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PROPOSALS REGARDING FORMATION OF RISKS PREVENTING MECHANISMS TO ENVIRONMENTAL SOUND DEVELOPMENT IN THE FUEL AND ENERGY SECTOR

Topicality. Given the energy dependence of the country, existing energy, environmental and social threats to sound development due to increased tariffs for heat and electricity and rise in prices for products and services of all economic sectors, it is necessary to determine the strategic directions of risk management in the fuel and energy sector. The choice of a management option, based on the features of preventing and reduction of risk to a possibly low level in the fuel and energy sector, becomes particularly relevant.

Aim and tasks. The goal of the article is to substantiate the mechanisms for managing the environmentally sound development of the fuel and energy sector, to identify areas of the settlement and ways to minimize currently existing risks and measures aimed at preventing threats and risks in the fuel and energy sector of the economy.

Research results. The article substantiates and proposes mechanisms for managing the environmentally sound development of the fuel and energy sector. There are considered areas of the settlement and ways to minimize currently existing risks and measures aimed at preventing threats and risks in the fuel and energy sector of the economy.

There are represented systematic understanding of the logical connection between existing risks and their consequences depending on the source of threats and are defined monitoring phases of threats which should be the basis for making management decisions.

Analyzing the research of foreign and our scientists, we came to the conclusion that the use of alternative energy in the fuel and energy sector strengthens energetic and environmental safety and defied a number of necessary modern steps that will contribute to environmentally sound development of Ukraine.

Based on an analysis of the current state of usage of the energy resources and energy development in Ukraine, the need to increase the share of primary energy production from alternative energy sources, which can solve critical problems in the regions of Ukraine, was proved.

The study of international investment practice in the environmentally sound development of the country, the means and trends of stimulation allowed to propose organizational and managerial measures to ensure the efficiency of the mechanisms. It was proved that in order to obtain the most positive economic-environmental effect within the national energy it is necessary to give preference to projects with the highest investment efficiency to get positive economic, environmental, social and resource effects.

The necessity of applying an integrated approach to the formation of a system of mechanisms for providing an effective environmentally sound development of the fuel and energy sector, which synthesizes systemic, managerial, integrated, innovative approaches and allows to comprehensively explore the processes of management and use of alternative energy sources is substantiated. There is proposed the complex of mechanisms of national, regional, municipal ecologically oriented regulation of environmentally sound development of the fuel and energy sector.

Conclusions. It was established that the management of environmentally sound development of the fuel and energy sector is a complex of processes that ensure the transformation of existing problems into a new state through the application of certain controlled actions. The theoretical, methodological and conceptual basis for the establishment of a system for managing the environmentally-oriented development of the fuel and energy sector, the implementation of strategy and strategic management mechanisms that ensure long-term development on the basis of ecologization constitute the subject and prospects for further scientific research in this direction.

Key words: environmental safety, energy security, management of environmentally sound development, preventive measures.

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ПРОПОЗИЦІЇ ЩОДО ФОРМУВАННЯ МЕХАНІЗМІВ ПОПЕРЕДЖЕННЯ ВИНИКНЕННЯ РИЗИКІВ ЕКОЛОГОБЕЗПЕЧНОМУ РОЗВИТКУ В ПАЛИВНО-ЕНЕРГЕТИЧНОМУ СЕКТОРІ

Актуальність. З урахуванням енергозалежності країни, існуючих енергетичних, екологічних та соціальних загроз безпечному розвитку внаслідок підвищення тарифів на тепло і електроенергію та зростання цін на продукцію і послуги всіх секторів економіки виникає необхідність визначення стратегічних напрямків менеджменту ризику у паливно-енергетичному секторі. Вибір варіанту управління, в основу якого покладено особливості попередження та зниження ризику до можливо низького рівня у паливно-енергетичному секторі набуває особливої актуальності.

Мета та завдання. Метою статті є обґрунтування механізмів управління екологобезпечним розвитком паливно-енергетичного сектору, виявлення напрямків регулювання і способів мінімізації нині існуючих ризиків та превентивних умов щодо попередження виникнення загроз та ризиків у паливно-енергетичному секторі економіки.

Результати. У статті обґрунтовано та запропоновано механізми управління екологобезпечним розвитком паливно-енергетичного сектору. Розглянуто напрямки регулювання, способи мінімізації нині існуючих ризиків та превентивні умови щодо попередження виникнення загроз та ризиків в паливно-енергетичному секторі економіки.

