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INSTITUTIONALIZATION OF THE TRANSITION TO THE USE OF ALTERNATIVE SOURCES OF ENERGY

The consumption of traditional energy resources by the world economy leads to their catastrophic reduction and severe environmental consequences. In addition, there are a number of alternative means of energy replenishment, which are inexhaustible sources of energy: air, solar, geothermal energy, energy of orbital motion of the Earth (gravity), and energy derived from them. With traditional energy sources, they are able to provide energy to the world economy. Institutionalization processes have embraced the social development of global and national economies. It is important not only to cover alternative energy sources, but also to study the processes of institutionalization of the transition to them, improving the institutional system, institutions and institutions for the use of alternative energy sources. Multiple and diverse studies of alternative energy sources provide large-scale development. However, insufficient development of institutional issues, processes of institutionalization of the transition to the use of alternative energy sources are becoming a deterrent. **Goal.** The aim of the article is to develop scientifically sound proposals for the institutionalization of the transition to the use of alternative energy sources. **Method.** Various research methods are used: theoretical and empirical, fundamental and applied. **Results.** The rapid depletion of traditional energy resources and the constant increase in their price with increasing energy needs due to economic development and the evolution of people's lifestyles lead to the creation of alternative energy sources. The advantages of alternative energy sources are: renewable, widespread in most of their species, using some low operating costs, environmental friendliness. The negative qualities of using alternative energy sources include: low energy flux density, which forces manufacturers to use large areas of power plants; instability of energy production over time; high cost of using alternative energy sources. Institutionalization of the economy (generally) is a process of formation of formal institutions that limit the behavior of economic entities and generate a number of agreements, rules of the game, stereotypes of behavior, traditions. Institutionalization aims to improve the quality of life. The most important factor in justifying the institutionalization of the use of alternative energy sources is the need to address issues that directly affect the development and use of alternative energy sources. **Scientific novelty.** The study highlights problems that significantly reduce the use of alternative energy sources. Therefore, scientifically sound proposals for the institutionalization of the transition to the use of alternative energy sources: organizational, financial, methodological, educational decisions. **Practical significance.** The practical significance of the study lies in the possibility of using developed scientifically sound proposals in the process of planning the country's energy strategy, sectoral programs for the development of energy generation from alternative sources, planning the work of industrial consumers, producers of energy from alternative sources.

Key words: alternative energy sources, institutes; institutions; institutionalization; traditional energy sources

Statement of the problem

The consumption of traditional energy resources by the world economy leads to their catastrophic reduction and severe environmental consequences. In addition, there are a number of alternative means of energy replenishment, which are inexhaustible sources of energy: air, solar, geothermal energy, energy of orbital motion of

the Earth (gravity), and energy derived from them. Together with traditional energy sources, they are able to provide energy to the world economy.

The use of alternative energy sources currently has a high cost. Perhaps this explains the common belief that switching to renewable energy sources reduces the profitability of the business.

The high cost of using alternative energy sources justifies insufficient attention to the institutional requirements of such a transition.

A significant number of publications on alternative energy sources occasionally address the regulatory, financial and administrative support for the transition to renewable energy sources. The transition to alternative energy supply does not meet the current level of development of science, the needs of economic practice.

It is important not only to cover alternative energy sources, but also to study the processes of institutionalization of the transition to them, improving the institutional system and institutions for the use of alternative energy sources.

Analysis of recent research and publications

The problems of alternative energy are actively studied by a large number of researchers, including O. Akymenko, S. Barbera, O. Barabanov, M. Butko, A. Cherep, K. Corbetta, L. Eder, F. Fassio, M. Fria, V. Gloystein, A. Haitun, G. Khalila, S. Kudrya, A. Kopilov, J. Lawrence, D. Leonov, O. Nikiforov, A. Petrovska, A. Pibalds, R. Rapira, R. Rikoshevich, H. Sayen, K. Tsyhanok, S. Zanda, O. Zenner, and others. Their in-depth work focuses on the energy supply of the economy, the feasibility of using alternative energy sources, the transition to them.

Works of institutionalists and philosophers V. Dementiev, B. Erznkyan, S. Glazhev, G. Kleiner, N. Kondratiev, R. Kouz, D. Lvov, D. Nort, V. Vernadsky, O. Vil'yamson, V. Jacobson, A. Zarnadze and others constitute the basis of institutional support of the problem, and the methodological basis of research on the institutionalization of the transition to the use of alternative energy sources.

In Ukraine, T. Gaidai, L. Golovkova, D. Khodzhson, V. Kolomiets, O. Nosova, V. Osetsky, M. Radieva, I. Rekun, A. Shastitko, A. Tkach, T. Tkach, V. Yakubenko deeply study the institutionalization of society in the modern dimension.

