DOI 10.26886/2414-634X.2(38)2020.2
UDC: 69.003:502.1:338.28

FORMATION OF PARAMETER SYSTEM FOR DIAGNOSTICS PRODUCTS BIOSPHERE COMPATIBILITY

H. Shpakova, PhD in Technical Sciences
http://orcid.org/0000-0003-2124-0815
Kyiv National University of Construction and Architecture, Kyiv, Ukraine
shpakova.a@gmail.com

The article deals with the stage of formation of universal indicators of evaluation of biosphere compatible production on the principles of sustainable development. The concept of assessment consists in the universalisation of the assessment criteria adapted to the relevant industry in view of the environmental and economic constraints that operate in accordance with international environmental regulations. The limits of isolation of optimal solutions and algorithm of their estimation are presented. A list of economic and managerial independent factors (indicators) based on commonly accepted accounting indicators is proposed. Factors that impede the spread of best practices for sustainable production in diagnosing environmental and economic compliance are analyzed. On the basis of the analysis of impact factors, a list of coefficients and indicators that integrate the components of the socio-ecological-economic system into a single system of biosphere compatibility assessment and comprehensively characterize production is proposed.

Key words: environmental and economic monitoring, sustainable development, green technology indicators, biosphere compatibility of production.

Introduction. Problem statement. Ecology of economic activity at the present time is the prerogative of the most excused country of economy and economy. Tiles of the country with a highly reproached financial system in the winter contribution to the life of a great cat in environmental protection. To the most beloved endeavors of the state, like Prague before the economic growth on the principles of steel development, the realization of such minds, the functions of the public, so that they can take care of the environmental protection of the public.

Under the conditions of the existence of modern models of economies of the countries of the world and against the background of a complication of the general environmental crisis, which, according to certain signs, has

taken the form of an environmental disaster, a clash of economic and environmental interests is inevitable. At the same time, short-term economic interests prevail mainly in third world countries, as a result of which less funds are allocated for environmental protection than is necessary, or not allocated at all. Projects approved at the state level appear, focused on “quick” profit and deceptive well-being now, but threaten with losses in the future.

Analysis of recent research and publications. English researcher L.J. Botton wrote: “Two options are possible: either people will make so that there will be less smoke in the air, or smoke will make so that there will be fewer people on Earth.” The founder of the doctrine of the biosphere V.I. Vernadsky defined it as "the shell of life - the area of existence of living matter." He outlined the paradigm of the impossibility for humanity to “freely build its history”, emphasizing the need to comply with the laws of the biosphere, taking into account the laws and restrictions that affect civilizational development. The scientist noted that technogenic impacts on the biosphere provoke the loss of its stability, as a result of which a spontaneous process of self-destruction of the biosphere as a self-regulating system that does not depend on people can begin [1]. As Stephen R. Mann noted in his Theory of Chaos and Strategic Thought, humanity exists because it is an element of this unique self-regulating system – the biosphere. For the loss of equilibrium, small actions are sufficient in comparison with the scale of global processes [2]. Of course, sooner or later, these unbalancing processes will again come to equilibrium: the stabilization forces of nature are great. But the new balance may shift to the side where the person may simply not have a place - the range of human existence is very narrow. The most significant role in attracting the attention of the international community to environmental issues was played by the report of the Limits of Growth Club of Rome, commissioned by the authors D. H. and D. L. Meadows, I. Randersos V. V. Berens III, where they were presented simulation results of the growth of the human population on the globe and its impact on the dynamics of the exhaustibility of natural resources [3]. The mathematical model included indicators such as the irreplaceability of resources, industrial and agricultural capital, capital of the services sector, free land, urban, industrial and agricultural lands, the degree of environmental pollution, population and many other additional parameters. The well-known statement of E. Weizsacker characterizes the modern attitude to the environmental component of economic policy:

“Bureaucratic socialism collapsed because it did not allow economic truth to be told. A market economy can destroy the environment and itself if prices are not allowed to tell the ecological truth” [4]. Therefore, improvement technology should primarily be to reduce the consumption of non-renewable natural resources per unit of industrial production. One of the strongest factors of anthropogenic impact on nature and at the same time a powerful component of the economic development of any country in the world is construction. In terms of waste, construction occupies perhaps the most advanced place among environmental pollutants. Until recently, the improvement of construction technologies was carried out only in areas that ensure economic benefits without taking into account environmental and social factors.