Представлено системне уявлення про закономірний зв'язок між існуючими ризиками та їх наслідками залежно від джерела загроз та визначено етапи моніторингу загроз, які мають бути підґрунтям для прийняття управлінських рішень.

Аналізуючи дослідження зарубіжних та вітчизняних вчених, дійшли висновку, що використання альтернативної енергетики в паливно-енергетичному секторі зміцнює енергетичну та екологічну безпеку та виділено ряд необхідних сучасних кроків, які будуть сприяти екологобезпечному розвитку України.

Спираючись на аналіз сучасного стану використання енергоресурсів та розвитку енергетики в Україні, доведено наявність потреби збільшення частки виробництва первинної енергії з альтернативних джерел енергії, які можуть вирішувати критичні проблеми у регіонах України.

Дослідження міжнародної практики інвестування в екологобезпечний розвиток держави, засобів та тенденції стимулювання, дозволили запропонувати організаційно-управлінські заходи забезпечення дієвості механізмів. Доведено, що для отримання максимально позитивного економіко-екологічного ефекту у рамках національної енергетики необхідно віддавати перевагу проектам з найвищою інвестиційною ефективністю для отримання позитивного економічного, екологічного, соціального та ресурсного ефектів.

Обґрунтовано необхідність застосування комплексного підходу до формування системи механізмів забезпечення ефективного екологобезпечного розвитку паливно-енергетичного сектору, який синтезує системний, менеджментний, інтегрований, інноваційний підходи та дозволяє всебічно дослідити процеси управління та використання альтернативних джерел енергії. Запропоновано комплекс механізмів державного, регіонального, місцевого екологоорієнтованого регулювання екологобезпечного розвитку паливно-енергетичного сектору.

Висновки. Встановлено, що управління екологобезпечним розвитком паливно-енергетичного сектору є сукупністю процесів, що забезпечують перетворення існуючих проблем в новий стан шляхом застосування певних керованих дій. Теоретико-методологічні та концептуальні засади створення системи управління екологоорієнтованим розвитком паливно-енергетичного сектору, запровадження стратегії та механізмів стратегічного управління, що забезпечують довгостроковий розвиток на засадах екологізації становлять предмет і перспективи для подальших наукових досліджень в даному напрямку.

Ключові слова: екологічна безпека, енергетична безпека, управління екологобезпечним розвитком, превентивні умови попередження виникнення ризиків.

Problem statement and its connection with important scientific and practical tasks. The importance of the environmentally sound development of the fuel and energy sector is primarily due to the huge costs of energy and natural resources in agriculture, industry, urban-industrial agglomerations, taking into account global climate change, rising energy prices, and environmental pollution. A compliance with the principle of safety is crucial in forming and institutionalizing organizational and economic management mechanisms at the global, national or regional levels. Analyzing the research of our and foreign scientists

who considered the energy sector, we came to the conclusion that the use of unconventional energy sources in the energy sector strengthens both the energy and environmental safety of the country. To ensure the environmentally sound development of the fuel and energy sector, there are some objective and subjective reasons which are necessary for development and implementation alternative energy presented in Fig. 1.