Formulation of the purpose of the article

Multiple and diverse studies of alternative energy sources provide large-scale development. However, insufficient development of institutional issues, processes of

institutionalization of the transition to the use of alternative energy sources are becoming a deterrent.

The aim of the article is to develop scientifically sound proposals for the institutionalization of the transition to the use of alternative energy sources.

Various research methods are used: theoretical and empirical, fundamental and applied.

The practical significance of the study lies in the possibility of using scientifically sound proposals in the process of dominating the country's energy supply strategy, sectoral programs for the development of energy generation from alternative sources, industrial enterprises, consumers, energy producers from alternative sources.

The main material of the research

World development predicts a significant increase in energy consumption. The share of exhaustible energy sources such as natural gas in the world energy balance will be 30%, oil and coal will be 24%. The structure of energy consumption will change due to changes in the ratio of exhaustive and alternative energy sources. Forecasts declare the dominance of the use of air energy (15%), solar energy (10%), hydropower (9%). The energy of the tides can be 1% of the total consumption structure [1].

The development of alternative energy sources will reduce oil production and could have a major impact on the world economy.

The rapid depletion of traditional energy resources and the constant increase in their price with increasing energy needs due to economic development and the evolution of people's lifestyles lead to the creation of alternative energy sources. Under the influence of this trend, the structure of energy consumption is changing in both developed and developing countries. Countries such as the United States, Canada, England, Germany, and Japan are constantly increasing the share of alternative energy sources in total energy consumption in order to reduce the economy's dependence on oil and gas imports [10]. In addition, they are trying to reduce the use of depleted energy sources due to the dangers of their extraction and use, the negative impact on the environment, human health, climate around the world.

Political and economic instability in countries specializing in the extraction of exhaustible energy sources plays an important role in the development of alternative energy sources. Their production cannot grow indefinitely due to limited natural resources.

The development of alternative energy sources is complicated by the lack of business motivation and appropriate incentives, decisions on the institutionalization of the transition to the use of alternative energy sources. High intellectual capacity of non-traditional energy sources requires non-standard approaches to financing.

Alternative energy sources include [7; 8; 11; 12]:

- air energy;
- solar energy;
- geothermal energy;
- tidal energy;
- energy of the Earth's orbital motion (gravity);
- energy derived from them.

Recently, thermonuclear energy of controlled explosion has been added here, which is released with minimal fuel consumption.

The advantages of alternative energy sources are:

- recoverability,
- the ubiquity of most of their species,
- when using some low operating costs,
- environmental friendliness.

The development of alternative energy significantly reduces harmful emissions into the atmosphere, improves the environment. In the long run, the widespread use of alternative energy sources will reduce the greenhouse effect.

The negative qualities of using alternative energy sources include:

- low energy flux density, which forces manufacturers to use large areas of power plants;
- instability of energy production over time;
- high cost of using alternative energy sources.

Non-traditional energy sources have a steady upward trend, despite the need for infrastructure and large investments. This is possible only in rich countries with sustainable economic development. According to experts, with a high level of investment in the development of non-traditional energy sources can be provided by solar energy (10%); air - 15%; hydropower - 9%; tidal and geothermal energy - 1%; nuclear - 7%; and due to the energy obtained from the combustion of biomass and industrial waste - 4% of total world energy [18].

Institutionalization processes have embraced the social development of global and national economies. In the modern world, certain industries are being regulated, legal norms are being developed and implemented, and new institutions are being created and successfully operating. Accordingly, progressive states consider alternative energy sources as the most valuable resource for development.

According to D. North, the institutionalization of economy (as a whole) is a process of formation of formal institutions that limit the behavior of economic entities and agreements, rules of the game, stereotypes of behavior, traditions.... [9].

Ukrainian researchers insist on normalization and institutionalization in legislation, including alternative energy sources [5; 6; 13; 14; 15; 16; 17; 20; 21]. Institutionalization should be aimed at improving the quality of life of society. Therefore, the limits of institutionalization, possible positive or negative consequences require in-depth research and development, as this is the most promising resource for both the economy and globalization in general.

The institutional structure is based on institutions, and specific actions are implemented through institutions. According to D. Khodzson, institutions are "normative models that determine what in a given society is considered mandatory, given or expected mode of action or social relationships" [3, p. 190–191]. D. North recognizes institutions as "certain structures created by human consciousness" [9, p. 104].

Institutional system is a combination of old and the formation of new institutions in the evolution of society. There is a transformation of some institutions into others. "Ineffective informal institutions are being supplanted by legitimate norms that are transforming the behavior of economic actors. This contributes to the expansion of the institutional field, achieving the homogeneity of institutions, the synchronicity of their functioning, the institutionalization of mechanisms of interaction between business and the state "[4].