The purpose and objectives of the article is to analyze environmental and economic indicators of production assessment in order to form diagnostic tools for environmental and economic analysis of biosphere compatibility using the construction industry as an example.

Statement of the main research material. The Directives of the European Parliament and the Council of Europe (2008) on waste introduce measures to protect the environment and human health by preventing or reducing the negative effects of production and waste management, as well as reducing the overall consequences of the use of resources and increasing the efficiency of such use [5]. But in parallel with European national standards relating to the regulation of environmental quality, there are corporate and voluntary rating certifications with environmental friendliness of production. The mechanisms of these certifications are developed on the basis of monitoring environmental indicators, namely: monitoring the state of the biosphere, assessing and predicting its state, identifying factors and sources of impact, determining the degree of anthropogenic environmental impact, and the like. A prerequisite for the possibility of attracting domestic production to the European market for construction services is the fulfillment of the priorities prescribed in the Council's directives. Accordingly, for domestic producers to enter world goods markets, the first step is the modernization of production of structures and products to world quality standards. However, the ability to evaluate existing production technologies by the criterion of "biosphere compatibility" is imperative. The concept of “biosphere compatibility” in construction is defined as “a type of dynamic equilibrium of a natural-anthropogenic system” when implementing “technologies of regional and

sectoral development that ensure proportional and unbalanced development of the biotechnosphere" [6]. Balancing the natural-anthropogenic or ecological-social component of the system requires the establishment of social and environmental priorities aimed at improving the environment, against the background of the introduction of a policy of economic attractiveness, which must act simultaneously. In this context, the environmental and economic assessment of the implementation of production should be based simultaneously on the principles of sustainable development, that is, structurally and critically recall its indicators. Based on a study by A Warhurst for the Warwick business school [7], indicators of sustainable development can be conventionally divided between environmental, social and economic components, which are at the same time limiting parameters of the system "ecology" - "economy" - "society". It should be noted that the principles of biospherecosum production, which, in turn, are based on the principles of sustainable development, have a polymorphic belonging to the group, provoked by overlapping areas of the system "ecology"-"economy"-"society". The "aggregation" of indicators of the three components of the dimensions of sustainable development may require analysis in order to determine the significance (significance) in the hierarchy of assessing the biosphere-totality of production. For this purpose, data normalization is needed, oriented on the principles of biosphere-totality of production. The principle of biosphere compatibility of construction, introduced on the basis of the concept of sustainable development, is complex. Its analysis and assessment should be based on a system-integrated approach, that is, the allocation of multifactorial indicators (indicators) reflecting the relationship between economic, social and environmental components in terms of the usefulness of the biosphere compatibility of construction technologies at the state level.

Taking into account biosphere compatibility indicators, some of which will be absolute values, and some will be coefficients partially integrated, which are relative characteristics of production. Therefore, the general formula for assessing the biosphere compatibility of production can be represented as

$$Z_{bs} = \sum_{i=1}^{n}(Z_i \cdot m_i) = \sum_{i=1}^{n}\frac{\{K_{bs}\}}{\{I_{bs}\}}(Z_i \cdot m_i),$$

where Z_i – the indicator of biosphere compatibility of the ith component of the overall assessment;

$m_i = \{m(K_i); m(I_i)\}$ - weighting coefficients of the corresponding factors influencing biosphere compatibility, depending on the industry, determined by expert methods (advantage method, rank method, pair matching method, etc.) [6];

$\{K_{bs}\}$ – a system of coefficients of socio-ecological, ecological-economic and socio-economic components of the assessment of biosphere compatibility of production;

$\{I_{bs}\}$ – a system of indicators of socio-ecological and environmental-economic components of the assessment of biosphere compatibility of production.

