

ЕКОНОМІКА ТА УПРАВЛІННЯ НАЦІОНАЛЬНИМ ГОСПОДАРСТВОМ

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FEATURES OF INVESTMENT PROCESS IN THE FIELD OF ALTERNATIVE ENERGY

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Introduction. Investment process implementation in the field of alternative energy should create conditions for its stable functioning at the present stage, and ensure high potential for development in the future. In this regard, the investment process forms the basis for the conditions of economic stability, independence, sustainability of the alternative energy functioning and its ability to develop in the future. Formation of a more effective mechanism for implementing an investment process can contribute to a positive chain reaction concerning ensuring the stable functioning and alternative energy development.

Review of recent research and publications. The scientific works by domestic and foreign economists are devoted to the issues on ensuring the energy security and the use of alternative energy sources. They include works by O. Adamenko, E. Bobrov, O. Gaufe, V. Gayts, V. Gorbulin, V. Zinchenko, M. Kabat, M. Kalinchik, S. Kudria, M. Kulik, V. Onyshchenko, M. Mkhitaryan, I. Samoilenko, H. Strubenhoff, O. Schreiber, S. Shulzhenko, L. Yakovenko and other scientists. However, despite the significant achievements of the mentioned authors, the issue on the investment process implementation in the field of alternative energy is insufficiently studied.

The objective of the article is to investigate and identify the features of investment process in the field of alternative energy.

The basic materials and results. When summarizing the scientists research on the sequence of the investment process implementation, it should be noted that a significant number of them determines the complexity for this category, since it takes into account not only the inclusion the individual subjects of investment relations in the production factors development process, which constitutes the concept of investment activity, but also causes the social impact of implementation the investment projects on the national economy formation and development. A model of implementation the investment process in the field of alternative energy is constructed (Fig. 1). It is based on the generalization of scientific approaches to the definition for the investment process, the stages of its implementation and component provision.

The model includes distinct stages, in particular the definition of investment resource requirements in the field of alternative energy, justification the choice of alternative energy objects for investment and implementation the investment projects. The presented stages determine the sequence of actions for the investment process implementation in the field of alternative energy and are specified by the respective types of work and risks at certain stages of its implementation and the levers of state support.

An effective mechanism of state policy in the field of energy efficiency and renewable energy is a fundamentally new model of work based on the principles of public-private partnership. The Law of Ukraine "On Public-Private Partnership" [1] provides for the conclusion of agreements between the state (the relevant state authorities) and economic entities claiming state support in any form (direct budgetary financing, soft lending and lending rates compensation, preferential tax treatment, preferential tariff setting, state guarantees).

At the same time, the condition of state support is the obligation of economic entities to achieve energy efficiency indicators set by the standards (norms and standards) or a certain level of traditional resources replacement with renewable energy resources. Failure to comply with the terms of the agreement involves financial liability. The procedure for providing state support to public-private partnerships is approved by the Resolution No. 279 of Cabinet of Ministers of Ukraine from March 17, 2011.

