management services at the enterprise.

For example, if the enterprise does not have the conditions for waste disposal, it can turn to the services of another specialized enterprise or create its own waste disposal service.

The choice of a certain set of functions and the method of their implementation, depending on the company's strategy in the field of providing EB, affects the determination of both the type of organizational structure of the units responsible for EB, and the form of integration of the ESS into the overall management system.

For the most effective implementation and functioning of the SUEB at the enterprise, it is necessary to:

- 1) the formation of a coordinating center for the provision of EB (CEB) and the selection of its organizational structure, which would correspond as fully as possible to the specific conditions that have developed at the enterprise;
- 2) choosing the optimal form of integration of the SUEB into the general management system of the enterprise.

CEB is a division of the enterprise that carries out methodical management and coordination of the activities of all divisions of the enterprise to ensure the functions of OHS and labor protection in production.

In our opinion, there are two basic approaches to the creation of a CEB structure at an enterprise:

- 1) creation of an autonomous structure that includes technological and functional divisions;
- 2) creation of a mixed structure, which provides for an independent functional unit that reports to the deputy director of

EB, and technological areas that are part of the production shops and are subordinate to the head of the shop.

The creation of an autonomous structure of the CEB will enable centralized state control and management of the EC at the enterprise level. In this case, the CEB should include:

- a functional group that coordinates all activities to ensure EB, prepares reports, assesses the environmental situation and the level of damage, determines the priorities for the implementation of measures and current costs for ONS and OP;
- sanitary and industrial laboratory;
  - technological sites, departments for waste disposal, cleaning of dust and gas emissions and wastewater, recirculating water supply stations.

The mixed structure of the formation of the CEB is based on the principle of the responsibility of the technological workshops for the EB and the subordination to it of the areas of capture and disposal of construction emissions, compliance with the requirements of labor protection at workplaces. The functional division performs only the coordination of activities for the provision of EB. This structure is characterized by high personal responsibility of technological shops and employees for the results of environmental activities. At the same time, the advantage of the principle of cleaning and neutralization as a component of the technological process is fully realized.

The integration of the SUES into the general organizational structure of enterprise management can be carried out in various ways depending on the type of organizational structure of enterprise management as a whole.

It is expedient to determine the advantages and disadvantages of enterprises implementing SUEB and fulfilling the requirements of environmental standards ISO 14000 (Table 3.4)

In connection with the complexity of enterprise management, it is inevitable to allocate the main areas of its activity and group material, informational, financial and human resources according to them. In management theory, two systems of dividing the organization into separate blocks (departmentalization systems) are considered:

1) division of the organization into separate elements, each of which has its own clearly defined, specific task and responsibilities (functional structure);

*Table 3.4*

**Advantages and disadvantages of enterprises implementing SUEB**

*(determined by the author according to data [15,16])*

<b>Advantages of the enterprise that to environmental standards</b>	<b>Expenses of the enterprise in case plementation of environmental standardization</b>
reduction of material costs due to recycling; reduction of energy intensity of production; absence of unforeseen expenses for payment of insurance policies; attracting qualified personnel; receiving more income from the sale of ecologically clean products; development of the "green" market, provision of environmental services; improving the image of the enterprise; better integration into domestic and international spaces.	lagging behind competitors in promising scientific and technical developments; anticipatory growth of material costs compared to competitors using zero-waste technologies; worse opportunities to attract investors; strict control by the authorities on the implementation of environmental standards; increase in fines for violation of standards requirements; loss of a part of consumers who want to buy environmentally friendly products; reduction of the image of the enterprise; unfavorable prospects for development.

2) division of the organization into elements by types of goods or services, groups of buyers or geographical regions (divisional structure).

Modern management systems are built on the basis of a process approach, which considers the entire activity of the organization in the form of a chain of interconnected processes, the purpose of which is to satisfy the requirements of internal and external consumers.

Let us consider further the advantages and disadvantages of the three selected approaches. In contrast from the representatives of the school of administrative management, who described the functions of management and considered them as independent from each other, the authors of the process approach consider the functions of management as interconnected, namely management

– as a process, or work to achieve some goals with the help of others, that is, they claim that it is not a one-time action, but a series of continuous, interconnected actions. The disadvantages of the functional approach are summarized and analyzed by us in table 3.5.

*Table 3.5*

**Disadvantages of the functional approach and ways to overcome them**

*(developed and systematized by the author on the basis of [15,16])*

<b>Drawback</b>	<b>Description of the defect and its consequences</b>	<b>Ways to overcome shortcomings</b>
1. Insufficient permeability of information channels	As the number of managed events increases, information is delayed and blocks the feedback channel. The manager is forced to make decisions in conditions of insufficient information.	<ul style="list-style-type: none"> <li>- implementation of effective information technologies;</li> <li>- self-organization in standard situations;</li> <li>- creating a matrix organizational structure</li> </ul>
2. Separation of competence in relation to integral objects of management and internal monopoly of services	Responsibility for the management of the facility is assigned to several divisions, which leads to interfunctional contradictions; none of the divisions has a holistic view of the interests of the external consumer, and therefore cannot them satisfy	<ul style="list-style-type: none"> <li>- the use of a systematic approach to organizing the activities of units;</li> <li>- appointment of responsible process managers</li> </ul>
3. Conditionality of the balance of powers and responsibilities	The field of competence of functional services is formed abstractly, this leads to the duplication of functions or the appearance of functions for which no one is responsible.	<ul style="list-style-type: none"> <li>- to appoint responsible managers of processes, giving them powers;</li> <li>- describe all processes in detail;</li> <li>- strengthen vertical ties.</li> </ul>

As can be seen from the table, overcoming the shortcomings of the functional approach will allow the transition to process-oriented enterprise management. Note that functions and processes are not opposites, but represent only different levels of abstraction.

The process is considered as a set of works and functions; one employee, performing several functions, can participate in various processes. At the same time, employees are grouped according to the principle of professional affiliation, forming functional units [9].

The divisional structure, in our opinion, is a kind of functional structure, but closer in content to the process-oriented structure. In divisional structures, some of the functions are common to all divisions (finance, marketing, accounting, staffing), and some of the functions are subordinated to a specific purpose (production and sale of finished products).

Thus, in the product management structure, the authority to manage the production and sale of a product or service is transferred to one manager who is responsible for this type of product. This approach allows a large organization to pay the same attention to a specific product as a small organization that produces only one or two products, to respond more quickly to customer demand and competition. But in practice, this often leads to an increase in costs due to the duplication of the same types of work for different types of products.

In a customer-oriented organizational structure, all divisions are grouped around serving specific customer groups. The regional organizational structure is used mainly in those cases when the enterprise extends its activities to large geographical areas both on the scale of one country and on an international scale, which to a greater extent concerns sales organizations.

Below we present a comparative table of the advantages and disadvantages of the divisional structure (Table 3.6).

Table 3.6

**Advantages and disadvantages of the divisional structure***(developed by the author on the basis of [2, 20])*

<b>Advantages</b>	<b>Disadvantages</b>
Unloading of senior management Small interconnection of subsystems Delimited spheres of responsibility Transparency of structures 5. Solutions for individual products, clients, regions Quick adaptation to changes 7. More integrated, problem-oriented solutions 8. Better development opportunities for young employees Comprehensive management tasks Autonomy of employees of subsystems	1. The need for qualified managers Complexity of coordination 3. The danger of losing the unified policy of the entire system 4. The danger of striving for subsystems to improve only their own results 5. Less integration of all personnel 6. Less communication with the whole system and its goals

Unlike divisional structures, which are characterized by the management of target processes at individual stages of the product life cycle, the process approach considers all stages of the product life cycle as a whole. Its advantage lies in the fact that the requirements of interested parties are taken into account at each stage of the product life cycle while maintaining the systematicity of management.

Thus, in our opinion, the use of a process approach at all stages of the product life cycle in combination with the functional organization of the enterprise's activities will allow:

- to increase the interest of each specific performer in improving the quality of the final product and in the high-quality performance of his work;
- react more flexibly to external and internal changes;
- optimize the exchange of information between units.
- to give executors great powers, increase their role, independence and, as a result, return, satisfaction with work;

- relieve managers from "current" work and focus on strategic, systemic issues.

Application of the process approach requires careful analysis and formation of certain organizational structures at the enterprise.

Thus, the introduction of not separate subsystems of SEM, SUPBIOT, but the creation of a comprehensive environmental safety management system provides the enterprise with the effect of synergy of all elements, which consists in the optimal use of material and organizational resources necessary for the enterprise. At the same time, the organization of the SUEB, based on the principles of complexity, economy and the use of a process approach to all stages of the product life cycle in combination with the functional organization of activities, will allow the enterprise to increase the efficiency of management and environmental activities, as well as create conditions for its economic growth.

#### **1.4 Factors of greening as a direction of target programming of development and revitalization of building revitalization territories**

In the conditions of rapid development of technologies, global and regional organization of production, deterioration of ecology and global climate changes and, as a result, increased competition for resources and investments increases the effectiveness of responding to changes and adapting local development policies to these dynamic conditions, helps in strategic planning of territorial development. Strategic planning contributes to the formation of agreed views, development of a vision of harmonious socio-economic development of the respective territory, optimal use of limited resources of the region and serves as a tool for dialogue between the authorities and representatives of other sectors of the territorial community.

The practice of strategic planning is based mainly on the use of foreign experience with its adaptation to Ukrainian conditions. In Ukraine, it began to be implemented in some cities as early as 1994-1995. This process began to unfold more intensively in Ukraine at the beginning of the current century and has now gained widespread development in local self-government.

It is in the process of improving the practice of drawing up and implementing the budget through the use of modern methods and progressive approaches, confirmed by world experience, that the so-called program-target method is used.

Program-target methods are methods of planning, programming and effective organization of the process of solving problems and achieving goals. They involve a consistent transition from identifying problems, needs and goals to determining the process of their implementation, its technological saturation and, accordingly, resource requests. They provide the greatest effect within the framework of strategic planning - in the presence of complex, interconnected goals and processes, strict resource limitations, when traditional planning and coordination methods do not work. The program-target method in the budget process is a system of planning and management of budget funds in the medium term, focused on the relationship between the level of funding of each individual program and the expected results from its implementation [27, p. 119-124].

The program-target method assumes that any budget expenditures must be directed to goals that correspond to the medium- or long-term development strategy of the territorial community or the country as a whole. It is a tool that provides medium-term budget planning and the transition from control over the targeted use of budget funds to a combination of control over the actual results of providing budget services to citizens.

The relevance of the implementation of the program-target method of planning and implementation of local budgets is that one of the problems of the development of local self-government in Ukraine is the limitation of financial resources, which do not fully ensure the implementation of the powers delegated by the state to local authorities. The global financial crisis, which hit Ukraine's economy particularly hard, is exacerbating this problem. Along with the need to revise the tax base, in order to increase local budgets' own revenues, there is a need to increase the efficiency and effectiveness of the use of available budget resources, which is achieved thanks to the application of the program-target method in the process of budget planning and implementation.

Budget planning is a component of resource management, which, in its own right, in turn, is a component of a broader concept - strategic management, and the budget process is the final stage of strategic planning.

Budget programs are, so to speak, an estimate of the expenditure and profit parts of targeted development programs and plans for ensuring the vital activities of society and the state, their resource, including financial, cut. It is in the development programs that the goals, the process of their implementation, and its technological saturation are determined, which provides the initial data for the budget process. No one doubts the need and importance of monetary mechanisms of state administration, their effective use. But in isolation from development programs, plans for ensuring the activities of society and the state, financial indicators, mechanisms and the budget process itself lose their physical meaning, and their use under these conditions does not lead to anything except the creation of financial bubbles or financial pyramids with well-known consequences.

The following considerations convince us of the need for strategic state planning:

Each state exists in a certain international environment, which is characterized by relevant laws, trends, and traditions. At the same time, time frames and paces

"national" cycles of development require coordination with the parameters of global processes.

In the developing world, there is resource, technological, and cultural competition between states. The competitive capabilities of the state are determined not so much by the ability to solve tactical, situational tasks, but by the ability to look into the future, to build a strategy based on anticipating the decisions of competitors, on the resource security of one's actions for a certain perspective.