This approach to assessing the biosphere compatibility of production is a universal tool for determining the compliance of the latest implementations in any sector of the economy with the principles of sustainable development [8]. The difference in assessing the biosphere compatibility of construction, which is studied in the works of Chernyshev D.A., consists in assessing the components of the industry for generally accepted reporting and accounting economic indicators, which allows expanding the boundaries of the implementation of the assessment mechanism both for various industries and for local diagnosis of individual subordinate structures of the region.

Conclusions and perspectives. It should be noted that environmental modernization of production is an expensive process. As foreign experience shows, to solve the problems of ecological and economic balance, accumulated amid limited financial resources for the implementation of the accelerated program of greening production in order to fulfill international obligations, there are real market mechanisms. These include, for example, compensation premiums and commercial permits. In the first case, the introduction of biosphere-compatible production can bring the owner compensation for the sale of saved quotas for pollution or through bonus funds supporting environmental production. In the second case, the concept of pollution charges can be expanded by introducing a system of premiums for enterprises that reduce their emissions to a level lower than agreed upon by agreements. The replenishment of bonus funds occurs precisely through the purchase of excess emission allowances and fiscal measures associated with them. When introducing modernization of production at the pre-investment stage, we also need to assess its biosphere compatibility within a certain region by indicators that do not require additional analytical data, the collection of which is delayed in time. Therefore, the

environmental and economic mechanism for evaluating any production should be based on generally accepted reporting and accounting economic indicators with industry-specific adaptation factors and indicators.

References:

1. Vernadskyj, V.Y. (1993), *Neskol'ko slov o noosfere* [A few words about the noosphere], Sovremennyk, Moscow, Russia.
2. Steven R. Mann. “Chaos Theory and Strategic Thought” [electronic source], available at:. https://archive.org/stream/1992Mann/1992%20mann_djvu.txt (Accessed 4 February 2020).
3. Meadows, Donella H., Randers, Jorgen, Meadows, Dennis L. and Behrens, William W. (1972). *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind.* Universe Books. ISBN 0876631650.
4. Vajtszekker, E., Ejmory, B. Lovyns, Khanter, Lovyns L. (2000), *Faktor chetyre. Zatrat – polovyna, otdacha – dvojnaia. Novyj doklad Ryms'komu klubu* [Factor four. The cost is half, the return is double. New report to the Club of Rome], Academia, Moscow, Russia.
5. Ministry of Energy and the Environment (2008), “Directive of the European Parliament for the sake of 2008/98/ЄС від 19th of the list of fall 2008 in the year of 2008 on the issue of the passage of directives”, available at: https://menr.gov.ua/news/31288.html. (Accessed 4 February 2020).
6. Chernyshev, D.O. (2018), “Naukovo-metodolohichnyj instrumentarij orhanizatsii budivnytstva na zasadakh biosferosumisnosti”, Abstract of Science Doctor dissertation, of Technical Sciences, Kiev National University of Construction and Architecture, Kyiv, Ukraine.
7. Warhurst, A. (2002), “Sustainability indicators & sustainability performance management. Mining and Energy Research Network”. Paris, 14th January 2002, available at: https://pubs.iied.org/pdfs/G00919.pdf. (Accessed 4 February 2020).
8. Shpakova H. (2020), “Preidentyfikatsiia formuvannia vartosti staloho budivel'noho aktyvu shliakhom funktsional'noi transformatsii na osnovi retsyklinhu” [Re-identification of the value formation of a sustainable construction asset by functional transformation based on recycling]. *Intelekt XXI,* vol. 1, pp. 172–175.

Citation: H. Shpakova (2020). FORMATION OF PARAMETER SYSTEM FOR DIAGNOSTICS PRODUCTS BIOSPHERE COMPATIBILITY. Innovative Solutions in Modern Science. 2(38). doi: 10.26886/2414-634X.2(38)2020.2