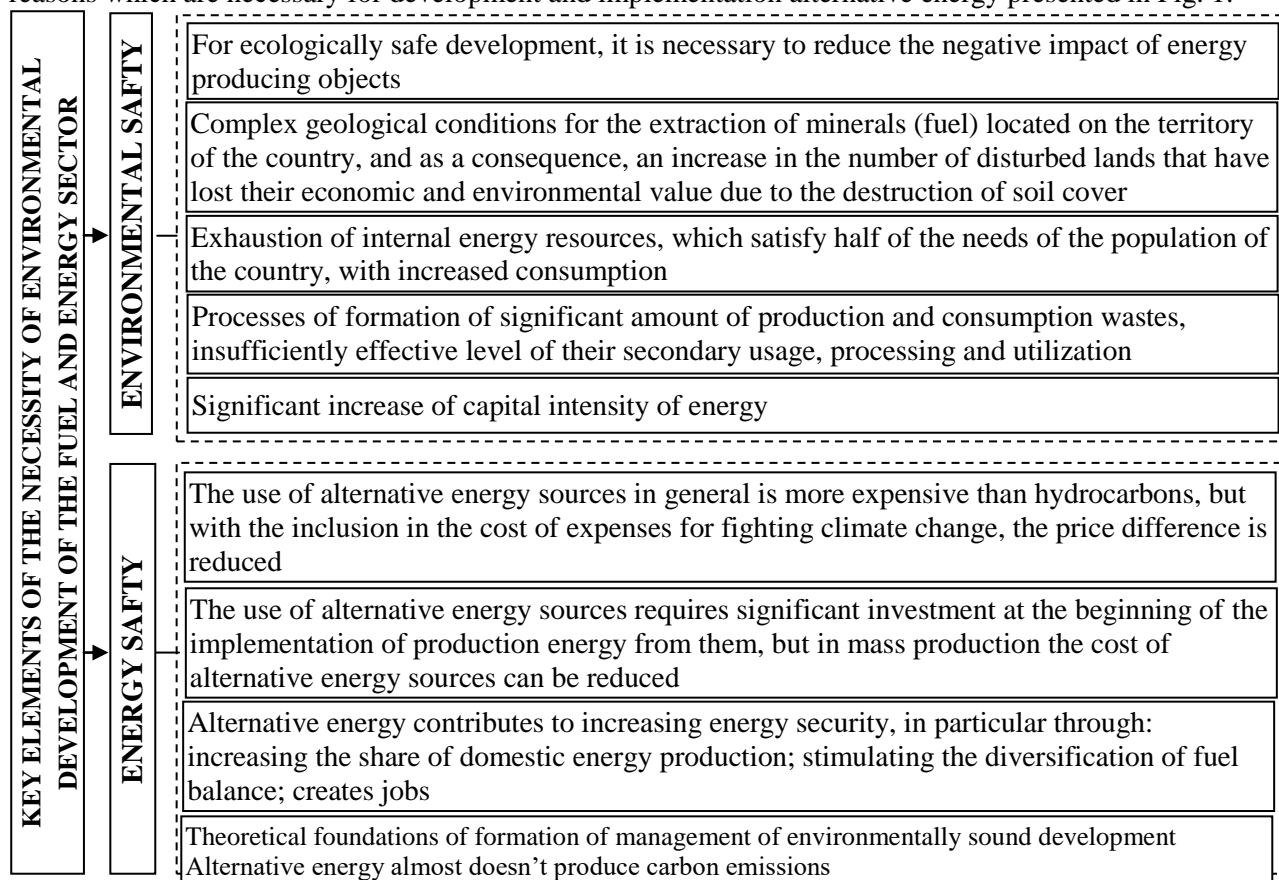


Fig. 1. Objective and subjective reasons which are necessary for development and implementation alternative energy

Source: author's development

Analyzing the vectors of the development of environmentally sound development of the fuel and energy sector in different countries, the following steps that will facilitate the implementation of environmentally sound development in Ukraine should be mentioned: increasing the share of use of alternative energy sources (wind, solar power plants, etc.); implementation of new types of energy sources; improvement of the regulating the energy sector legislation; the necessary level of public investment in promoting the development of ecology; providing the necessary national level of investment promotion in environmentally oriented development; formation of market conditions for the development of the energy industry; transition from energy saving to energy efficiency; promotion of environmental protection and energy efficiency in the manufacturing and consumer sectors (granting of benefits, loans with lower interest rates, incentive measures); use of technical means of achievement energy efficiency; a structural analysis of all energy-consuming sectors of the economy and the development of practical recommendations for energy conservation.

The development of alternative energy is a key element of sustainable environmentally sound development of the fuel and energy sector, provides a significant reduction in the negative impact on the environment, a more even distribution of energy resources, decentralization of energy production, and an increasing in the level of economic freedom of the country, which is one of the conditions for ensuring environmental and energy security of Ukraine.

Analysis of recent publications on the problem. For a long time a number of our scientists and researchers are engaged in researches of many problems in the development of the fuel and energy sector, including in the field of alternative energy and energy saving, energy and economic security such as: A.