Prerequisites for the successful development of society are not only the transparency of state policy, but also its comprehensibility, awareness of the actions taking place within its framework. Formation of effective state policy involves: justified setting of development goals; determination of directions, general rules and restrictions, within the framework of which the choice of alternative methods of step-by-step solutions to urgent problems is carried out; development of an algorithm provided with resources for the implementation of the selected method; disciplined, controlled execution of intended plans and decisions.

The presence of the mentioned components ensures at each stage of the implementation of the state policy not only its comprehensibility for the executors, but also the possibility of its assessment, control, reaction to the results of control at the following stages, due, in particular, to the adjustment of programs, plans and the use of monetary regulation mechanisms.

In addition, a well-founded, understandable and acceptable strategy stimulates:

- consolidation of society and political forces around the general idea of development;
- increasing the activity of all layers of society on the basis of guaranteed long-term compliance with the rules of state behavior;
- the transfer of political debates about ways of development from slogans and declarations to the plane of alternative ways of realizing the intended goals.

Despite the impression that Ukraine is not inclined to implement "strategic" treatment modern methods and progressive approaches in system

strategic planning is necessary gradually, patiently, reasonably and purposefully.

Firstly, in the current socio-economic situation, given the announced course of European integration, Ukraine should be interested in the wide implementation of effective strategic management at all levels. But state planning should not become end-to-end, total. Its principles should be the sufficiency of the degree of state intervention, as well as the stimulation of grassroots business activity. It should be directive - for state bodies and institutions, contractual - for contractors of state programs and plans, indicative - for all other subjects of society.

Secondly, the state leadership needs to get rid of the ideological "husks" and determine the choice of methods of state regulation. The introduction of mainly indicative methods in the modern conditions of Ukraine seems premature due, first of all, to the weakening of control over the use of budget funds. Achievements in this field in developing countries, as well as in some developed countries, testify to the greater attractiveness at the current stage of the balance of programmatic and target methods of planning and planned and contractual methods of state regulation.

Thirdly, the implementation of strategic planning in state bodies should receive a legislative basis. The legal framework in this area should be minimized while simultaneously improving its quality and system. With this in mind, it seems appropriate to combine the processes of developing and adopting not only the Budget Code, but also the State Planning Code, which should cover both the state and regional levels, as well as all stages, types and forms of planning. Of course, this requires thorough professional discussions, and not making hasty decisions in order to have time for the adoption of the next budget.

Fourth, in the field of organizational support, it is necessary to proceed from the functional and temporal characteristics of strategic planning, as well as from the realities of the existing system of public administration. In order to form conceptual documents, it is proposed to turn the Department of Strategic Planning of Economic Development of the Ministry of Economy into an independent central body. There is no need to create special, permanent structures in the state apparatus - apart from a single central body. This body should be responsible for the organization and coordination of this work in the state on an ongoing basis with the

involvement of other state authorities, science, and public organizations. It is expedient to entrust the direct development of conceptual and strategic proposals to a temporary interdepartmental commission consisting of 7–10 leading specialists from among the top state management and scientists. The development of the national program of socio-economic development must be entrusted to the already mentioned central body, and its components - state programs by functional spheres of activity, branches to the relevant departments-managers of budget funds. At these departments, it is necessary to create special units for the management of state programs within the existing state.

Fifth, it is necessary to intensify the training and rotation of management personnel at all levels of state management, to improve their quality. The key to high-quality rotation of civil servants is purposeful reform of the civil service system, increasing the principle of attestation, especially of heads of structural units. In the process of increasing the level of professionalism of the state management staff, it is necessary to involve specialists from non-state organizations in the development of conceptual, strategic, and programmatic documents. Formation of system knowledge should become a priority task of science and education in Ukraine.

Therefore, strategic planning is a method of structuring the state's activities in such a way as to realize the set goals with the least obstacles. Therefore, in addition to comprehensive work on the creation of legislative, legal, organizational, educational foundations, it is necessary to create moral and material motivation, regulatory incentives for this activity to become mandatory, attractive and conscious. Accumulating world and Ukrainian experience, a terminological and instrumental base should be gradually created and domestic traditions of territorial development planning developed.

The goal of introducing the program-target method in the budget process is to establish a direct connection between the allocation of budget funds and the results of their use.

The main advantages of the program-target method of budget formation over the traditional approaches to budget planning developed in Ukraine are:

multi-year planning of expenditures, which makes it possible to link budget

expenditures with the fiscal impact on macroeconomic indicators of the country's development in the medium-term perspective (while the balance sheet, regulatory, and direct account methods mostly provide for the formation of expenditures for only one year);

increasing the responsibility of ministries in ensuring the transparency of the management system of budget programs, establishing indicators of the effectiveness of programs and the institution's activities as a whole.

The disadvantage of program-target budgeting is a rather detailed periodic analysis of all programs, which requires significant human resources and often financial costs. Until the analysis is completed and management decisions are made, there may be uncertainty about the future funding of the programs.

Thus, it is possible to single out the main obstacles on the way to the full introduction of budgeting technologies in Ukraine:

lack of national and regional strategic development guidelines, as well as high-quality and clear strategic planning at the level of the main managers of budget funds;

non-reformation of most branches of the economy, which complicates the application of progressive budgeting technologies;

insufficient awareness of experts of leading state institutions and local self-government bodies with the acquisition of world financial theory and practice, Ukrainian financial science;

imperfection of state and local budget management, forms and methods of budget management, lack of real budget planning and forecasting for medium and long-term periods based on the latest global budget technologies, which are quite successfully applied in Western Europe.

Systemic changes are required for the full application of program-target budgeting in Ukraine. First, modernization of the entire system of strategic planning and programming of state policy. This step should also take into account structural reforms in Ukraine, aimed at improving the efficiency of the functioning of industries and improving the quality of public services. Secondly, improvement of the budgeting methodology in view of world experience. Thirdly, gradual and professional training of modern budgeting techniques for specialists working in the

field of public finance, starting from the level of politicians, civil servants who make management decisions, and ending with specialists on the ground and future specialists.

An integral part of the strategic planning of the development of construction revitalization territories is the planning of the management of environmental protection and ecological safety, i.e. mastering the set of forms of organization of relations, methods of formation of target resource funds and their use in order to achieve the necessary natural conditions of life in accordance with the national ecological doctrine, constitutional law citizens for a quality living environment, expansion of the social need for the ecological usefulness of the good and business responsibility for its reproduction, strengthening of international obligations. Particular attention is paid to the ecological and economic conditions of development of the leading branches of industry, which are major environmental polluters of the regions, for example, as the coal industry of Donbass.

Therefore, there is an objective need for strategic planning of measures to create conditions for greening the industry, namely the coal industry.

Greening of socio-economic development of building revitalization areas is defined as a promising direction of targeted programming in the work, which is interpreted as a complex, multi-faceted process of improvement and improvement of production-technical, social, economic and ecological characteristics of building revitalization areas with the help of technological renewal and organizational and economic transformations, the final the result of which is the socially and ecologically and economically effective use of the natural resource potential of the territories. Greening in the above sense can be considered as a special form of extended reproduction of building revitalization areas, a distinctive qualitative feature of which is the fact that more ecologically efficient means of production corresponding to the goals of socio-economic development are used here.

It is possible to determine the environmental and economic conditions and factors of environmentalization of the coal industry using the example of the Donetsk region, which is characterized by the highest territorial concentration of industrial production and at the same time is distinguished by a high level of

development of the rural economy. Large reserves of valuable minerals are being mined on the territory of the district, which led to the development of resource-intensive sectors of heavy industry here. The central part of Donetsk region and the adjacent western territory of Luhansk region are among the largest highly urbanized areas in Ukraine.

The general direction of the socio-economic development of Donbas is the improvement of the structure of production based on the preferential use of intensive factors, the effective functioning of production and scientific and technical potential, the rational use of natural and labor resources

resources. The high level of concentration of production and population in the area, the intensive involvement in the economic cycle of natural and economic resources, the predominance of construction branches of heavy industry in the sectoral structure caused negative consequences of an economic and social nature [6, p. 86-98; 114].

Currently, foreign economic literature offers a wide range of indicators characterizing the greening of production and sustainable development of the territory [27, 75].

Traditional indicators of greening and sustainable development are:

- indicators of health and environmental improvement (reduction in the release of toxic materials that affect humans; reduction in morbidity and mortality caused by external effects; reduction in the number of people living in areas where water and air purity standards are not observed );
- indicators of economic development (increase in GNP per capita; increase in the number and quality of jobs; decrease in the number of people living below the poverty line; increase in savings and investments per capita; increase in expenses for the protection of the natural environment);
- indicators of social justice (equalization of incomes per capita; development of indicators of external actions affecting different social groups; percentage of people from different social groups who have access to basic social benefits);
- indicators of nature conservation (reduction of soil loss due to anthropogenic action; increase in the area of healthy hayfields; increase in the area

of forests; reduction of emissions and excess fertilizers; reduction of greenhouse gas emissions);

- indicators of rational management (reduction of material capacity per unit of production and per capita; reduction of waste, application of technologies for their secondary use; reduction of energy production capacity; rational use of renewable resources) [220, p. 112-116].

In our opinion, it is appropriate to group the factors that hinder and promote the process of greening as follows:

- environmental factors (environmental disaster zones, man-made development of environmentally dirty industries, including raw and extractive industries);
- peculiarities and traditions of mass consciousness and mentality;
- foreign economic and foreign political factors;
- natural resource and climatic features that determine the specifics of the development of national and regional economic complexes;
- integral complexes of social factors;
- directly economic factors.

Also, at the national level of the economy, it is worth highlighting the directions of the strategy that contribute to the promotion of the process of environmentalization of the coal industry:

- implementation investments, oriented on development resource conservation;
- state support of nature-exploiting sectors of the economy;
- increasing the effectiveness of environmental and economic policy measures in industrial and economic complexes.

Special attention should be paid to the greening of legislation and economic activity. At the same time, two main series are formed - industry and regional factors, which are then summarized in the final series. The regional factors can be classified into three groups:

- factors of regional resources - in the interests of increasing the regional efficiency of the use of these resources, it is necessary to limit the conditions of scarcity, and if they are available in sufficient quantity, to stimulate their involvement in the development of production;

- innovation level factors that stimulate the development of industries that have a fairly high level and pace of scientific and technical development;
- factors of influence and interaction of construction objects, the economic complex of the region as a whole, and the economic conditions of the population's life.

The analysis and evaluation of the profile according to the factors of the first group will allow to stimulate productions that use regional resources in the most rational and ecologically efficient manner, which will contribute to the achievement of the goals of resource balanced development. At the same time, the factors of the second group are related to the full use of innovative scientific and technical potential, and the third group combines profile factors that reflect the directions of increasing the regional efficiency of production and are related to the participation of business entities in the regional production process and its influence on the parameters social, economic, ecological, demographic.

The main principles and rules of greening of the coal industry include: preventiveness, continuity and permanence, interconnection and complexity of environmental protection measures, which should be the basis of the strategy of greening the production process.

Greening of the economic activity of revitalization enterprises involves the consistent implementation of technical-technological systems, organizational-management and resource-regulatory measures, which allow to carry out scientifically based regulation of man-made effects on nature and to fulfill the requirements of maintaining the health of the population, the quality of the environment and the rational use of natural resources.

When developing technical and technological measures to increase the ecological level of coal production, one should be guided by two main approaches [26, p. 5-9]:

- the main requirement for any newly created or operated mining equipment and coal extraction technology is its unconditional environmental safety;

- the preservation of the natural habitat of man has an undisputed priority over any technocratic solution to the economic problem of coal mining.

The principles of environmentalization of the coal industry, in our opinion, represent a system of requirements and recommendations, and they can include:

- the principle of combining administrative and market mechanisms for managing the greening process;
- the principle of ecological purposefulness, i.e. effective provision of innovative restoration of production and economic activity taking into account the goals and objectives of the transition from elimination of the consequences of construction pollution to their prevention;
- the principle of non-deterioration of the environmental situation as a result of the development of production rates and GDP growth, which involves the use of the following rule: new industrial facilities or those being modernized must meet the requirements of environmental protection;
- the principle of priority and complexity is aimed at the formation of criteria for the selection of priority areas of investment support for environmentalization of economic activity.
- the principle of maintaining a balance of current (tactical) and prospective (strategic) interests.