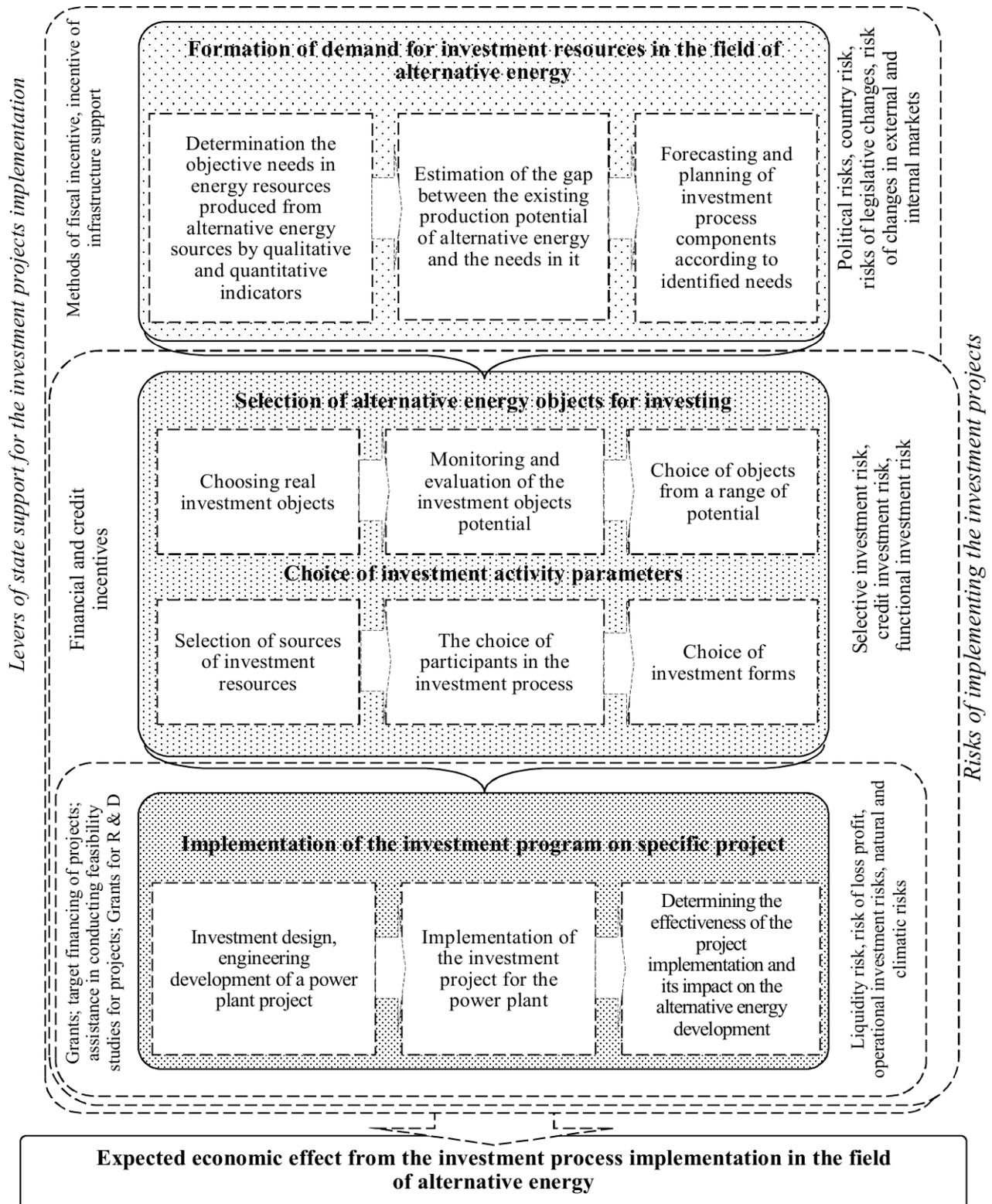


Fig. 1. Model of implementation the investment process in the field of alternative energy

Source: compiled by the author

Positive results are observed due to the economic mechanisms for stimulating the production of energy generation from renewable energy sources, implementation the energy saving materials and technology provided for the Tax Code of Ukraine and the introduction the stimulating "green" tariffs.

However, on the other hand, experts point out the inconsistency of aims and excessive attention to certain types of renewable energy sources, due to lack of interest to others, but no less important. Specialists in the field of renewable energy and economic entities, interested in the development of this area offer to clarify the priorities of the renewable energy development. Emphasis on the realization of only one priority can have not only positive sides (attracting additional sources of energy), but also, due to excessive enthusiasm, cause risks to the reliability of the country's electricity system and impose an excessive burden on economic costs for end users.

Prospects for the renewable energy use and investment attraction are determined by the draft of revised version of the Energy Strategy of Ukraine for the period up to 2030 year [2]. They also take into account the practical actions and vision of the development prospects for the most active current subjects, and consider development of wind and solar generation as priority directions. The State Agency on Energy Efficiency and Energy Saving of Ukraine also advocates increasing the focus on the development of renewable energy sources in the future Energy Strategy of Ukraine, while focusing on increasing the share of solar, wind and small hydroelectric power stations [3].

Energy efficiency and the use of renewable energy sources has become an urgent need of time, as it helps to solve not only energy supply issues, but also many environmental, economic and social problems. When studying the state and preconditions of the alternative energy development, one should focus on the world trends in the existence of the main obstacles that hamper the alternative energy development and its development factors (see Table 1-4).

Table 1

The main obstacles and factors of the alternative energy development

Obstacles		Development factors	
Alternative energy is still in the phase of "curve study". Insignificant public awareness. Uncertainty in the constant availability of resources. Technologies in permanent research and development. High cost of equipment and support. Significant obstacles for capital mobilization		The need for energy, the strategic need to diversify the energy balance. Importance of using the existing local resources. Require to reduce dependence on fossil fuel import (geopolitical and economic impacts). Awareness of the importance for clean, environmentally friendly energy. Reducing risks to energy security	
Developed countries	Developing countries	Developed countries	Developing countries
Niche technologies are presented only because of the environmental causes	Technologies some nations cannot afford are difficult to support and do not solve significant electrification problems	Diversification of energy resources and promotion of alternative energy	Use of local resources and opening of opportunities for foreign capital attracting

Source: systematized by the author according to the data [3, 4]