Galchinsky, J. Zhalilo, G. Zabarny, S. Kudrya, A. Shevtsov, A. Shidlovsky, V. Lipkan, N. Nyzhnik, G. Sitnik, M. Zemlyany, L. M. Gorbach and others. Among the foreign experts, in these studies are engaged: V. Weiss, A. Erdman, B. Zanner, W. Nordhaus, W. Rowe, W. Streicher, R. Young and others. On the basis of the literature analysis we revealed that scientists are considering issues of environmentally sound development of the fuel and energy sector from the point of view of the implementation of alternative energy, which strengthens energy security. Existing research is the basis for improving the mechanisms of management of environmentally sound development.

Allocation of previously unsolved parts of the general problem. Problems in forming preventive measures to ensure effective and environmentally sound development of the fuel and energy sector remain unresolved. The issues of management and use of alternative energy sources for elimination of socio-ecological and economic threats and risks are insufficiently substantiated.

Formulation of research objectives (problem statement). The goal of the article is to substantiate the mechanisms for managing the environmentally sound development of the fuel and energy sector, to identify areas of the settlement and ways to minimize currently existing risks and measures aimed at preventing threats and risks in the fuel and energy sector of the economy. A integrated approach to the formation of a system of mechanisms for providing the environmentally sound development of the fuel and energy sector in this study will be considered from the point of view of synthesis of systemic, managerial, integrated and innovative approaches that will comprehensively explore the processes of management and use of alternative energy sources and will facilitate the enhance the implementation of modern energy policy and elimination of existing socio-ecological and economic threats and risks.

Outline of the main results and their justification. Considering that the basis of energy today is energy resources, the main peculiarity of which is the limited inventory and exhaustiveness, as a result of which they can't be a guarantee of sustainable development of the world energy in the long-term perspective and taking into account the aspect, that their use is one of the main causes of the crisis in the environment, there is a need for the development of alternative energy as a key element of the impact on energy security and sustainable environmentally sound development of the fuel and energy sector.

The importance of the environmentally sound development of the fuel and energy sector is primarily due to the huge costs of energy and natural resources in agriculture, industry, urban-industrial agglomerations, taking into account global climate change, rising energy prices, and environmental pollution. Table 1 represents systematic understanding of the logical connection between problem situations and their consequences depending on the source of threats.

Table 1

The connection between problem situations and their consequences depending on the source of threats

Source of threats	Factors of risk	Consequences
Inefficiency of management of fuel and energy system (FAES)	High energy dependence of Ukraine	<ul style="list-style-type: none"> – excessive dependence of Ukraine on external monopoly suppliers of natural gas, oil and nuclear fuel (due to increased demand for energy resources and limited inventories of their traditional types in the world, as well as high and volatile prices for them); – excessive energy intensity of the branches of the economy of the country, including the fuel and energy complex, as well as the social sphere; – structural and price imbalances of the energy balance of the country
	The presence of non-market and non-transparent relations in the FAES	<ul style="list-style-type: none"> – administrative regulation of prices; – cross-subsidies between individual categories of consumers and industries of the FAES; – non-transparent privatization, monopolization of regional energy markets; – absence of state strategic reserves of fuel and energy resources; – destruction of scientific and technological potential and low innovative activity of the FAES

Source of threats	Factors of risk	Consequences
High levels of harmful impact of FAES on the population and the environment	The depletion and reduction of natural resources	Decrease or termination of production activity of natural resources enterprises, loss of workplaces, decrease of economic growth rates, etc.
	The deterioration of the quality of the environment and, as a result, human health condition	Increase in diseases of population due to environmental factors, increases of costs for medical programs, changes in living conditions, etc.
Increasing threat of man-made disasters from the operation of the (FAES)	Increase in technogenic pressure due to the development of additional infrastructure	The deterioration of the quality of the environment, decrease of the assimilation capacity of the territory, deterioration of living conditions of the population, economic losses from the reduction of GDP, economic losses from environmental pollution and deterioration of the health of the population, etc.
	Increase in technogenic pressure due to the growth of production of resource-intensive and low-tech	The same, and also the reduction of budget incomes from the loss of market value of the territory, restrictions on access to biological resources, violations of inter-sectoral cooperation and territorial connections, energy intensity of GDP, etc.
	The growth in the number and magnitude of man-made disasters	The deterioration of the quality of the environment and living conditions, economic losses from environmental pollution and the deterioration of the health of the population, reduction of production efficiency through increased costs for compensation payments and costs for the elimination of consequences, reconstruction, etc.