The measures developed taking into account these principles will make it possible to substantiate the complex of ecological, economic and social requirements for coal mining technologies, as well as to form a scientifically based program of environmentalization of the development of natural resources.

Based on the essence of the process of greening, their systematization allows to distinguish the following groups as the main ones: legal, economic, ecological, organizational-technological, social and international

Formation and ecological and economic assessment of options for the development of the coal industry should be carried out on the basis of [59, p. 1-4]:

- developed integrated performance criteria that take into account the degree of change in economic, ecological, social indicators, and a complex of scientifically based compatible measures;
- economic-mathematical models based on the comparison of income from the main activity, capital costs, environmental and social costs associated with coal mining, and taking into account the results of the functioning of the environmental, economic and social spheres of the industry;
- economic mechanisms, including the formation of environmentally acceptable options based on compatible measures using integral criteria.

Taking into account the principles and factors indicated above, it is possible to analyze the current state of greening of the coal industry based on the concept of three types of economic regulatory mechanism:

- "stimulating" - with the advantage of market instruments and the creation of a favorable economic environment for the development of environmentally friendly production and other types of activities in the ecosphere;
- "tough" with the use of administrative and financial and economic instruments of coercion and repression with the help of a strict tax policy for the development of ecologically dangerous industries;
- "soft" with the establishment of liberal restrictive environmental frameworks that have a relatively weak influence on the pace and scale of ecological development, a framework understanding of the ecological and economic mechanism of the development of the coal industry is highlighted [63].

In our opinion, the study of ecological and economic conditions and factors of greening in industry in construction revitalization territories should become the basis of regional program and target planning for the implementation of the policy of ecologically sustainable socio-economic development in construction revitalization territories.

It is advisable to define the following as the strategic goals of such a policy on BRT:

- the priority of environmental safety requirements, the obligation to observe environmental standards and regulations regarding the protection of the natural environment and the use of natural resources;
- significant reduction of man-made impact of coal industry enterprises on the environment and population due to the implementation of an active policy aimed at increasing the efficiency of natural resource use and energy conservation;
- reduction of the formation of environmentally harmful substances in the process of production activities due to the introduction of progressive technologies of extraction (production), transportation and use of natural resources, closure of enterprises with an unacceptable level of environmental safety, implementation of preventive measures regarding the protection of the natural environment, greening of material production based on complexity decisions on issues of environmental protection and use of natural resources;
- reducing the harmful impact on the environment by localizing (capturing) emissions and discharges with their subsequent neutralization, storage and disposal;
- reduction and elimination of the dangerous consequences of the already caused ecologically dangerous impacts of mining enterprises on the environment and the population living in the construction revitalization territories adjacent to them.

On the basis of the strategic principles of sustainable development, the concept of sustainable development of BRT should be formulated, which should proceed from the need to fulfill three rather obvious tasks, which determine the three main strategic stages of ensuring sustainable development, namely [14]:

- overcoming ecological and economic crisis, software macroeconomic stability and the creation of favorable conditions for the sustainable recovery of economic growth on the BRT;

- structural restructuring of the production and infrastructure sectors, improvement of the quality of life of the population and provision of protection and restoration of the environment on the BRT;

- sustainable development of industrial production and infrastructure, ensuring a high quality of life of the population and the environment on the BRT, creating the foundations for the transformation of the regional economy on an innovative, ecological and social basis.

From our point of view, the structure of each stage is cyclical and should be implemented in a systematic sequence. The sequence of development of quality parameters of the economic management system and characteristics of alternative types of sustainable development strategies is implemented in accordance with the spiral-cyclic growth of requirements for the efficiency of the functioning of the relevant economic systems, namely:

- formulation of the mission, goal, definition of target tasks for the implementation of the functions of a sustainable type of the BRT economic system, separation of the functions of its components from the standpoint of the possibility of solving the problems of ensuring sustainable development in accordance with ecological and economic interests and the selected innovative development model;

- assessment of possible obstacles to the implementation of the regional policy of sustainable development, the state of the economy management system with the existing technological level;

- study of possible changes in the state of the BRT economic system under the conditions of additional contribution of certain volumes and flows of resources, information and development of a limited scale of strategic potential in the context of ensuring balance and achieving target development benchmarks;

- diagnostics of the parameters of the external environment of BRT activities, assessment of the severity of the impact of threats and risks, generalization of the consequences of the previous experience of transformation of the economy and the depth, scale and nature of the obtained socio-economic, ecological and organizational changes;

- the selection of types of resources corresponding to socio-economic and production-economic processes, available reserves with a multivariate development trajectory to achieve the rationality of redistribution between types of economic activity of investment and innovation opportunities to ensure the sustainable development of BRT;
- modeling of the composition of the means of action implementation and mechanisms for ensuring the strategy of sustainable development, building the optimal design of the state management system, determining the rules for the implementation of management influences and donations to the BRT;
- development of new forms, methods and technologies of management of subsystems of the regional economy, implementation of technical and technological solutions in accordance with priority tasks within the triad "economy - ecology - society"
- justification of objects and places of concentration of efforts, various types of resources with the possibility of their redistribution according to the calculated correlation effect on the sustainable development of certain macroeconomic indicators, processes, threats and risks to ecological and economic security;
- carrying out a forecast of the maximum possible to achieve and minimally expedient values of ecological and economic indicators of the development of BRT, excluding the extrapolation of retrospective trends for the future, experimental verification of the consequences of the implementation/implementation of a certain type of sustainable development strategy;
- substantiation of the required volume of investments and innovative efforts in certain spheres of activity to ensure the maximum effect from the implementation of the strategy of sustainable development, under the conditions of achieving the expected rates of economic growth and ecological balance on the BRT; urgent restructuring of the real sector in the direction of greening of energy- and resource-intensive and technologically dangerous industries;
- generation of a new methodology for the development of methods,

methods and techniques for solving the problems of implementing the strategic principles of sustainable development BRT, adequate to existing or likely social and ecological and economic processes;

- assessment of the future effect of the implementation of the sustainable development strategy of BRT and, as a result, ensuring the full development and development of the natural resource potential of BRT, increasing the rating of its competitiveness and innovative ability;
- generation of a new structure of state administration (state administration apparatus and its structures) with determination of the target functions of subsystems and activation of production and innovation activities in the context of ensuring eco-economic balance, improvement of mechanisms for implementing the strategy of sustainable development;
- the choice of an updated model of sustainable development in the context of achieving a high level of efficiency in the functioning of the economy; determination of strategic priorities and partnerships in the economic, environmental and social spheres of activity.

A tool of political activity, a means of improving the organization of the work of the region's governing bodies are targeted programs, namely a set of socio-economic, industrial, scientific-research, organizational, as well as other tasks and activities aimed at solving a specific socio-economic problem of the region, coordinated by resources, executors and terms of implementation. However, on the basis of the conducted research, we concluded that at the current stage of ensuring ecologically sustainable socio-economic development of construction revitalization territories as a complex task is not highlighted in the programs of socio-economic development of regions, but only individual indicators of regional development are presented.

One of the main reasons, in our opinion, is the imperfection of the systemic approach and failure to include ecologically sustainable socio-economic development issues in the main strategic goals when developing regional development programs.

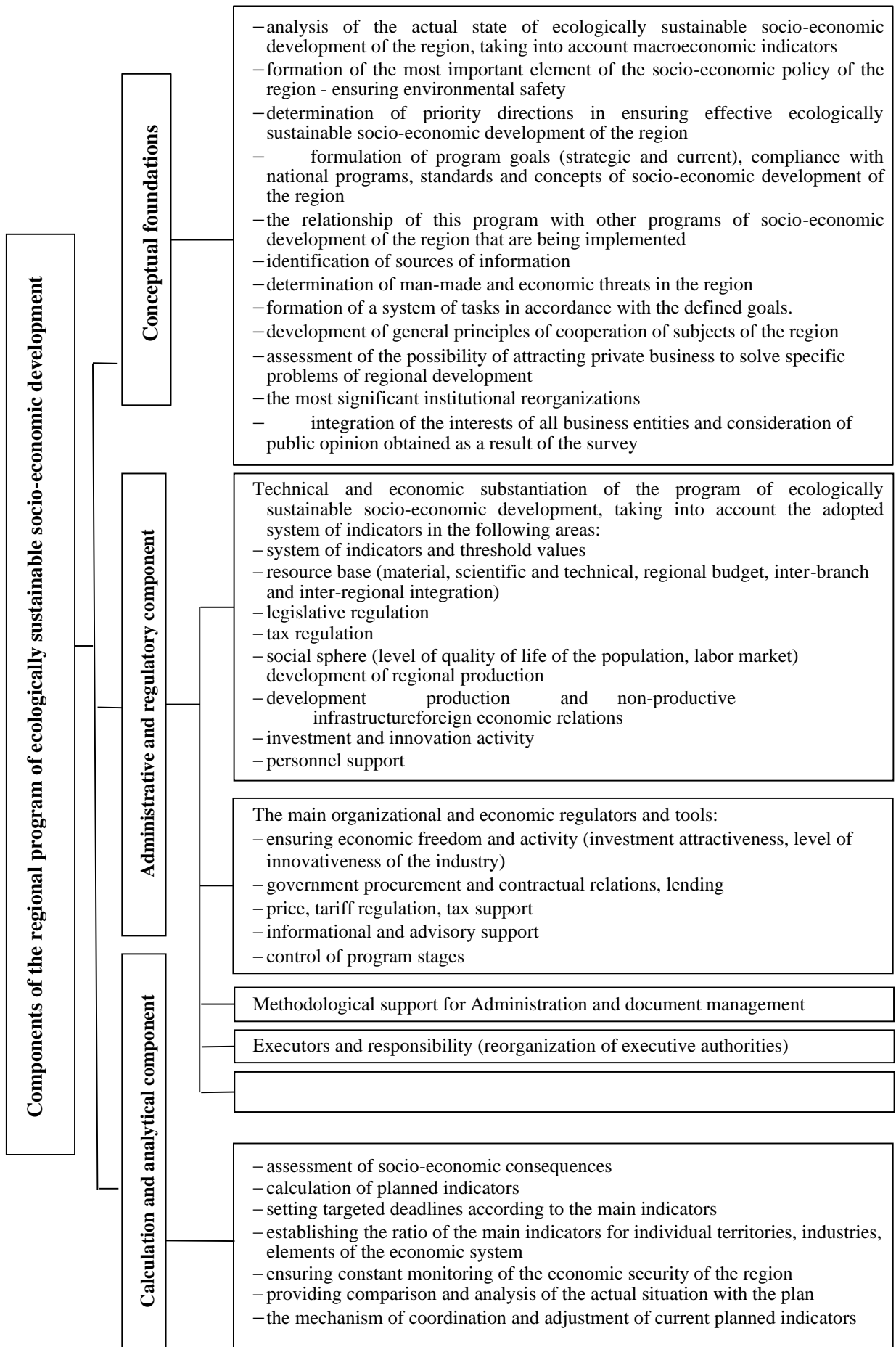
One of the priority directions of regional management in construction revitalization territories is proposed to determine ecologically sustainable socio-economic development. A model of a regional ecologically sustainable program is proposed socio-economic development of the industrial coal territory (Fig. 3.4), which, in our opinion, should become primary in the system of socio-economic development programs, which will make it possible to correctly choose the directions of socio-economic transformations. All predictive positions of the proposed program model must be formed in accordance with the unified state standards, taking into account the specifics of the development of a particular region.

The program for ensuring the ecological and economic development of the region should determine the directions of structural restructuring of the region's economy, taking into account local opportunities and features of the territory, and is compiled on the basis of economic forecasts of the region's development.

The main condition for the effectiveness of such a program is the consistency of priorities and the most promising directions of the region's development with its capabilities - natural-resource, innovative, human, scientific-technical and other potentials.