A number of researchers emphasize that institutionalization is a synthesis of ideas as part of economic theory [2; 5; 6; 13; 14; 15; 16; 17; 19; 20; 21].

In order to develop and effectively use alternative energy sources, all elements and components of the institutional system must actively interact. D. North pointed out the need

for active interaction of institutions, mechanisms for implementing rules and norms [9]. It is the intensity of their interaction that explains the revolutionary development of the economies of some countries and the protracted gradual path of backward countries. The inertia of institutionalization becomes a brake on changes in the economy of countries, and, consequently, in the development of alternative energy sources.

Under the influence of institutionalization, the object of influence changes. In turn, the consequence of institutionalization is a change and new quality of the institutions themselves, institutions, their interactions, changes in the institutional environment.

The analysis of normative provisions on institutionalization of alternative energy sources, which are developed by institutional structures, revealed inconsistency of normative-legal acts, which regulate the relations between the state and business. There are also insufficient formal documents on alternative energy sources.

The most important factor in justifying the institutionalization of the use of alternative energy sources is the need to address issues that directly affect the development and use of alternative energy sources and which need to be paid close attention.

In the industrial sector, regulatory and technological, mental, administrative, bureaucratic obstacles to the use of alternative energy sources have been identified. The existing lack of environmental institutions, staffing, science, logistics, hinder the development of alternative energy sources.

As the institutional structure of the alternative energy sector is in its infancy, resistance is inevitable at all levels and barriers are emerging:

- mentality of economic agents who believe that the transition to the use of alternative energy sources is economically impractical and has a long payback period;
- long-term prospects of innovative energy technologies and risks of depletion of traditional energy resources are underestimated;
- high cost, low capacity and variability of energy production of some types of alternative sources do not compete with traditional sources;
- significant capital costs for equipment, long period of commissioning;
- orientation of Ukrainian industry to non-renewable energy sources;
- lack of mechanisms to encourage industrial enterprises to use alternative energy sources as an

energy resource;

- Lack of environmental institutions that create soft conditions for state environmental regulation, lack of clear requirements for cleaning and regulation of emissions, lack of sanctions for violations;
- the legal field for the functioning of alternative energy sources is just emerging, improvements in the legal framework, regulation of law enforcement mechanisms are needed;
- lack of personnel reserve in the industry, lack of faculties in higher education institutions to train narrow specialists in the industry, lack of specialists who have significant practical experience due to the "youth" of the industry;
- weak scientific support of the industry due to low funding for basic and applied research, unclaimed research on the use of alternative energy sources.

Institutional barriers to alternative energy generation are grouped into three groups:

1. related to the legal framework (formation of standards, regulations, norms of technological nature);
2. are economic in nature (taxation, subsidies, customs regulation);
3. formation of the organizational mechanism (propaganda and advertising of alternative energy sources, selection of specific market agents).

These problems significantly reduce the use of alternative energy sources.

We consider it expedient to provide proposals for the institutionalization of the transition to the use of alternative energy sources:

- organizational decisions: measures to overcome interdepartmental inconsistencies and the formation of mechanisms of administrative, regulatory and financial regulation (creation of a specialized structure for coordination of strategic interests of producers, consumers and the state; creation of indicative production and energy planning for effective geographical location energy generation, Transformation of the institution of attracting market participants in legislative changes in the field of alternative energy, the creation of an institution to coordinate supply and demand, advertising of new energy technologies, creating an accessible information environment);
- financial solutions: creation of a system of tax benefits for alternative energy producers and industrial consumers (abolition of income tax for the above categories for the payback period of used alternative energy sources; when using

imported equipment abolition of customs duties and value added tax; subsidizing bank rates on equipment loans on the generation of alternative energy; compensation for the cost of technological connection of alternative energy networks to the grid; introduction of adequate environmental taxes on traditional energy sources; strengthening fines and sanctions for non-compliance with regulations on harmful emissions and waste disposal);

- methodological solutions: formation of methodological base for practical application of different types of alternative energy supply in different conditions;

- educational solutions: formation of a system of training professionals and managers in the field of alternative energy sources, creation of a system of lifelong learning, a system of interaction between higher education institutions and energy producers.

Conclusions

The consumption of traditional energy resources by world's economy leads to their catastrophic reduction and severe environmental consequences. In addition, there are a number of alternative means of energy replenishment, which are inexhaustible sources of energy: air, solar, geothermal energy, energy of orbital motion of the Earth (gravity), and energy derived from them. With traditional energy sources, they are able to provide energy to the world economy.

Institutionalization processes have embraced the social development of global and national economies. It is important not only to cover alternative energy sources, but also to study the processes of institutionalization of the transition to them, improving the institutional system, institutions and institutions for the use of alternative energy sources.