Source: [1,2,3,4]

A compliance with the principle of safety is crucial in forming and institutionalizing organizational and economic management mechanisms at the global, national or regional levels. Analyzing the research of our and foreign scientists who considered the issues of the energy sector, we came to the conclusion that the use of alternative energy sources in the energy sector strengthens the energy and environmental safety of country.

Ukraine has a significant technically feasible potential for the development of alternative energy, and in order to increase the share of primary energy production from its sources and strengthen its place in the energy balance, it is necessary to form economic, informational and regulatory provision for the mass implementation of such technologies. Such energy sources can solve critical problems in the regions of Ukraine and promote environmentally sound development of the country.

Key weaknesses in the use of alternative energy sources in the context of providing environmentally sound development of the fuel and energy sector and preventive measures for responding to risks are presented in Table 2.

The use of alternative energy sources provides a significant reduction in the negative impact on the environment, a more even distribution of energy resources, decentralization of energy production, and an increase in the level of economic freedom of the country, which is one of the conditions for ensuring the environmental and energy security of Ukraine.

The necessity of conducting systematic, comprehensive research of the mechanisms of national management and the application of new fundamental approaches to the formation of a management mechanism through energy saving and environmentally sound technologies in the context of ecologization of the fuel and energy sector of the country becomes of particular relevance in the modern country.

Risks and preventive measures of response to the use of alternative energy in the context of environmentally sound development

	Hydroelectric power plants	Solar power plants	Wind power plants
Risks in usage	<ul style="list-style-type: none"> - the risk of land flooding; - the risk due to the absence of a stationary hydrometric post; - the risk of changing ecological chains in the certain rivers, water temperature; - the risk of increasing greenhouse gas emissions as a result of the intensification of the processes of decomposition of organic compounds, etc; - the absence of regulatory documents regarding the design, construction and operation of small hydroelectric power plants (the regulatory framework for large hydroelectric power plants is used) 	<p>The risks due to technological process associated with the production of new materials for solar power plants.</p>	<ul style="list-style-type: none"> - the use for construction of wind power plants large in area of land; - the threat of the death of birds.
Preventive measures for responding to risks	<ul style="list-style-type: none"> - development of a national program for the development of small hydropower; - reconstruction of the system of hydrometric points of measuring water consumption on small rivers; - high-quality and multi-vector energy, ecological and water management at all stages of the life cycle of a small hydroelectric power station HPS; - to predict a ban on the construction of the SHPS not only in the territories of the nature reserve fund, but also upstream on the rivers that flow through the nature protection and recreation areas; - implementation of normative documentation on the design, construction and operation of small hydropower plants, which would formulate environmental requirements 	<ul style="list-style-type: none"> - development of power generating capacities. Construction of photovoltaic stations; - development of regulatory and legal support for the development of solar energy; - scientific and technical support for the development of solar energy. 	<ul style="list-style-type: none"> - most of the used land can be used for the production of agricultural products (WPP occupy 1% of the total required territory, 99% can be used); - as the mortality of birds from the traffic of cars is 300 times higher, and from power lines is 50 times higher than the WPP of 1000 MW, it is necessary to use more powerful wind turbines and reduce the frequency of their rotation; - scientific and technical support for the development of wind energy.
	Geothermal installation	All types of heat pumps	Bioenergy
Risks in usage	<ul style="list-style-type: none"> - a sufficiently high temperature of geothermal water is required; - there is a need for a renewable cycle of the flow (injection) of water (usually spent) into the underground aquifer, which takes additional energy consumption; - there is possible local lowering of the earth's surface, which leads to a destabilization of terrestrial structures and changes in the landscape; - with significant usage of geothermal waters, there is possible an increase in seismic areas. 	<ul style="list-style-type: none"> - high cost of equipment compared to traditional boilers - limiting climatic and geographical order; - the need for a thorough technical-economic and operational substantiation for making a decision on the implementation of a heat pump. 	<p>The threat of realization of implementation due to the obstruction of the issuance of technical terms for the connection.</p>
Preventive measures for responding to risks	<p>The implementation of new effective technologies will significantly reduce the negative impact on the environment, as well as get an additional economic effect by extracting valuable components.</p>	<p>Creation of a mechanism for management of energy use by heat pumps for autonomous heat supply and modernization of existing heat supply facilities</p>	<p>Change of the law "On heat supply", which would give priority access to the objects of alternative heat generation to the heating networks.</p>

1. Analysis of the information on the potential of environmentally sound development of the fuel and energy sector, considering modernization of operating power units, optimization of the production load on the TPP, implementation of alternative technologies.