The main goals of the program can be:

- increasing the efficiency of the regional ecological and economic system in the complex due to the organizational and economic mechanism of ensuring the sustainable development of the territory;
  - timely forecasting and identification of external and internal threats to the ecological and economic security of the region;
- development and implementation of operational and long-term measures to prevent and neutralize destabilizing factors;
- ensuring European standards in the social sphere of the region due to ecologically sustainable socio-economic development;



- promoting the reproduction and development of science and education in the field of nature management, which will allow to overcome scientific, technical and technological dependence on external factors;
- integration of ecological and economic interests of all regional entities;
- use of inter-branch and inter-regional coordination;
- improvement of the sectoral structure of the industrial coal territory;
  - consideration of internal and external factors of ecologically sustainable socio-economic development of the region;
- improvement of the ecological situation in the region;
  - achieving regional development rates sufficient to achieve a certain level of regional security.

Thus, the study of ecological and economic conditions and factors of greening in industry in construction revitalization territories should become the basis of regional program and target planning and one of the main criteria for assessing the social feasibility of implementing ecological and innovative projects, including in construction revitalization territories.

#### **4.1 Analysis of the principles and methods of nature management in the context of ecologically sustainable socio-economic development of construction areas**

In a broad sense, management of the greening of building revitalization areas can be considered as an activity for the organization of rational nature management and environmental protection on them. Nature management is understood as the use of natural resources in the amounts and methods that ensure sustainable economic development, harmonization of the interaction of society and the natural environment, rationalization of the use of natural resource potential, economic mechanisms of ecologically safe nature management. This activity is provided by the implementation of:

- of the methodology (theoretical concept) of the main activity in the field of nature management: object of management, principles, goals, tasks, methods of goal achievement;
- structural and functional organization of nature management;

- informational, methodical and legal support.

Taking into account the fact that the process of management of nature use harmoniously combines the features of the development of two, at first glance, different processes, namely the development of nature and the development of society, we can come to the conclusion that the achievement of the goal should involve taking into account these features and various factors that are carried out directly

influence on the process of interconnection in the complex multi-criteria system "society - natural environment".

Therefore, the process of nature management demonstrates the objective necessity of forecasting possible consequences in the system of interaction of society on the natural environment and, conversely, the environment on society. This phenomenon acquires special importance in the conditions of scientific and technical progress (STP), when the scale of society's influence on the surrounding natural environment is commensurate with the scale of phenomena occurring in the environment itself. Thus, the ability of society to cause certain global changes in the qualitative and quantitative parameters of the balance of substances and energy in nature on a planetary and local scale (for example, the greenhouse effect, "ozone holes", as well as the disappearance or emergence of huge areas of forest and grassland, deserts, steppes, the territorial movement of certain huge masses of water and their localization in time and space and the creation of reservoirs and water surfaces).

Scientifically based management of processes affecting the surrounding natural environment should take into account the fact that the natural environment has a certain reserve, a limit in terms of the ability to self-renew, self-clean, and self-regulate. It becomes obvious that the management of the impact on the environment should move consistently from limiting the impact to rational transformation, rational adaptation of human activity to the features of the natural environment.

An objective necessity in modern conditions is the organization of purposeful, consciously organized and scientifically based activity on the impact on the surrounding natural environment based on scientific prediction of possible changes

and consequences by planning actions and forecasting consequences. It is possible to draw conclusions about the degree of objectivity and optimality of the management decisions made, based on the degree of knowledge of the properties of nature, the degree of development of available means

accounting and control over resources, as well as features and qualities of the natural environment and, of course, the pace of their restoration and reproduction.

Based on the determined objective principles of dialectics, it is practically impossible to restore the pristine quality of the natural environment, but it is possible to get close to it. It is also impossible to know the properties and qualities of a specific natural environment once and for all, because this process is endless, so the basic principles of effective management of the process of nature use must be determined, that is, those that would maximally correspond to the achieved level of knowledge about nature and human capabilities, taking into account the established restrictions, criteria. Among the main principles, the following should be highlighted:

1. Management of natural resources is an integral, necessary, mandatory element of social and economic development.

2. Management of natural resources should be carried out through the achievement of NTP at the same pace and means as are inherent in the main production.

3. Management of nature management is based on understanding the continuity of the process in time and space, taking into account the relationship of individual components, certain elements of the natural complex, as well as individual natural resources, their properties and qualities.

4. Natural resources and objects may not coincide with the formed administratively and economically separated territories, and may also not coincide with their boundaries (for example, on the territory of a large regional economic industrial complex, several integral natural objects, such as separate water objects or separate forest areas, because they spread over the territories of several regional economic complexes).

5. Natural resources and objects, by their nature, are not created by human labor, therefore they cannot be fully appropriated by a separate

an individual, a group of individuals, a team. The extent of ownership of them is almost a conditional concept, a phenomenon.

6. Optimizing the system of management of natural resources should take into account the division of labor (that is, territorial, public, international joint efforts, as well as coordination, cooperation).

7. It is necessary to observe the system in time and space of accounting, control and observation, etc., regarding the dynamics of quantitative and qualitative characteristics, as well as indicators of resource balances.

8. Due to the interest in the implementation of legislation on nature use at all levels of management (region, state, international agreements), responsibility for nature use according to its types (material, moral, administrative, criminal) should be stimulated.

The process of improving management in the field of use of natural resources should be implemented through clarification of the role and place of territorial and industry factors at the stages of formation of the main quality characteristics of the environment.

At the same time, it is necessary to take into account that in the system of planned management of rational nature use, priority is given to the territorial approach. There is experience that the local councils of people's deputies are the full-fledged managers of the natural resources provided for involvement in the field of production. Thus, the main task is to use the rights granted to local councils as effectively as possible and to combine territorial and industry interests, as well as to direct the production, economic and operational activities of construction enterprises and associations, ministries and agencies working in the region to a constructive solving current environmental problems.

Recently, more and more attention has been paid to the development and implementation of adaptive procedures for assessing the ecological situation in decision-making processes in the management of natural resources. This is due to the fact that: the interrelationships of social, demographic, economic and ecological processes are always complex in nature, the processes have the ability to change dynamically in space and time, so judgments about future changes in nature use are usually unreliable, even if they are based on the detected at a specific

moment, trends in the development of certain processes; while economic-production and ecological systems, which have the property of changing and self-organizing, can maintain their adaptability and ability to self-renew only within certain limits, which, if exceeded, can pass into a qualitatively different state;

- losses from errors in planning calculations and deviations at various stages of environmental protection policy implementation are too great to be able to implement them in a trial-and-error mode, almost limited to responding to violations, without self-learning of the entire system.

These circumstances demonstrate the impossibility of developing "ideal" environmental protection strategies that could meet the needs of society's development and at the same time remain stable for a long time. Changes made to such strategies should be based on in-depth scientific theories and dynamic optimization models. While the controlling and corrective mechanism of environmental protection policy should ensure anticipatory and prompt introduction of necessary changes in environmental protection measures, be based not only on the trends of changes in objective data, but also possess data that in the past led to mistakes or contributed to successes, as well as know and to take into account the "cost" of the consequences of both positive and negative experiences of environmental policy. Therefore, an adaptive approach to the management of environmental protection activities is one of the most important prerequisites for its effectiveness [8, p. 51-61].

Adaptation of the management mode is usually carried out in two ways. First of all, by correcting certain strategies of nature management and establishing key parts of the operational decision-making mechanism, which requires changing conditions and certain predictions. On-

secondly, experience shows that environmental protection policy can and should actively influence the formation of certain favorable conditions for its further development, namely, through increasing the level of environmental education of society, increasing its environmental protection potential, etc. It means active adaptation, which is achieved through purposeful changes in the external environment in accordance with the needs of achieving the long-term goal of protection and rational use of certain natural resources. At the same time, the nature protection policy should actively use emerging spontaneous adaptation processes carried out in the nature management system, if necessary, oppose them, depending on their direction and results.

The determined circumstances regarding the multidisciplinary and interdepartmental nature of environmental policy problems determine the complexity and specificity of the informational and methodological support of this activity, which led to the development of environmental monitoring.

The documents of the UN International Conference on Environmental Issues (Stockholm, 1972) justified the idea of monitoring in the form of national systems of constant observation of certain changes in the biosphere with the aim of obtaining operational information about the growth of technogenic influence on its components, as well as ecological forecasting and justification of regulatory decisions interaction of the technosphere with the biosphere [20].

Monitoring (from the Latin monitor — the one who oversees, reminds) — assessment of observation, (comparison with normative parameters), constant and continuous observation and forecast of the future state of the natural environment in connection with production and economic activity [27].

For the purpose of organizing the collection, processing, storage and analysis of information about the current state of the natural environment, as well as forecasting its possible changes and developing scientifically based recommendations on

making effective management decisions in the field of nature management in Ukraine since 1991 p. a system of state monitoring of the natural environment is being formed. Thus, the monitoring of the effectiveness of the environmental protection policy (MEPP) becomes the main component of the general environmental monitoring system, which combines separate environmental monitoring subsystems (EMS), namely monitoring of environmental protection potential (MPP) and monitoring of environmental protection education (MPE) [21]. In each individual case, a predictive surveillance system is implemented, the main functions of which can be defined as:

- systematization of operational information about existing processes and their consequences in the future, based on the results of development in the past;
- filtering of certain operational information through the identification of certain critical points of development;
- determination of possible existing development alternatives based on the indicators of normative forecasts of achieving the set goals in the conditions prevailing at a specific moment in time;
- obtaining recommendations and information for the governing body based on forecasting the consequences of implementing various development options.

Thus, within the framework of the monitoring system, not only the collection and accumulation of the necessary data should be ensured, but also the prompt execution of certain procedures of analysis, diagnosis and prognosis, which are necessary for management in an adapted mode.

In the subsystem of the Ministry of Emergency Situations, an assessment of the current environmental situation is carried out, as well as a forecast of its changes. The obtained results of the Ministry of Emergency Situations help to specify the goal of environmental protection policy, as well as to determine urgent tasks that require immediate resolution. Therefore, the MPP provides constant control over the state and use of certain nature management technologies, as well as over the effectiveness of the effective mechanism

economic and administrative regulation of mutual influences in this area, introduction of nature-saving innovations.

In MPO, as in MPP, in addition to information sources specific to this system, information about real changes in the surrounding natural environment that occur under the influence of anthropogenic activity is also used. As a result, the accumulated data make it possible to evaluate the final effectiveness of individual environmental education strategies, and then to make scientifically based corrections in the relevant parts of the environmental policy.

The joint action of all MEPP subsystems should ensure:

- continuous clarification of goals, specification and correction of tasks depending on changes in the emerging environmental situation;

- identification and research of possible options for the use and restoration of the nature conservation potential of a certain territory in accordance with data on the environmental friendliness of nature use technologies and the effectiveness of management influences, as well as information on the results of the use of certain nature conservation innovations;

- identification and evaluation of possible options for the development of environmental education, taking into account the influence of mass media and the results of educational work among the population.

Among the following significant ways of regulating nature use, one can define environmental expertise, environmental standardization and regulation, as well as certification and audit.

The purpose of environmental expertise is to determine the prevention of the negative impact of human economic activity on the state of the natural environment and the health of people in a certain territory, as well as the assessment of the level of environmental safety in a specific ecological situation in individual territories and objects [60].

Environmental standardization and rationing should be carried out to establish a complex of necessary and mandatory norms and rules regarding

environmental protection, as well as rational use of natural resources available in a certain territory and environmental safety.

Environmental certification becomes a tool for environmental accounting of certain, often subjective characteristics of specific economic objects for the preparation of adaptive management solutions. Therefore, if the accounting of available natural resources has already received a sufficiently developed form of reflection in the form of cadastres of natural resources, then the accounting of environmental parameters of economic entities still needs the development of adequate information support for further consideration of their impact on natural resources. The ecological passport of the enterprise can be defined as the foundation of environmental accounting of economic entities.

The expediency of using ecological passports is covered in Art. "State accounting of objects that have a harmful effect on the state of the natural environment" of the Law of Ukraine "On Environmental Protection" [85]. It is believed that the ecological passport is a comprehensive state document containing criteria for the relationship of a certain man-made or natural object with the environment.