Table 2

Obstacles and development factors in the project financing of alternative energy

Obstacles	Development factors
Traditional project financing is intended for large projects. Lack of financial structures for small projects. Ecological standards and large infrastructure of the project. Unregulated competition with conventional energy projects. High demands for advance capital.	Integration of small projects into joint renewable energy projects on significant financing reasons. Development of micro financing instruments. Private sector financing is stimulated by multilateral assistance and investments (World Bank Group, Global Environment Facility, regional development banks) and the Export Credit Agency (ECA) with state guarantees. Solving the related risks, flexibility in funding schemes (fast-track / one-stop financing, standardized procedures, standard purchase transactions, period and schedule of project closure). Multilateral insurance policy

Source: systematized by the author according to the data [3, 4]

Table 3

Political obstacles and development factors of alternative energy

Obstacles		Development factors	
Subsidies and other benefits for traditional forms of energy, inconsistent policies for the use of fossil fuels for renewable energy, social and environmental costs.		Climate change and other environmental policies (taxation, incentives, green certificates, etc.). Planning and implementation of renewable energy policy.	
Developed countries	Developing countries	Developed countries	Developing countries
Deregulation, which results in a non-interference policy. Promotion of trading power plants. Lack of institutional infrastructure.	The desire to solve problems quickly (installation of diesel generators). Political barriers (instability, lack of transparency, lack of legal and regulatory framework for private property support).	Distributed energy policy.	Rural electrification programs based on local off-grid electrification resources. GHG accountability (CDM, PSF, emissions trading).

Source: systematized by the author according to the data [3, 4]

Table 4

Legislative obstacles and development factors

Obstacles		Development factors	
1		2	
Lack of basic laws and regulations to support the renewable energy sources, lack of legal transparency in the energy sector and incompetent environmental legislation.		New rules issued by International Financial Institutions (IFIS), Export Credit Agency (ECA) and multilateral aid agencies for a coherent environmental project. Rules and regulations for strengthening the renewable energy sources (RPS, renewable obligations, renewable energy laws, etc.). Basic laws and regulations for private investments placement.	
Developed countries	Developing countries	Developed countries	Developing countries
Lack of consistency in energy jurisdiction.	The lack of transparent laws (regarding project structure, public-private relations, currency exchangeability, international arbitral authority). Lack of environmental legislation.	Jurisdiction will promote the use of renewable energy sources (laws, regulations). Jurisdiction will mitigate the effects of climate change.	Rules for promoting the energy supply systems in rural areas. State guarantees that ensure private investment. Rules for access to financing of international renewable energy sources.

Source: systematized by the author according to the data [3, 4]

Wind power and solar energy, biomass and energy of small rivers, geothermal energy and the environment one are the most widely used and available for Ukraine. The main obstacles that hamper the development of alternative energy by types and factors of their development in the world are presented in Table. 5-8.

Table 5

Obstacles and development factors of solar energy

Obstacles		Development factors	
1		2	
The resource is available only during the daytime, sensitive to atmospheric and weather fluctuations. Costs for solar photovoltaic electricity are much higher than for other alternative sources, high capital expenditures, long payback periods, technological connection, fragmentation, conservation of high value for cost for data storage solutions, material limitations of hazardous materials in photovoltaic systems. Solar installations are additional to the main components in heating systems. Several large industrial suppliers.		Clean, distributed energy solutions. Electrical technologies for larger solar power stations are more beneficial and they receive subsidies for solar energy. Huge areas of the roof and the facade, which are in an area of accessible energy. Kyoto protocol, the way of "green" profiling of buildings, enterprises. Relatively low costs of kWh compared to other renewable energy sources.	

1		2	
Developed countries	Developing countries	Developed countries	Developing countries
Not profitable for technological electricity and even electricity markets. The need for "net accounting". The need for integration in buildings.	High costs, low availability of PV power. Lack of financial opportunities for subsidizing renewable energy projects.	Low requirements for maintenance. High-reliability systems. Solution "Solar Architecture". Renewable energy resources.	Additional grids in remote rural areas where small amounts of energy are needed. High growth rates coupled with lack of capacity Reduction of need in import, cooling potential of solar energy.

Source: systematized by the author according to the data [3, 4]

Table 6

Obstacles and development factors of wind energy

Obstacles		Development factors	
Lack of good wind conditions. Non-competitive technologies in the short and medium term.		Sufficient state support for wind capacity to introduce subsidies. The Kyoto Protocol continues to reduce the cost of kWh from the wind.	
Developed countries	Developing countries	Developed countries	Developing countries
NIMBY (not in my backyard) effect. Access to generating capacity in the electricity sector. Instability of energy generation.	Lack of financial resources for subsidizing wind turbines.	High dependence on import of energy resources.	The growth rate of energy demand coupled with lack of power. Suitable for the electrification of rural areas.