2. Development of the concept of national regulation with an orientation towards the environmentally sound development of the fuel and energy sector and the strategy of alternative energy development, verification of its use on its basis.

3. Development of levers of organizational-economic, financial-economic and techno-technological influence, financial support, implementation of system-forming regulators to achieve a new state. The organizational-economic foundations of the mechanism of environmentally sound development of the fuel and energy sector are presented in Fig. 3.

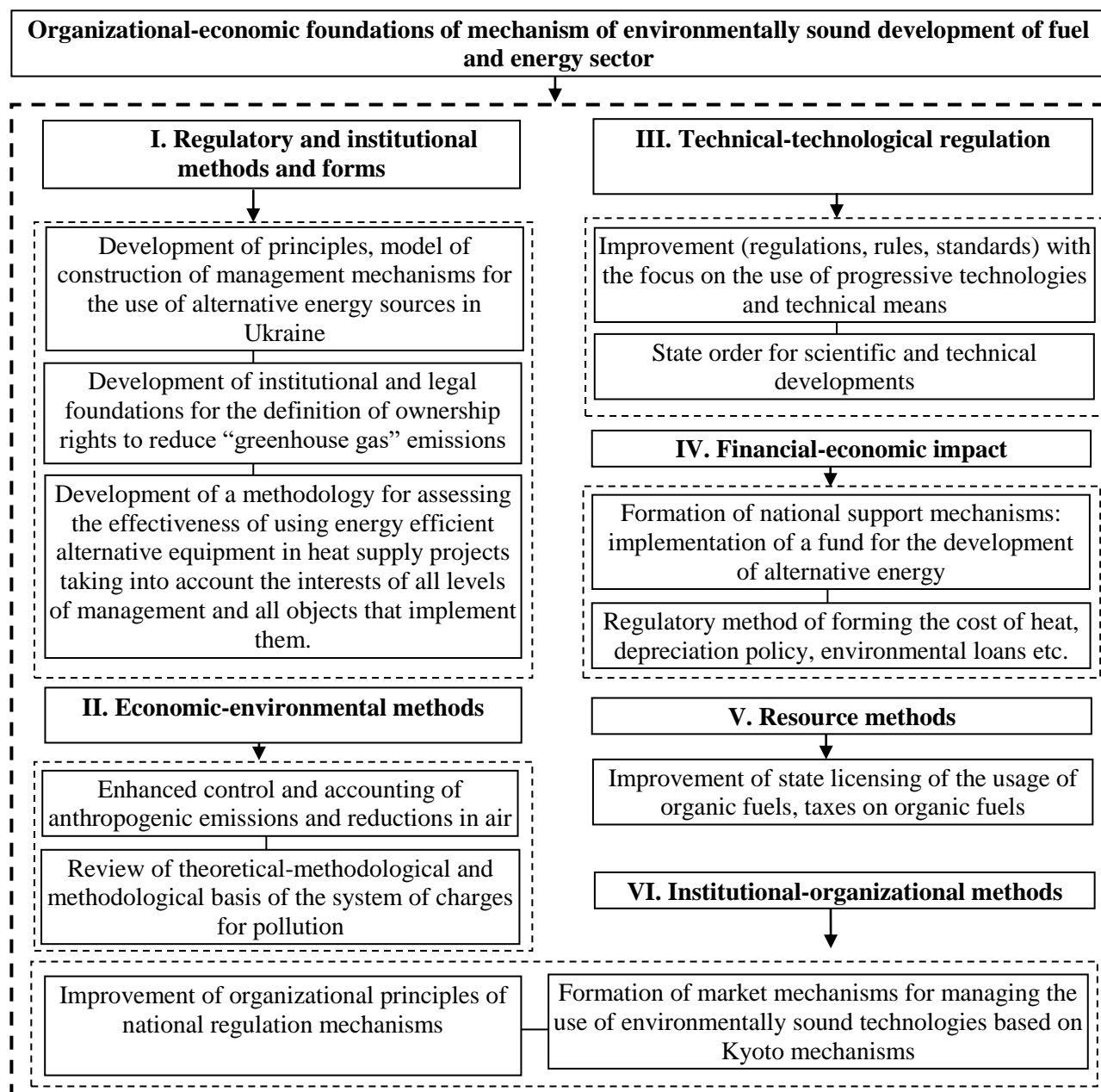


Fig. 3. Organizational-economic foundations of mechanism of environmentally sound development of fuel and energy sector

Source: author's development

4. Monitoring of indicators for environmentally sound development of fuel and energy sector and estimation of deviations of actual data from normative indicators.