The ecological passport of a manufacturing enterprise is defined by a regulatory and technical document that was first approved and put into effect in 1990. DSTU 17.0.0.04-90 "Environmental passport of industrial enterprises", which was developed to systematize information that determines the harmful impact of an enterprise on the natural environment. and control over compliance with established environmental norms and rules in the course of activity. Each individual industrial enterprise must develop its ecological passport, as a document defining the conditions of further interaction with the state, other business representatives and communities in matters of rational nature use and environmental protection. [36].

The environmental passport must reflect the data characterizing the sources of man-made impacts of the enterprise on the environment, namely the sources of emissions,

discharges, generation of waste, including dispersion of polluting substances in the environment and the level of use of resource-saving technologies at the enterprise and opportunities to reduce man-made impact, etc.

In contrast to the approved forms of environmental reporting, which characterize the enterprise as a source of harmful effects on nature, the main goal of the implementation of the enterprise's environmental passport is the formation of an information base for further environmentalization of its technological processes and harmonization of its production activities in the "nature-society" system. Among the goals of development and use of the environmental passport of the enterprise, the following can be identified:

- formation of the state accounting system and monitoring control over changes in the state of nature management entities;
- introduction of a generalized single information document in the system of state environmental management, which will reflect the harmful effects on natural resources of economic entities regardless of the forms of ownership, as well as give an assessment of their complex impact on the environment;
- creation of an information base that could be used to assess the degree of efficiency of a certain industrial enterprise's use of raw materials, water, land, fuel and energy and other resources;
- creation of an information base for environmental assessment of technologies used at the enterprise;
- software informative subsoil for licensing nature management;
- formation informative base for implementation economic mechanisms of stimulation activity construction enterprises in

in the direction of greening technologies, as well as saving natural resources and energy conservation.

Ecological audit is a determination of the existing ecological state, taking into account all the components of the environment, namely the lithosphere and mineral resources; relief, geophysical fields of the Earth and Space and their impact on the environment and human health. This refers to dangerous endo- and exogeodynamic processes that destroy the lithosphere and transform the terrain; make changes to

the hydrosphere and water resources; affect the atmosphere and climatic resources, with consequences for demography and population health related to environmental factors; changes in the technosphere and its impact on all previous components of natural ecosystems [58].

The ultimate goal of the environmental audit is to determine the compliance of the existing environmental situation with the current environmental standards, the implementation of which should ensure a socially acceptable state of the environment and the level of safety of the population's life. Its result should be, for example, a computer system of correlation of morbidity indicators of the population of construction areas depending on environmental factors, which should include:

- 1) databases of various degrees of morbidity of the population in certain areas by diseases in accordance with the current international classification of diseases (ICD);
- 2) electronic maps and databases on chemical contamination of soils, water resources, atmospheric air, vegetation with heavy metals, radionuclides, petroleum products;
- 3) computer maps of the ecological existing state of the geological environment, namely geophysical fields, geomorphosphere, landscapes;
- 4) maps of the ecological state of the technosphere of a certain district.

In order to determine the approaches and methods of rational

next, we will analyze the most widespread in literary sources.

In domestic works on economic theory, experts distinguish two main concepts of economic assessment of natural resources, namely cost and rent. Thus, the methodological and methodical principles regarding the economic assessment of natural potential were reflected in the works of L.D. Zagvoyska, T.E. Maseiko, M.M. Yakuba [68], M.S. Nudelman, A. I. Tarasov, I. M. Sinyakevich [17] and others.

Initially, the costly concept of nature management was singled out in economic science. Her idea is that natural resources should receive economic value because they are the subject of labor. The main criterion for the valuation of natural resources was the cost of

development and maintenance of natural resources in a condition suitable for operation. The weakness of the concept was that resources were put into operation, the development of which required less material and financial resources, labor costs.

Since the economic evaluation criterion "cost" had many significant flaws, the "result" concept appears in the scientific literature regarding the cost evaluation of natural resources, where the main criterion for the evaluation of natural resources was considered those results in cost form, which were obtained as a result of the development of a certain natural resource. However, none of the proposed approaches to the assessment of natural resources was able to fully reflect the real value that a certain object of nature use has for society. The result of the cost-effectiveness approach was the economic assessment of natural resources reduced to qualitative characteristics. It was based on various scoring systems, cadastres, conditional scales, etc.

According to the cost-value approach in the assessment of natural resources in the studies of S. I. Doroguntsov, K. F. Kotsenko, O. K. Ablova and others. it is proposed to combine the costs of its development with income from use [60]. This concept has the advantage that the value of the natural resource obtained in this way will be higher compared to previous cases, which is an incentive for the rational use of natural resources. But the concept also contains the shortcomings of

previous approaches.

Therefore, the most expedient majority of scientists determine the application of the theory of rent in the assessment of natural resources. At the same time, interpretations of this theory are contradictory, and the proposed methods of calculating rent are too complicated and have not yet been developed for many types of resources. Among the positive points of this approach, which stimulate the rational use of natural resources, in our opinion, it is appropriate to note:

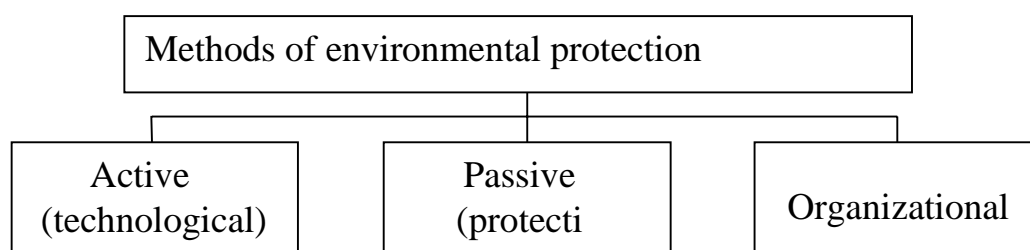
- in rent assessments, a resource that receives a higher value, i.e. the use of which brings a higher income with other costs being equal, receives a higher value;
- cost estimation is more objective, because they are oriented towards some average level;
- justified need to distinguish the rights and responsibilities of the owner of the resource and its user in order to determine the category of rent payments;
- rent estimates must take into account the factor of limited natural resources.

The reproductive approach discussed in the works of P.V. Koval, F.I. Yevdokimov, M.P. Zborshchuk, and A.O. Kravtsov is relatively new because it is related to the ecological crisis. Its essence is that the entire set of renewable and non-renewable resources in a certain territory and the existing state of the environment are close to the natural level and are considered as a certain standard, starting level. Then the use of any resource should involve the process of its restoration in the previous quality and quantity, or for non-renewable resources compensation taking into account the non-deterioration of the standard of environmental quality in the given territory. The cost of a natural resource in this case will be determined as the totality of costs necessary for the reproduction or compensation of the resource in the given territory [15 p. 6-10; 56 p. 3-8].

In the works of B. M. Danylyshyn, S. I. Dorohuntsov, V. S. Mishchenko, Y. V. Koval, O. S. Novorotov, M. M. Palamarchuk, V. P. Rudenko considers the monopolistic-departmental approach as one of the types of costly. Its essence is to correspond the amount of payments for the use of resources to the needs of financial support for nature protection activities of certain state services that

control nature use and environmental protection [45-47; 78].

Environmental protection methods mean a complex of technological, technical, and organizational methods aimed at solving problems of a medical-biological, hygienic, and ecological nature, as well as complex urban planning, etc. Universal methods for solving this problem do not yet exist. Therefore, the method that will give the desired positive results in some conditions, in other conditions, on the contrary, may not give satisfactory indicators. The most effective, of course, is a combination of certain methods, rationally selected for a specific case. According to the results of our research, all methods of environmental protection can be divided into three groups: organizational; active or technological; passive or defensive. The classification is presented in fig. 4.1.



Rice. 4.1. Classification of environmental protection methods To organizational

methods for environmental protection

the environment should include a set of certain legal and economic aspects of environmental protection and environmental and information provision of enterprises.

The legal basis of environmental protection and rationalization of nature use in modern conditions includes a system of state measures aimed at preserving and restoring natural resources on the one hand, and improving the conditions necessary for human life and the development of material production on the other [16].

The legal system in the field of nature management includes [16]:

- legal regulation regarding conservation and restoration of natural resources;

- state and public control over mandatory compliance with nature protection requirements and measures to rationalize nature use;
- legal responsibility for offenses.

The economic aspect of protecting the natural environment and the rationalization of nature use boils down to the fact that the products consumed by humans are necessarily created on the basis of the use of natural resources. We can come to the conclusion that a significant amount of various substances are involved in modern economic circulation, their reserves are extremely limited, while they are used very intensively. Therefore, in order to ensure the further socio-economic development of social production, it is necessary, first of all, to preserve the resources necessary for this, especially if it is impossible to find a full-fledged replacement for them. Thus, the adoption of measures for the protection of the natural environment (NPS), i.e. the creation of treatment facilities, etc., as well as the increase of natural wealth in the economic calculation, unfortunately, does not always turn out to be decisive.

The main reason for the negative environmental consequences of human economic activity is that, for the sake of economic goals, the contradiction is often not taken into account, in which the interests of ecology and economy, as a rule, conflict with each other. There is a need to develop a comprehensive concept of economic evaluation of the use of natural resources, which would become the basis of a unified system of indicators for evaluating nature-creating measures, with the condition that they do not contradict either the development of the economy or ecology. But this task is too complex and multifaceted. Therefore, the system of economic assessment of available natural resources generally means the system of established appropriate standards for the exploitation of natural resources. Justification of the economic expediency of capital investments in the field of nature management is inextricably linked with a real ecological and economic assessment of the anthropogenic impact on the state of the environment.

Moreover, when determining the economic result of a specific nature protection measure, it is necessary to take into account, for example, economic damage from NPS pollution, in particular, prevention due to the reduction of NPS pollution, as well as costs in industrial production, non-production spheres and

corresponding costs of the population of a certain territory.

In our opinion, these costs should include:

a) medical care and further maintenance of the population that has fallen ill and lost working capacity as a result of environmental pollution;

b) compensation for losses of certain products due to a decrease in labor productivity associated with absenteeism;

c) additional services of communal and household economy in the conditions of a polluted environment;

d) compensation for quantitative and qualitative losses of production associated with a decrease in the productivity of land, forest and water resources in a polluted environment;

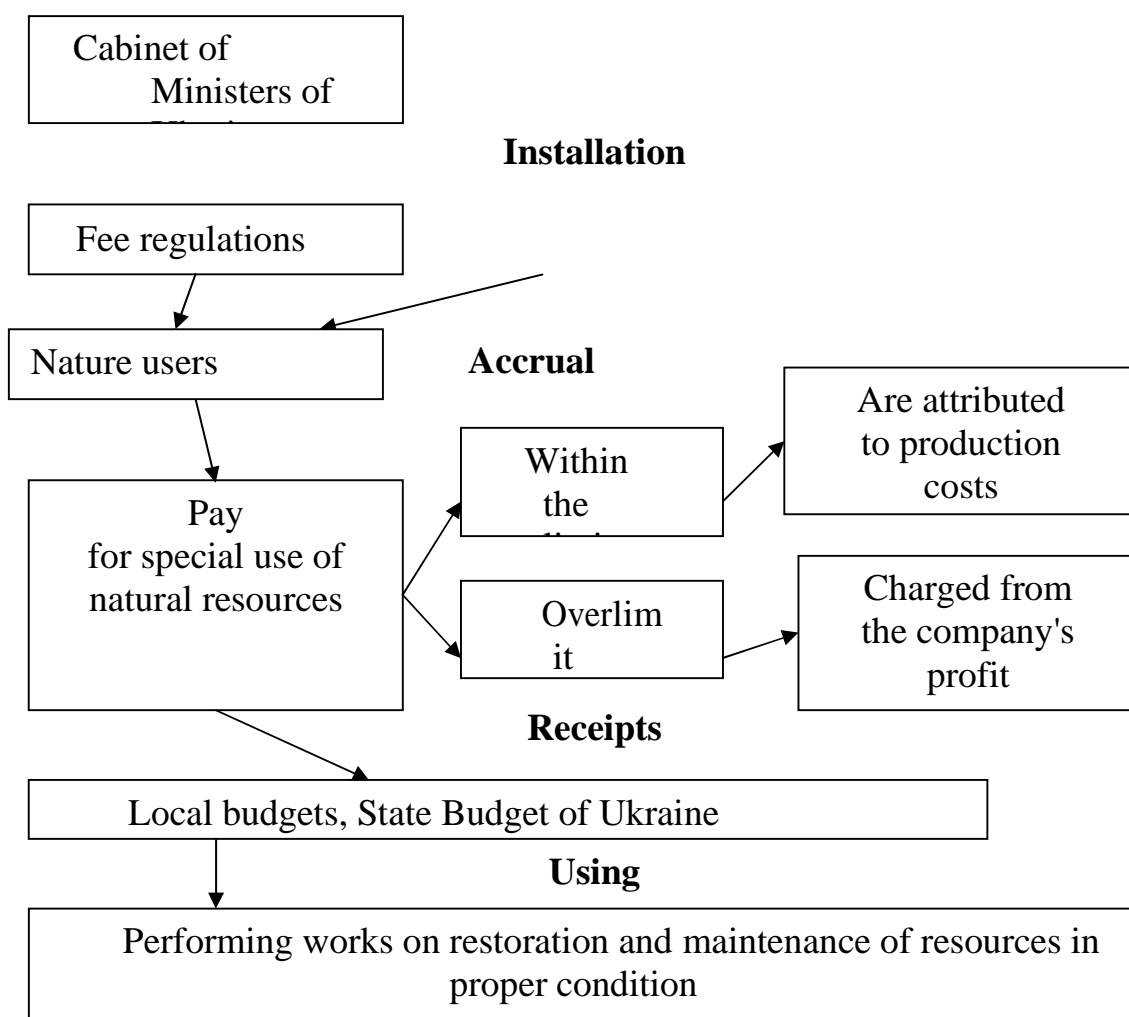
e) compensation for losses of industrial products due to the impact of pollution on fixed assets.