Source: systematized by the author according to the data [3, 4]

Table 7

Obstacles and development factors of hydro energy

Obstacles		Development factors	
High initial outlay		Renewable energy source. No GHG emissions in the process are widely distributed throughout the world.	
Developed countries	Developing countries		
The best installs are already designed.	Inadequate water resources and supplies. Competition for water with other sectors of economy (agriculture).		

Source: systematized by the author according to the data [3, 4]

Table 8

Obstacles and development factors of bioenergy

Obstacles		Development factors	
The scattered form of energy, the diversity of technological solutions are considered as underdeveloped: the risk for private investors. Difficulties associated with collection and transportation, deforestation. Low load factors of increase the energy system cost.		Reduction of fossil fuel import. Lack of expensive storage devices. Participation of the private sector in the bioenergy deployment. Distribution of energy production.	
Developed countries	Developing countries	Developed countries	Developing countries
Exhaustion of natural resources. Small resources, difficulties in creating a scale effect.	Minimal impact on the national energy supply.	Distributed energy resources. Utilization of local energy resources. Diversification of energy balance.	Increasing production in income-producing activities, reducing poverty gives jobs, capital and income sources to rural areas. Used in rural households.

Source: systematized by author according to the data [3, 4]

In view of the above mentioned, the state of renewable energy sources development in Ukraine should be more carefully assessed, first of all, in terms of ensuring the energy sustainable development, expansion the domestic market for the consumption of alternative energy sources by improving the structure rather than energy intensive technologies, preventing excessive economic burden on energy consumers and the deterioration the stability of the combined energy system in the country.

The place of investing in alternative energy in the economy of the state, its current state and prospects of development predetermine certain investment features inherent in the individual stages of the investment process implementation, in particular [4]:

- 1) significant influence of the state on the investment process components, as well as their use as a result of the dominance of the state ownership form and the unconditional importance of alternative energy for ensuring the energy security;
- 2) complexity of choosing the components of the investment process, namely: directions and sources of investment attraction. The reason is the investment unattractiveness of energy due to the sets of natural, industrial, financial and economic reasons, which hinders the implementation of an innovation model of modernization and industry development;
- 3) lack of investment, which leads to long-term construction compared to project or regulatory ones;
- 4) lack of effective mechanism for monitoring the use of investment funds, which allows them to misuse and reduces financial resources for strategic development.

Conclusions and recommendations for further research. Consequently, these features indicate that the problems of implementing the investment process in energy and alternative energy, in particular, exist at all stages. In order to solve them, it is necessary to introduce an effective mechanism for the investment process implementation, which allows efficiently directing investments to the use of alternative energy potential and justifying the alternative energy development strategy at the state level.

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Svitlana Sivitska, Ph.D., Associate Professor, Vice-Rector for Scientific, Educational, Social Work and International Cooperation. Poltava National Technical Yuri Kondratyuk University. **Features of investment process in the field of alternative energy.** The article analyzes the features of the investment process implementation. The model of implementation the investment process in the field of alternative energy is substantiated. The main obstacles and factors of alternative energy development are investigated. Legislative and political barriers and factors of alternative energy development are analyzed. The international experience is studied and the obstacles and factors as for development of renewable energy sources are identified.

Keywords: investment process, energy security, alternative energy, renewable energy sources.

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Свіцька Світлана Павлівна, кандидат економічних наук, доцент, проректор з науково-педагогічної, соціальної роботи та міжнародного співробітництва. Полтавський національний технічний університет імені Юрія Кондратюка. **Особливості забезпечення інвестиційного процесу у сфері альтернативної енергетики.** Проаналізовано особливості реалізації інвестиційного процесу. Обґрунтовано модель реалізації інвестиційного процесу у сфері альтернативної енергетики. Досліджено основні перешкоди і чинники розвитку альтернативної енергетики. Проаналізовано законодавчі та політичні перепони і чинники розвитку альтернативної енергетики. Досліджено міжнародний досвід, визначено перешкоди й чинники розвитку відновлюваних джерел енергії за видами.

Ключові слова: інвестиційний процес, енергетична безпека, альтернативна енергетика, відновлювані джерела енергії.

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Сивицкая Светлана Павловна, кандидат экономических наук, доцент, проректор по научно-педагогической, социальной работе и международному сотрудничеству. Полтавский национальный технический университет имени Юрия Кондратюка. **Особенности обеспечения инвестиционного процесса в сфере альтернативной энергетики.** Проанализированы особенности реализации инвестиционного процесса. Обоснована модель реализации инвестиционного процесса в сфере альтернативной энергетики. Исследованы основные препятствия и факторы развития альтернативной энергетики. Проанализированы законодательные и политические препятствия и факторы развития альтернативной энергетики. Исследован международный опыт, определены препятствия и факторы развития возобновляемых источников энергии по видам.

Ключевые слова: инвестиционный процесс, энергетическая безопасность, альтернативная энергетика, возобновляемые источники энергии.