As mechanisms of techno-technological regulation, the following are applied: 1) a system of standards, norms, regulations, oriented towards the use of progressive technical means and technologies of energy supply; 2) norms (limits) for the emission of pollutants into the air and discharges into water objects corresponding to advanced techno-technological means.

To economic regulatory mechanisms should be included: 1) price mechanisms and methods for calculating production costs and the cost of heat. Regarding the policy of pricing energy products, especially heat energy, it should be aim at inner reforming of all aspects of the industry and especially strengthening of all factors of the strategic development of alternative energy considering its high potential. Thus, we propose a transition to a normative method of forming the cost of heat with an orientation towards the use of progressive energy equipment, including an alternative to the reduction in the cost of organic fuels and emissions into the atmosphere, which will lead to a reduction in the cost of heat in central heating. Besides the item of material costs in forming the cost of a unit of thermal energy, another, equally important item of operating expenses, depreciation of fixed assets needs to be revised. According to the National Statistics Service of Ukraine, the level of general wear of fixed assets of the heat and power complex is more than 60%, for individual heat supply facilities this indicator reaches 97,5%. Such indicators are incompatible with the European standards, which indicates a long way to reduction the tariffs for heat. From the economic point of view, depreciation of fixed assets of the enterprise is one of the sources of self-financing of economic activity. However, the high level of the wear of fixed assets explains the low level of financing availability due to depreciation. According to the fact that in different regions of our country the price of heat is different, the reduction of the cost price of 1 Gcal depends on the approval of the investment component in the regions, such as: updating; recovery of networks; reconstruction; the implementation of alternative energy sources. 2) Depreciation of policy and depreciation norms for progressive environmentally sound technical-technological means.

The reduction of the share of material costs in the structure of the cost price is possible by replacing the share of traditional fuel and energy resources with alternative energy (low and medium potential energy, VER, solar energy, soil, water, etc.), which is currently for free. The article "depreciation of fixed assets" can be reduced through technical-technological changes, that is, the replacement of fixed capital with energy-saving environmentally sound technologies, which will increase the coefficient of suitability of fixed assets, which is about 3% at some objects of generating sources. This causes high expenses for heat energy now at the stage of heat production, but there is still a heat network, the technological state of which is poor. The amount of depreciation deductions mostly depends on the method of depreciation of fixed assets adopted and approved by the order on the accounting policy of the enterprise, and the period of their useful use, defined according to with the Tax Code of Ukraine. According to the last, there are 5 methods of depreciation provided for, which are also defined by the Standard (accounting standard) №7 «Fixed assets». From our point view, it is appropriate to define not only the minimum period of use of fixed assets, but also the maximum, or the degree of maximum wear of equipment. Then enterprises will have to keep a clear record of the depreciation of their core funds, to make optimal investment decisions and to increase level of energy efficiency. It should be noted that to the projects of innovation and technological development, the method of accelerated depreciation corresponds most, which allows expanding opportunities for innovations. The advantage of this method is that during the first years of using the equipment, the necessary amount of money for its restoration is accumulated. This method makes it possible to reimburse up to 60-70% of the cost of equipment during the first half of the useful period of its usage.

The mechanisms of financial and economic incentives include: 1) the system of taxes on both the use of organic fuel and the pollution of the natural environment (taxes on CO₂, coverage of losses for environmental pollution); 2) market mechanisms of the Kyoto Protocol; 3) specialized national financial funds; 4) benefit taxation.