Economic methods are consistently included in the life of a modern person in the matter of protecting the natural environment. Thus, according to the Law of Ukraine "On the Protection of the Natural Environment" [85], economic methods for ensuring the protection of natural resources are:

- interrelationship of managerial, scientific, technical and economic activities of enterprises with the rational use of natural resources and the effectiveness of methods for the protection of natural resources based on economic levers;
- identification of funding sources for these methods;
- setting limits on the use of natural resources, emissions and flow of substances that pollute the environment, and disposal of waste;
- establishment of standards of fees and amounts of payments for the use of natural resources, emissions, discharges of substances that pollute natural resources, placement of waste and other types of harmful effects;
- providing enterprises, organizations and citizens with tax, credit and other benefits when using low-waste, energy- and resource-saving technologies and non-traditional types of energy, implementation of other effective measures for the protection of natural resources;
- compensation for damages that occurred as a result of violation of the legislation on the protection of NPS.

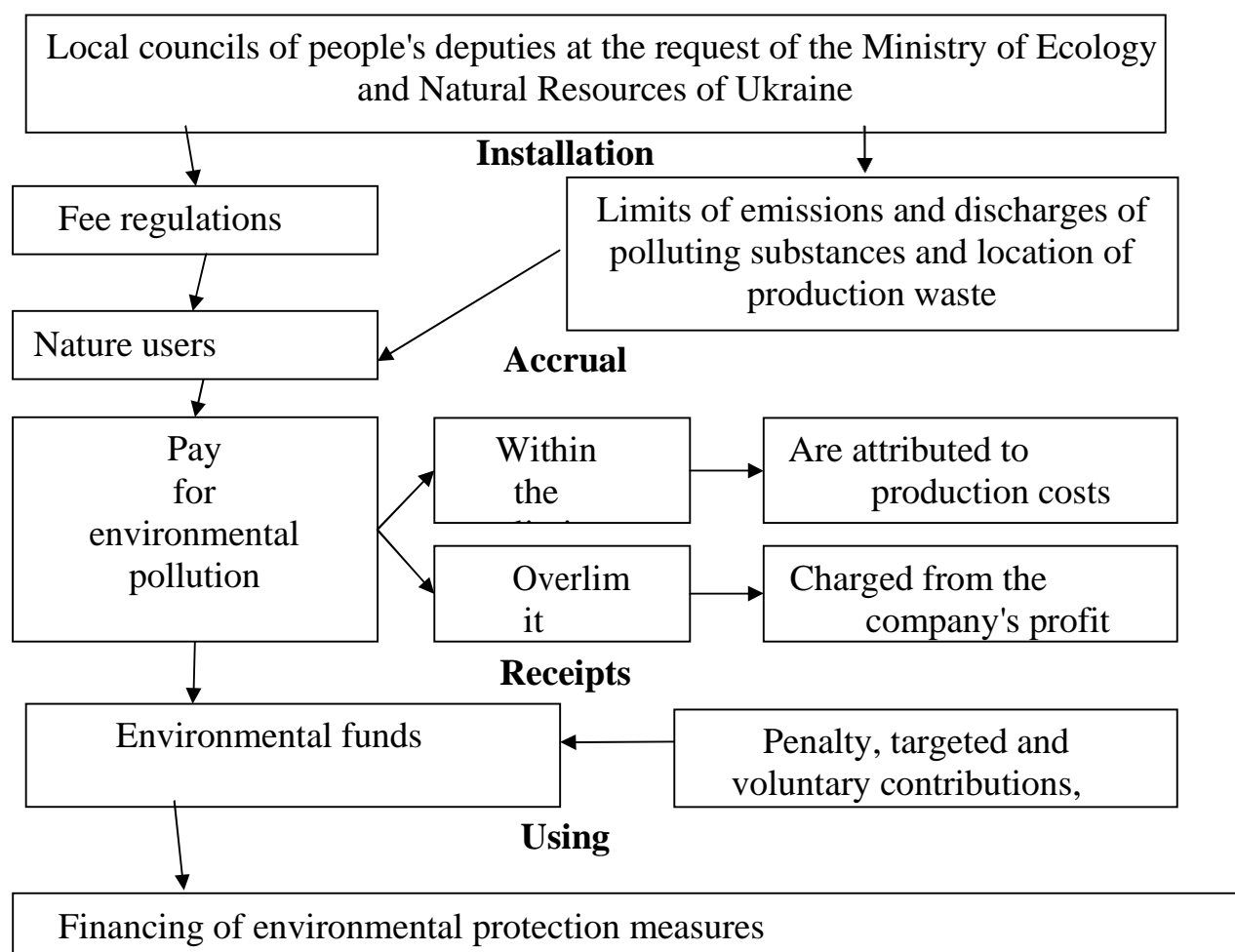
Financing of environmental protection measures for the protection of natural

resources should be carried out at the expense of the budget of Ukraine and local budgets, as well as the funds of enterprises, funds for the protection of natural resources and voluntary contributions, etc. There are two main types of payments, namely the fee for the special use of natural resources (PR) and the fee for pollution of natural resources. Generalized schemes of formation and spending of certain payments are shown in fig. 4.2 and fig. 4.3.



Rice. 4.2. Fee for the special use of natural resources in Ukraine (systematized according to the author's research)

In our opinion, it is expedient to define the active methods of combating pollution of the biosphere as the most progressive, because they make it possible to maximally reduce the mass and concentration and level of energy pollution for certain material emissions. Active methods directly affect the source of pollution, so their essence lies precisely in the improvement of existing and development of new technological processes and equipment.



Rice. 4.3. Fees for environmental pollution in Ukraine (systematized according to the author's research)

The main directions of development of these methods, in our opinion, can be defined as minimization of production waste; replacing toxic waste with non-toxic waste; replacement of unutilized waste with recycled ones and development

low-waste and zero-waste technologies. At the same time, zero-waste technology is recognized as an ideal model of production, which, with the rational use of certain resources and energy, allows to fully reduce the waste that occurs during the production and use of final products, and which eventually enters the environment. With the development of scientific and technical progress, there is a consistent approach of production to a waste-free, ecologically clean one through the introduction of low-waste technologies.

Practical experience proves that active methods are most effective in solving environmental protection tasks in such important industries as metallurgy, fuel and energy, machine building, road transport, etc.

One of the main sources of environmental pollution at the present time is the thermal power industry, which is characterized by high rates of development and impressive production scales, thermal emissions and combustion products of various types of fuel, namely carbon, sulfur, nitrogen oxides, arsenic compounds, dust and carbohydrates. Emission reduction can be achieved by improving fuel combustion technology, in particular, burning coal in a fluidized bed, or recirculation of flue gases leaving boilers, as well as fuel modification, for example, the use of sulfur-free fuel, production of coke, synthetic liquid and gaseous fuel from coal, separation ash from coal, as well as the use of natural types of liquid and gaseous fuel.

Accelerating the development of atomic and other types of energy (thermonuclear fusion, solar, wind, etc.) energy can ensure a significant reduction of emissions into the biosphere.

A rapid transition to reversible hydro-ash removal systems based on the multiple use of water will contribute to reducing the consumption of clean water, and therefore to reducing the pollution of natural water bodies.

Active protection methods are also used at certain stages of cleaning emissions from harmful impurities in the processes of obtaining utilized and non-toxic waste. Taking into account that active methods radically solve the problem of environmental protection, it should be taken into account that their implementation requires the implementation of sufficiently time-consuming and expensive measures, namely the implementation of specialized research and design works on the improvement of technological processes, as well as their introduction into production along with solving complex tasks of both a technical and organizational nature, as well as a socio-economic plan. Based on the above, passive methods of protection have become the most widespread in modern conditions.

Passive methods, as a rule, have a protective nature. The practical use of these methods is often not related to the impact on the source of pollution, but the technologies of passive methods remain the main means of combating environmental pollution. Passive methods contribute to reducing the concentration and level of pollutants already on the way of their spread in the biosphere, this is almost non-interference in technological processes, but only the fight against pollution that has already formed through the use of organizational and technical measures, for example, such as the rational placement of pollution sources; purification of emissions into the biosphere or localization of pollution sources.

Depending on the scale of pollution, the issue of rational placement of existing sources of pollution is resolved at different levels, in particular, state, regional, and local.

Thus, at the state and regional levels, the search for a solution to this problem is based on long-term forecasts regarding the pollution of the biosphere, and is regulated by state plans, which are developed taking into account the placement of productive forces in a certain territory of the state, as well as plans for the development of industries and production volumes, taking into account the landscape climatic conditions, etc. Therefore, in connection with the high

with the level of concentration of construction enterprises in the territory of large cities, the restriction of new construction and the relocation of construction objects to small and medium-sized cities, along with the removal of sanitary and hygienic industrial enterprises from cities to new industrial areas, is of particular importance.

At the local level, rational placement of pollution sources is implemented thanks to: determination of the optimal place for the construction of construction objects, that is, rational placement of construction buildings on the territory of the enterprise; construction of high chimneys for the purpose of dispersing dangerous substances in the atmosphere; establishing boundaries of sanitary protection zones, etc. When choosing a place for the construction of a production facility, the topography of the area, the actual state of the atmosphere, namely meteorological conditions, ventilation, etc., the influence of existing facilities, as well as a number of other factors are taken into account [78].

Industrial enterprises, as a rule, are located on flat terrain, which is recognized as unsuitable for agricultural use, with mandatory consideration of the dominant direction of the wind from the leeward side in relation to residential buildings. [22]

Industrial sites are recommended to be located at a lower level, compared to the residential area, in this way means of protecting it from washing away pollution from production sites are formed. The location of the sewage discharge point must be located downstream of the river from the boundaries of the residential area and the places of water use of the reverse flow in case of gusty winds.

Industrial buildings, which are sources of noise, vibrations, especially harmful substances, are placed on the edge of the industrial area on the opposite side of the residential area. The mutual location of production buildings is chosen in such a way that when the winds are directed towards residential areas, their emissions do not combine. Localization of sources of pollution includes isolation and sealing of sources of material pollution,

shielding and absorption of energy pollution, burial of production waste. Isolation and sealing of the remains of material pollution is carried out with the help of special warehouses, where there is technological equipment that emits pollutants, as well as replacement of flange connections of certain equipment elements with welded ones using seamless rolling of welded pipelines and ensuring the tightness of the floor, etc.