Multiple and diverse studies of alternative energy sources provide large-scale development. However, insufficient development of

institutional issues, processes of institutionalization of the transition to the use of alternative energy sources are becoming a deterrent.

The aim of the article is to develop scientifically sound proposals for the institutionalization of the transition to the use of alternative energy sources.

The rapid depletion of traditional energy resources and the constant increase in their price with increasing energy needs due to economic development and the evolution of people's lifestyles lead to the creation of alternative energy sources.

The advantages of alternative energy sources are: renewable, the prevalence of most of their species, using some low operating costs, environmental friendliness. The negative qualities of using alternative energy sources include: low energy flux density, which forces manufacturers to use large areas of power plants; instability of energy production over time; high cost of using alternative energy sources.

Institutionalization of the economy (as a whole) is a process of formation of formal institutions that limit the behavior of economic entities and generate a number of agreements, rules of the game, stereotypes of behavior, traditions. Institutionalization aims to improve the quality of life.

The most important factor in justifying the institutionalization of the use of alternative energy sources is the need to address issues that directly affect the development and use of alternative energy sources.

The problems highlighted in the study significantly reduce the use of alternative energy sources.

Therefore, scientifically sound proposals for the institutionalization of the transition to the use of alternative energy sources: organizational, financial, methodological, educational decisions.

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ІНСТИТУЦІОНАЛІЗАЦІЯ ПЕРЕХОДУ ДО ВИКОРИСТАННЯ АЛЬТЕРНАТИВНИХ ДЖЕРЕЛ ЕНЕРГЕТИКИ

Анотація. Споживання світовим господарством традиційних енергетичних ресурсів призводить до їх катастрофічного зменшення та жорстких екологічних наслідків. Поряд з тим існує ряд альтернативних засобів підживлення енергетики, які складають невичерпні джерела енергозабезпечення: повітряна, сонячна, геотермальна енергія, енергія орбітального руху Землі (гравітація), та похідні від них енергії. Вони здатні разом з традиційними енергоносіями забезпечити енергією світову економіку. Процеси інституціоналізації охопили суспільний розвиток глобальної та національної економік. Актуальним стає не тільки висвітлення альтернативних джерел енергетики, а також дослідження процесів інституціоналізації переходу на них, вдосконалення інституціональної системи, інститутів та інституцій для шодо використання альтернативних джерел енергетики. Множинні та різнобічні дослідження альтернативних джерел енергетики забезпечують широкомасштабний їх розвиток. Проте недостатня розробка інституціональних питань, процесів інституціоналізації переходу до використання альтернативних джерел енергетики стають стримуючим фактором. **Мета.** Метою статті є розробка науково обґрунтованих пропозицій щодо інституціоналізації переходу до використання альтернативних джерел енергетики. **Методика.** Використані різноманітні методи дослідження: теоретичні та емпіричні, фундаментальні та прикладні. **Результати.** Стрімке вичерпання традиційних енергетичних ресурсів та постійне зростання їх ціни при зростанні потреб в енергії, обумовлені розвитком економіки та еволюцією способу життя людей ведуть до створення альтернативних джерел енергетики. Перевагами альтернативних джерел енергетики стають: відновлюваність, повсюдна поширеність більшості їх видів, при використанні деяких низькі експлуатаційні витрати, екологічність. До від'ємних якостей використання альтернативних джерел енергетики віднесемо: низьку щільність потоку енергії, яка змушує виробників використовувати великі площі енергоустановок; нестабільність отримання енергії у часі; високу собівартість використання альтернативних джерел енергетики. Інституціоналізація економіки (в цілому) – це процес становлення формальних інститутів, що обмежують поведінку економічних суб'єктів і генерують ряд угод, правил гри, стереотипів поведінки, традицій Інституціоналізація спрямована на підвищення якості життя суспільства. Найбільш значущим чинником обґрунтування інституціоналізації процесів використання альтернативних джерел енергетики є необхідність вирішення проблем, що безпосередньо впливають на розвиток та застосування альтернативних джерел енергетики. **Наукова новизна.** В дослідженні висвітлено проблеми, які значно знижують використання альтернативних джерел енергетики. Тому надано науково обґрунтовані пропозиції щодо інституціоналізації переходу до використання альтернативних джерел енергетики: організаційні рішення, фінансові рішення, методологічні рішення, освітні рішення. **Практична значимість.** Практична значимість дослідження полягає в можливості використання розроблених науково обґрунтованих пропозицій в процесі планування стратегії енергозабезпечення країни, галузевих програм по розвитку генерації енергії з альтернативних джерел, планування роботи промислових підприємств-споживачів, виробників енергії з альтернативних джерел.

Ключові слова: альтернативні джерела енергетики, інститути; інституції; інституціоналізація; традиційні джерела енергії

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