As financial and economic incentive mechanisms in the practice of developed countries in order to stimulate alternative energy development and restrict the use of organic fuels, there are mainly used two types of tax mechanisms: 1) the tax on organic fuels (its size amounts to up to 20% of the already high cost of organic types of fuel – natural gas, oil, coal, etc.); 2) CO₂ emission tax on the combustion of organic fuels. It should be noted that the systems of technical-technological and financial-economic regulation are very closely interrelated, because the CO₂ taxation system is oriented on the norms of CO₂ emissions, which are much lower when using progressive environmentally sound technologies.

It should be emphasized that the high prices and taxes on organic fuels encourage entrepreneurs and heat producers to implement investment projects in the field of energy saving and alternative energy supply,

including at the level of development of technical-technological “know-how”. At the same time, the policy of developed countries makes it easier for entrepreneurs and producers to realize these tasks, because: 1) major programs are being implemented at the national level for the development of new technical means and technologies in the field of increasing energy supply; 2) programs of environmental protection (including atmospheric protection means), in their serial production are implemented at the national level.

In order for financial and economic mechanisms to work in the country and to fulfill the international obligations of Ukraine, it is necessary today: to adopt the Law on Monitoring, Verification and Reporting (MRV), the Law on the scheme of greenhouse gas emission trading; to agree on the principles for distribution quotas for greenhouse gas emissions; to deal with the issue of size and distribution of carbon taxes.

The validity of managerial decisions at the regional, municipal level and business entities depends on compliance with the main principles of the national policy of ensuring the development of alternative energy. The proposed principles are based on the general principles of the adoption and realization of management mechanisms through the implementation of progressive environmentally sound technologies (Table 3).

Table 3

Conceptual principles of construction of management mechanisms of the environmentally sound development of the fuel and energy sector

Principles	Characteristic
The principle of purposefulness	The main purpose of the functioning of the management mechanism is to provide energy and environmental safety on the basis of optimization of energy resources costs and minimization of the negative impact on the environment in accordance with international requirements.
The principle of interrelation and interdependence, stimulation and support	The system of mechanisms should take into account the interests (economic, social and environmental) of all participants in the process of development of alternative energy.
The principle of functionality	The management mechanisms should be aimed at the realization of the National Energy Strategy and combine management functions (planning, organization, motivation, control, regulation).
The principle of development	The ability to improve management mechanisms based on the harmonization of energy, economic, technical and environmental factors in the management process.
The principle of objectivity, specification and accuracy	The management mechanisms should be built on objective and reliable information, which allows making informed decisions. In order to improve the accuracy and reliability of analytical calculations, the process of collecting, processing, analyzing and recording information should be constantly improved.
The principle of consumer orientation	The management mechanisms should be aimed at guaranteed, environmentally sound heat supply taking into account the consumer's solvency.
The principle of economic and environmental efficiency	Ensuring the adoption of the most effective heat supply option from the point of view of the economic and environmental interests of the participants in the process of implementation alternative technologies.
The principle of continuity	The management mechanism should include a monitoring, institutional-legal, institutional-organizational and informational component that ensures high responsiveness to changes and threats in the management system.
Principle of responsibility and hierarchical co-subordination	Lies in is necessity to report to the supreme governing body and responsibility for the coherence and validity of the decisions taken.
The principle of transparency	Lies in the possibility of obtaining relevant information and bringing the decisions taken to the attention of all interested stakeholders (individuals and legal entities) in the implementation of alternative energy projects.

Source: author's development

These conceptual principles provide the basis for the mechanism of effective management in making managerial decisions at the subject-object level of various sectors of the national economy and preventing the emergence of risks to environmentally sound development in the fuel and energy sector.

Conclusions and perspectives of further research. The use of alternative energy in the fuel and energy sector strengthens energy and environmental security. An analysis of the current state of energy usage and energy development in Ukraine proves the need to increase the share of primary energy from alternative energy sources that can solve critical problems in the regions of Ukraine. The application of an integrated approach to the formation of a system of mechanisms for ensuring an effective environmentally sound development of the fuel and energy sector allows us to comprehensively explore the management processes and usage of alternative energy sources. The proposed complex of mechanisms of state, regional, municipal, environmentally-oriented management of the development of the fuel and energy sector will ensure the transformation of existing problems into a new state through the application of certain controlled actions.

The prospects for further scientific research in this area will be theoretical and methodological and conceptual foundations for the establishment of a system for managing the environmentally-oriented development of the fuel and energy sector, the implementation of strategies and strategic management mechanisms that ensure long-term development on the basis of ecologization.

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