To protect residential areas near radio stations, power transmission networks, television centers, construction facilities and other objects from electromagnetic radiation of radio frequencies, shielding of the residential area with buildings that have a high content of reinforced concrete structures is used, as well as by changing the direction of radiation of antennas and multi-row planting trees along the electromagnetic wave propagation front.

Protection against noise is recommended to be carried out by construction and acoustic methods through sound insulation, shielding, sound absorption.

Localization of waste that cannot be disposed of is carried out by burial. Thus, concentrated wastewater, which contains toxic and radioactive waste, must be pumped into deep horizons of the earth's crust, such as abandoned mines and exhausted wells. In practice, the costs of burying liquid waste are up to 10 times lower than the costs of cleaning, which determines its wide application. Radioactive liquid waste of a high level of activity is pre-concentrated to small volumes, and then preserved in sealed underground containers. As for solid radioactive waste, it is stored in special containers in the earth's crust at a great depth or filled with concrete in concrete trenches, etc.

Despite the above, the main means of combating pollution of the biosphere remains the purification of emissions from hazardous substances. Purification of emissions is defined as liberation from harmful substances

solid and liquid pollution in order to reduce their concentration to the established levels, at which no damage will be caused to the biosphere.

Therefore, in the existing conditions of socio-economic development of construction areas, there is a need to organize purposeful, consciously organized activities of the relevant management bodies (instead of spontaneous measures and attempts) regarding the impact on the natural environment on the basis of scientific prediction of possible changes and consequences (planning, regulation of actions and forecasting of consequences ).

Management of nature use involves certain influences on the system of relationships between the natural environment and society in order to organize, find an effective organization to meet the needs of natural resources, taking into account the properties and qualities of natural objects. Therefore, based on the object of influence and the difficulties of the mentioned relationships, the result of the management process can be effective and most appropriate to the set goals, provided that it has a scientific justification based on the use of objective laws.

The current level of development of productive forces should also be matched by an adequate mechanism for managing specific construction territories, which have their own characteristics in revitalization regions. It should be based, first of all, on the state's interest in the development of such territories. In our opinion, the management of construction revitalization territories should meet the following basic requirements:

- ensuring that the system achieves the goals of administrative and economic development of a certain territory;
- compliance with the principles of openness and further democratization of management, which will help direct the conscious activity of the population of a certain territory to the use of available reserves.
- territories should organically fit into the political, economic and organizational structures of the state under the conditions of sustainable development.

The management mechanism must be flexible, capable of reform and transformation, taking into account the specifics and features of all components of the development of a certain territory.

The system of goals is the foundation of the operation of the economic mechanism in matters of regulating the development of construction revitalization territories. Undoubtedly, it should be based on the constant consideration of the economic interests of all social groups living in the territory, as well as labor groups, entrepreneurs, associations, and should also ensure the intensification socio-economic development economy territories and the progressive restructuring of its structure through the acceleration of the pace of scientific and technical progress and the solution of current social problems. Economic goals management specific industrial territories expedient divide into several groups depending on the levels of management subjects interested in their achievement, in particular state, territorial and local. Among the goals of state significance, it is expedient to include the following: increasing the role of a certain territories in accelerated scientific and technical progress through activation intellectual potential highly qualified personnel with increasing the effectiveness and completeness of the application of the unique historical and cultural potential territories for development tourism and widepropaganda cultures; and also in creation of market infrastructure, stimulation of entrepreneurial and business activity, further development of foreign economic relations and solving health care problems, development of transport infrastructure.

Among the goals of the territorial level, it is appropriate to mention:

- ensuring the resource-target balance of the socio-economic development of the production complex of the territories;
- constant improvement of the structure of the economy of certain territories in the direction of increasing the number of specialized industries, as well as strengthening their complexity due to the increase of the contribution of individual administrative and territorial units to the development of territories and the state in general;

- ensuring the balance of economic and social development under the conditions of guaranteeing the normative level of the quality of life of the population through the rational use of territorial resources and the preservation or restoration of ecological and industrial balance;
- rationalization of placement of certain productive forces in the "state-territory" system.

Local goals that must be ensured by the economic mechanism for regulating the development of individual territories include the following: rebasing and liquidation of industries or repurposing ineffective according to economic, ecological, or social criteria; timely resolution of local problems related to improving the quality of life of the population in a specific area (housing, employment, food, education, etc.); as well as increasing the efficiency of the construction, agro-industrial, energy, and transport complexes by implementing their reserves through cross-industry use.

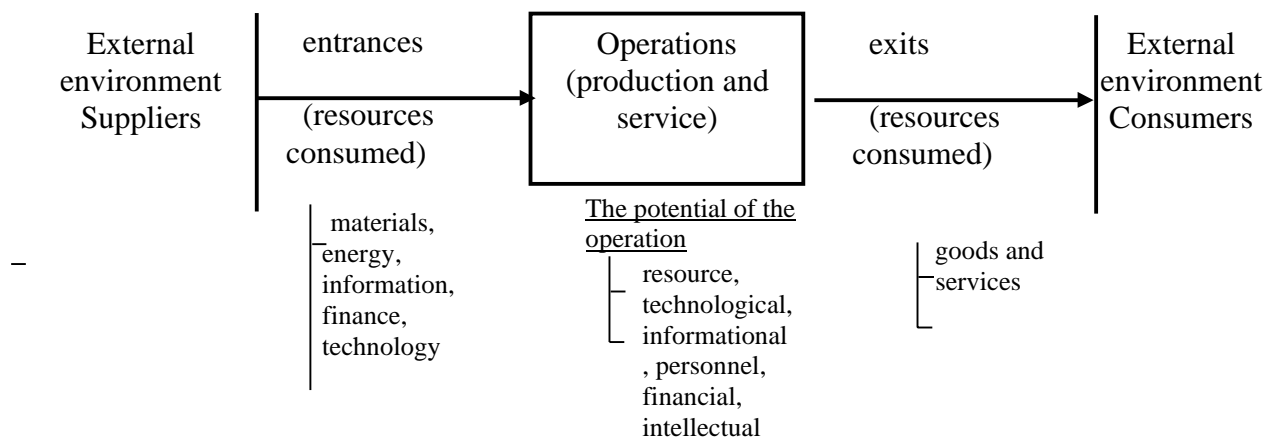
The functions of a specific territorial management body depend on the tasks assigned to it, for example: regulation of economic activity of production enterprises and organizations of various forms of ownership with the aim of the most efficient use of natural resources; comprehensive development and functioning of industrial and social infrastructure for the purpose of increasing the efficiency of production potential, which will contribute to the creation of a high level of living conditions of the population; as well as environmental protection by ensuring reproduction of the ecological conditions of life in the territory [15, pp. 13-20].

In market conditions, the implementation of these tasks creates the need for certain changes regarding the functions of territorial management bodies and the methods of implementing these functions. Therefore, it is necessary to demarcate the functions of entities that manage in a specific territory and to switch mainly to tax methods of regulating economic activity, as well as to expand the legal basis for economic methods and to give a certain independence to municipal

bodies in matters of formation of modern territorial management structures.

The organization of economic management of the territory should be based on the principles of self-sufficiency, self-financing, material interest, equivalence of commodity exchange on the territory. A clear balance must be maintained between trading companies, large-scale enterprises, banks and representatives of small and medium-sized businesses. Economic and social planning should be aimed not at the development of a detailed draft plan, but at determining the direction of economic and social development. Planning should include a carefully developed set of levers (tariffs, investment control, public procurement, tax policy and financial loans) of influence on industry, agriculture and other sectors [49]. And predict certain economic activity, the consequences of activity and recessions at various stages of development of new and traditional industries and industries.

The generalized scheme of the process of interaction of production with the external environment is presented in fig. 4.4., which can be the basis of the resource cycle of individual production.



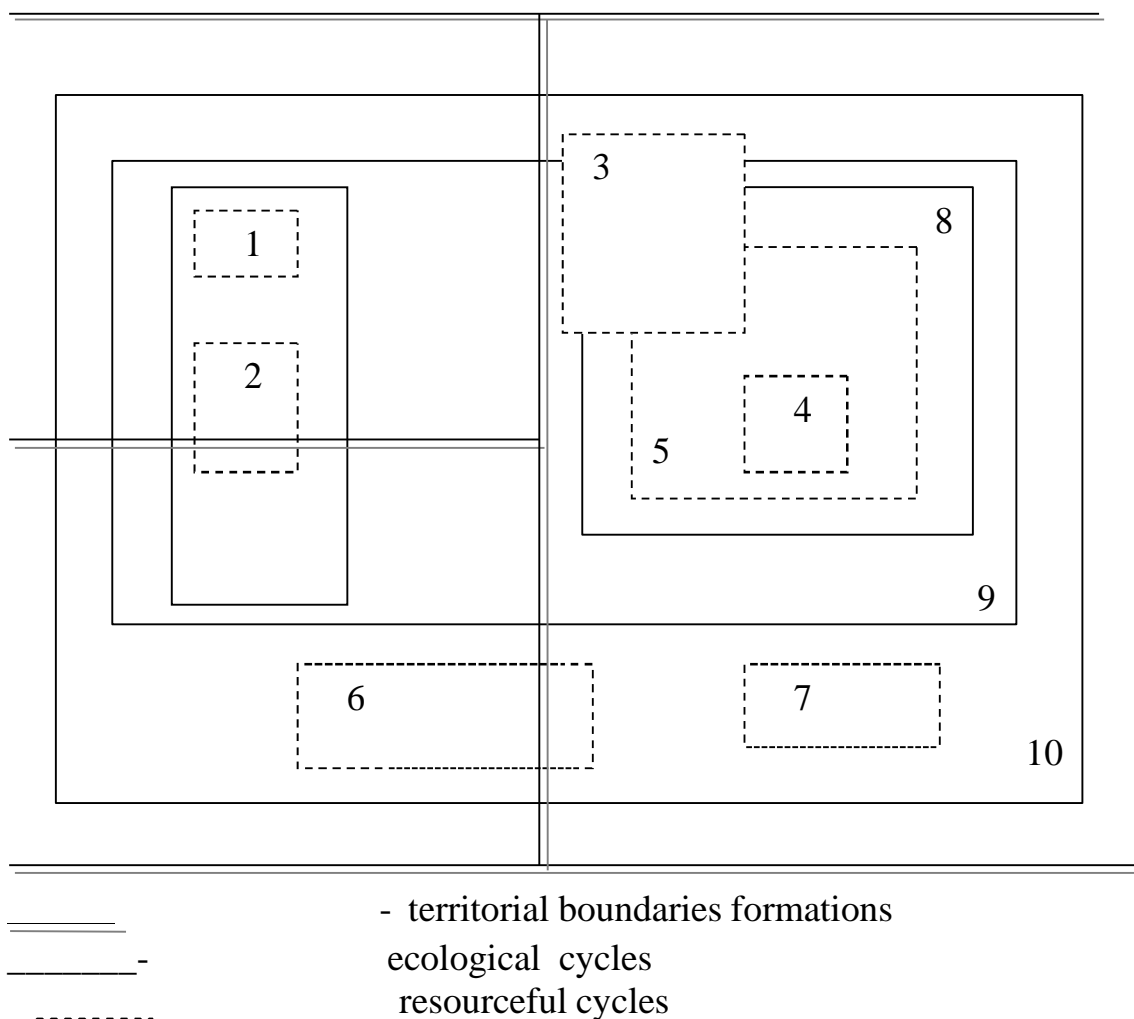
Rice. 4.4. Generalized scheme of interaction of the production process (service) with the external environment

A certain amount of substance (energy) is always spent on the production of a useful product, part of which in the production process is inevitably dispersed into the environment in the form of various impacts, therefore, the rational use of resource potential should strive to create resource cycles of production in the conditions of closed ecological cycles. This determines the necessary expansion of the rights of territorial management bodies throughout the territory in certain directions.

The first direction should be related to the establishment of production, that is, projects should be implemented that are of interest to the territories and stimulate the accumulation of forces and economic opportunities through a close industrial and economic partnership. In fig. 4.5. basic situations of crossing resource and ecological cycles and boundaries of territorial formations are presented.

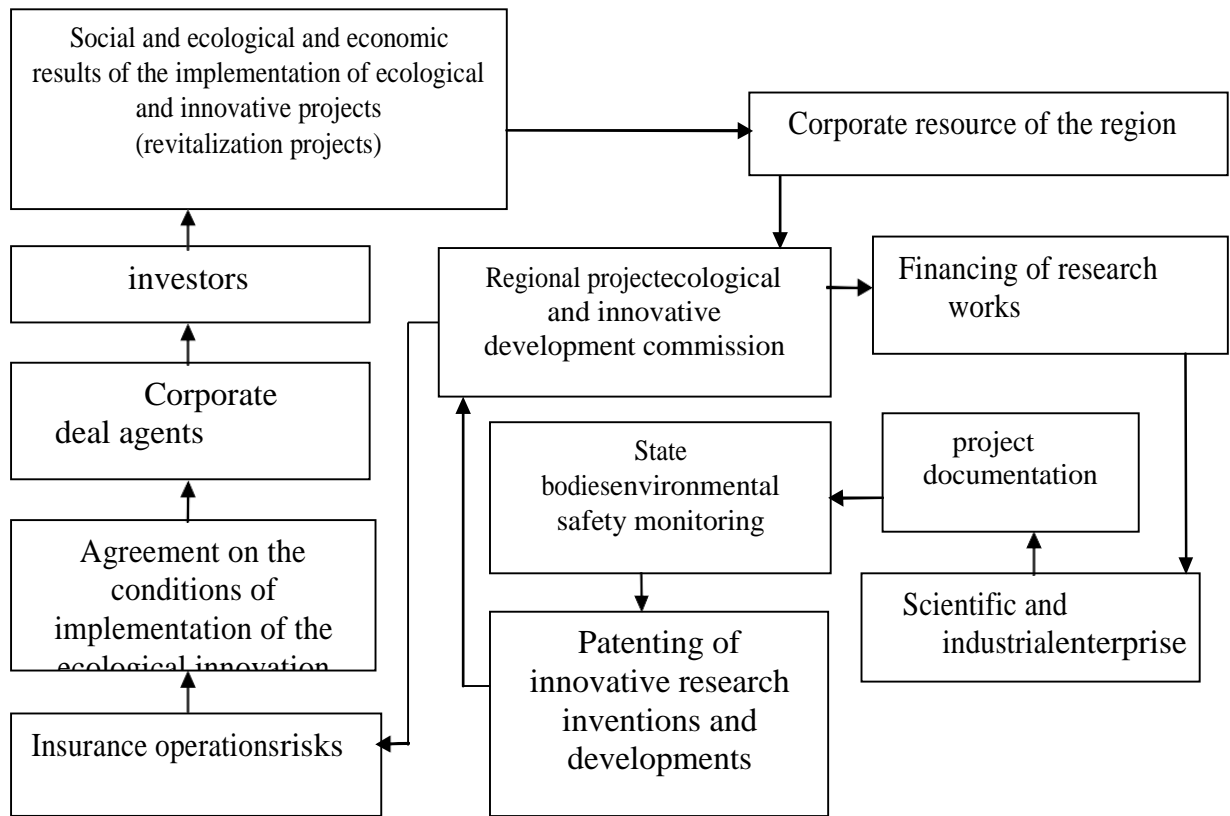
Open resource cycles have gaps in the place of waste generation (which in this case should also include harmful emissions into the air, water basins, soil, etc.). These gaps can act as breakers of ecological cycles, parts of which they are, if the amount of total waste exceeds the maximum permissible values for a certain ecological cycle. In such a case, an open ecological cycle can act as a breaker of the ecological cycle of a higher rank, of which it is a part, up to the level of the cycle capable of accepting such a mass of aggregate waste into its streams.

Therefore, the second important direction is greening, that is, the formation of mechanisms of environmental safety and rationalization of nature use, especially in the real sector of the economy. The activity of state monitoring bodies of social and environmental responsibility should be ensured by a special economic model of property and environmental risk insurance with future investments in a single regional ecological and innovation project financed through these bodies.



Rice. 4.5. Principle situations of intersection of resource, ecological cycles and interterritorial formations (1,2,3,4,5,6,7 – resource cycles that are carried out within the framework of ecological cycles 8,9,10 and cover the corresponding inter-territorial formations).

In terms of content, this model becomes a corporate agreement of the parties and is aimed at replacing an outdated technical and technological base with potentially dangerous productions, as well as a means of managing the environmental safety of a certain region and revitalizing specific territories [15]. The structural and functional model of the interaction of the participants in the processes of regional innovation development is shown in fig. 4.6.



Rice. 4.6. Structural and functional model of interaction of participants in processes of regional ecologically sustainable socio-economic development

The third direction is to determine the integrated use of available resources. Certain revitalized objects can be used in the processes of organizing domestic and foreign tourism. Therefore, depending on the share of investment costs for the formation of the necessary infrastructure in the process of mastering the revitalization of these objects, there is an opportunity to earn a profit in hryvnias and foreign currency [15].

Provided that economic relations between individual territories develop on a mutually beneficial and equal basis, they not only do not harm the development of their independence, but on the contrary, strengthen it. Manufacturing enterprises themselves are looking for future suppliers and consumers of products. Production growth increases due to the amount of income to the local budget. In the event that local conditions are such that the costs of

production of individual goods exceeds the costs of their purchase, authorities should focus on including these goods in a special intensive system of trade relations.

One of the main tasks of power structures in market conditions is to create conditionally equal starting opportunities through investments, grants, subsidies, tax benefits, which are within the competence of local representative authorities. This causes the emergence of the need to solve the problem of equalization, that is, the redistribution of budgetary resources. It is appropriate to determine that the desire for equalization becomes a powerful factor that determines the unity of the state. Unfortunately, the impossibility of achieving absolute equality of socio-economic development of the territories is determined by the relevant circumstances.

First of all, there are no completely identical regions in terms of natural potential, availability of human and other resources. The need to take into account the difference in potentials is an objective requirement in the formation of an economic development strategy, where the principle of economy of public labor should determine the priority direction of socio-economic development of certain territories that have more favorable objective conditions.

Secondly, the objective socio-economic differentiation of the territories is to a certain extent connected with certain advantages of the transport position, available natural resources, however, it is leveled by the system of assessments of the relevant resources. But taking into account the labor intensity and scarcity of certain resources evens out some economic conditions in a specific territory, but, unfortunately, does not ensure absolute equality. This is impossible because in the conditions of a market economy only a small part of the price mechanism is controlled by real authorities. But it should be remembered that there is a danger of losing incentives for accelerating economic development in those territories where it is associated with lower costs of public labor [9, p. 116-120].

Thus, the economic policy of the territories should be based on economic equalization through the specialization of the production of industrial and agricultural products according to market needs. The development of production requires such forms of organization at construction enterprises and in agriculture that could correspond to the pace and content of market transformations, but this requires their significant support and improvement in order to promote the development of production and increase its profitability.

The biggest shortcoming of territorial economic policy can be defined as insufficient use of a systemic approach. First, it is necessary to determine what exactly we understand by the concepts of "economic policy of the state", in particular as a system and its subsystems (territories). Undoubtedly, we are talking about the formation of socio-economic policy, where the economic policy of the state considers, on the one hand, the practical activity of the relevant state bodies in all territories of the country, clearly elaborated in the legislative field, while on the other hand, it is understood the socio-economic policy that should be carried out on the basis of national legislation, but by the territories themselves to achieve local goals.

World experience shows that it is the strictly centralized model of territorial organization and state administration that leads to negative consequences. It inhibits certain areas of development of the local economy and does not allow solving the existing social problems of the territories. Therefore, there is a need to implement the socio-economic policy of territories where the strategic goal should be to significantly increase the standard of living of people in the country based on the qualitative improvement of methods of using their resource potential, as well as fundamentally new approaches to the development of productive forces and improvement of the ecological situation. But the achievement of this goal is possible only with the implementation of two decisive directions: first, the state is called to ensure unity in its territories

reproductive macroeconomic processes, and secondly, it should promote the economic interest of territories in active socio-economic activity, ensuring the implementation of the strategic goal of structural and qualitative renewal of the economy in conditions of sustainable development.

Thus, based on the analysis of the principles and methods of management of rational nature management, we determined the expediency of taking into account the peculiarities of the intersection of resource and ecological cycles within the framework of inter-territorial formations in the processes of managing the ecological and economic development of construction revitalization territories. Undoubtedly, this requires defining the role, functions and powers of the relevant state regulatory bodies in the field of nature management and environmental protection.

## CONCLUSIONS

An integral result of the master's study is the substantiation of theoretical and methodological provisions regarding the formation of a new concept for the implementation of ecological and economic policy, principles and methods of environmentalization and institutional support for the development and implementation of innovative projects of ecologically sustainable socio-economic development and revitalization of building revitalization territories.

The conducted research made it possible to formulate the following conclusions and proposals, which have both theoretical and methodological and scientific and practical significance.

The scientific views on the theoretical and methodological prerequisites of ecologically sustainable socio-economic development of building territorial systems based on orientational paradigms and principles of the dialectics of sustainable development and the economy of nature use are revealed and summarized. The dialectic of ecologically sustainable social economic development is considered in the work as a fundamental principle of modern ecological knowledge, attention is focused on its property as development, which means the transition of one quality to another with the aim of forming new systems, new types of organization that grow from previous systems. It was determined that the laws of dialectics allow for the formulation of common principles of the development of socio-economic systems, aimed at increasing their stability, the justified need to create opposites to processes that have no countermeasures and disturb the balance of the system; maintenance of balance, balance of opposing forces and processes; elimination of disparity and unreconciliation of contradictions; limitation and control of self-organization processes; planned preparation of conditions for the necessary qualitative changes in the organization and development of building territorial systems.

1. The essence of the ecological and economic component of the concept is determined

"industrial coal territory", which, unlike the existing ones, is proposed to be understood as an object of sustainable development, which is interpreted as an area of administrative distribution of natural resource potential, where production assets and production waste of revitalization enterprises are located, which are users of natural resources and potential sources of man-made load and environmental hazards; as well as the classification of construction revitalization territories according to such criteria as the direction of revitalization, assessment of the level of safety, features of the technogenic and ecological impact of mining production.

2. The concept of ecologically sustainable socio-economic development and revitalization of BRT has been developed and theoretically substantiated, which by determining the priorities of environmental policy, first of all, bringing the BRT out of the crisis ecological situation, directions and methods of greening at the meso- and macro-levels, institutional support of management on the condition of achieving agreement between interests of private, state and public subjects of nature management sets strategic goals and creates organizational-economic, market and administrative tools that allow, with the use of specific means of achieving the efficiency of industrial nature management, to optimize innovative projects of ecologically sustainable socio-economic development and revitalization of BRT.

3. The essence of the revitalization of BRT as a special form of their expanded reproduction with the aim of their integration into the natural environment and the economic turnover of administrative-territorial formations is revealed. A classification of the principles, processes and stages of the revitalization of BRT is proposed, which allows the enterprises located on them, based on the existing system of economic relations, to choose the most favorable scenario, starting with a full diagnosis of the financial state, production potential and factors of environmentalization of the polluted territory and ending with implementation its programs. Systematicity, purposefulness, ecological and economic conceptuality and innovativeness are defined among the principles.

4. Based on the results of the analysis of the ecological and economic condition of the construction revitalization areas of the Donetsk region, it was proven that the consequences of environmental pollution are particularly acute in the regions where coal and mining enterprises are concentrated. It was determined that indicators of environmental load in the construction revitalization territories have reached a critical level in terms of atmospheric pollution, destabilization of the ecological-hydrogeological balance, disposal of land resources and subsoil. An approach to assessing the consequences of man-made pollution at mining enterprises and surrounding territories on their ecologically sustainable socio-economic development based on relative indicators of pollution of the natural environment (indicator of complete use of water resources, indicator of non-closed cycles of water resource use, indicator of external impact of production on the atmosphere) is proposed. indicators of the effectiveness of the use of financial instruments within the framework of nature protection activities and rationalization of nature use (indicator of financing of industrial revitalization by enterprises, indicator of the share of environmental sanctions, indicator of the ecological cost of production in the volume of sold products, etc.), the effect of "decoupling", which determines the discrepancies between the rates of economic growth and changes in indicators , characterizing the negative impact on the environment in a branch-territorial section.

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