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INSTITUTIONAL MECHANISMS TO ENSURE THE EFFICIENCY OF RENEWABLE ENERGY: CURRENT STATE AND PROSPECTS FOR REGIONAL DEVELOPMENT

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The article examines the problem of the insufficiently studied essence, structure, and socio-economic significance of the use of energy from renewable sources (RES). Based on the analysis of a wide range of fundamental and applied scientific works, as well as the experience of developed countries, the author substantiates the relevance of RES development in the context of limited fossil fuel resources, the need to comply with international obligations to reduce greenhouse gas emissions (Kyoto Protocol) and ensure energy security. The specific characteristics and types of renewable energy resources are systematized, considering the level of their integration into the economic activity of regional systems. The energy potential of the regions of Ukraine for the introduction of innovative technologies for the use of renewable energy sources is assessed. It is emphasized that the unsatisfactory state of the environment and energy deficit of the regional energy systems of Ukraine necessitate theoretical substantiation and practical implementation of measures aimed at overcoming the problems of energy supply to the population and industry using RES. It is argued that the effective implementation of RES in Ukraine requires the formation of its own national model, which includes the creation of a separate energy sector with effective regulatory instruments for each type of RES, the development of an incentive state policy, which refers to a set of measures and regulations designed to encourage the development and use of renewable energy and the search for sources of financing. Achieving a balance of key technical and economic indicators of traditional and renewable energy is considered possible if the pricing system in traditional energy is reformed, given that price is one of the determining factors in the internalization of global energy markets. Priority areas for the implementation of renewable energy have been identified, including intensification of scientific (fundamental and applied) research, as well as research and development and exploration work; creation of an educational base for training highly qualified specialists in the field of renewable energy; modernization of the existing industrial and professional infrastructure to ensure theoretical and practical activities in the field of renewable energy; simplification of access of renewable energy facilities to the electricity and heat networks of energy companies on the basis of relevant regulatory frameworks.

Keywords: *renewable energy sources, region, institutions, efficiency of use, regional energy systems, energy security, energy potential of the region.*

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PROBLEM STATEMENT AND ITS SIGNIFICANCE

The critical state of the environment and the shortage of energy resources in domestic and regional power systems necessitate immediate theoretical substantiation and practical implementation of measures to overcome the energy supply problems for the population and industrial enterprises. Using renewable energy sources (RES) is a promising way to solve this problem. According to experts, the limited reserves of organic resources and current trends in their irrational use determine the time horizon of their availability for human economic activity, which does not exceed 50-60 years. This may result in a global crisis associated with the exhaustion of energy resources necessary for any economic activity. Given these challenges, research on promising areas of global energy development is of particular relevance, particularly in the context of identifying and implementing RES as an alternative to traditional forms and types of energy supply.

ANALYSIS OF RECENT RESEARCH AND PUBLICATIONS

The issue of using renewable energy sources (RES) as an alternative to traditional energy supply is not just a matter of scientific debate but a topic of strategic importance among energy theorists and practitioners. Numerous fundamental and applied studies confirm the depth of this area. However, the study's relevance is further enhanced by the insufficient development of issues related to the specification of the essence, nature, and classification, as well as methods and technologies for using RES in the context of regional economic systems.

The theoretical foundations of using modern methods, tools, and technological solutions to exploit key types of RES (wind, solar, geothermal, biomass, and environmental energy) are covered in the works of such scientists as S. Kudria [2], K. Pavlova, O. Pavlova [4, 7-9], V. Kupchak [3], D. Sala, and I. Bashynska [11].

A. Shydlovsky's scientific works [5] provide a comprehensive consideration of the issues related to assessing the economic potential, identifying ways to expand and prospects for the implementation of RES, and improving the energy efficiency of the relevant equipment. This thorough research is a significant contribution to the field.

SETTING THE TASK

This study aims to comprehensively analyze the essence, nature, and efficiency of renewable energy sources (RES), assess their energy potential in the regional context, and develop recommendations for improving the efficiency of RES implementation in Ukraine's economic activity. The findings of this study could significantly enhance the energy landscape in Ukraine. The following tasks have been set to achieve this goal:

1. To conduct a theoretical generalization, specify the essence and nature, and develop methodological approaches to using RES, focusing on practical application.
2. To study and summarize the EU countries' practical experience in ensuring a significant RES potential, particularly by examining their policy frameworks, technological advancements, and the social and economic impacts of their RES initiatives.
3. Identify and evaluate the social and economic effects of implementing regional energy systems with an increased share of RES compared to traditional energy systems.
4. Identify and substantiate potential ways to diversify Ukraine's energy resources based on using RES.
5. To monitor and analyze the state of energy potential of Ukrainian regions.

PRESENTATION OF THE PRIMARY RESEARCH MATERIAL

In the wide range of definitions of the concept of renewable energy (RE), the most accurate is the one that defines it as a branch of economic activity that covers the relevant scientific and technical potential for the production, transmission, transformation, accumulation, and consumption of mechanical, thermal and electrical energy through the use of renewable energy sources (RES) as primary energy resources. Renewable or inexhaustible energy resources are classified into primary and secondary. Primary energy includes direct solar radiation, while secondary energy results from transformed wind, hydropower, biomass, and geothermal energy. Using renewable energy sources makes it possible to solve the problems of production, transmission, transformation, accumulation, consumption, and utilization of waste typical of traditional energy systems in the context of their relative inexhaustibility, environmental balance, and compliance with energy security requirements. Many countries are implementing strategies to decommission nuclear power plants and gradually replace them with alternative and renewable energy sources.

In the context of ensuring energy security, the importance of using renewable energy sources in developed countries is not only due to limited fossil fuel reserves but also to the need to comply with the limits on greenhouse gas emissions set by the Kyoto Protocol. The greenhouse effect, which results from carbon dioxide emissions and its absorption of infrared radiation, increases the temperature and humidity of the Earth's atmosphere, which has highly negative environmental consequences. Unlike conventional energy technologies, renewable energy sources have virtually no impact on the planet's heat balance, help reduce greenhouse gas emissions, and potentially increase energy production and transmission [1, 2].

Traditional energy sources include human and animal muscle power, hydropower (in particular, water flow energy), peat, and wood combustion energy. Non-traditional renewable energy sources include biomass (excluding firewood), solar, geothermal, wind, wave, river, and tidal energy. It should be noted that the scientific literature also uses the term "new renewable energy sources" to refer to sources derived from technological innovations.

Each renewable energy source is characterized by specific production features, different specific power (kW), and various forms of use. Several factors affect the efficiency of each RES source: 1) geological and exploration work, including environmental monitoring, to identify potential sources (cells); 2) analysis of the needs of a particular region, taking into account the industrial, domestic, and agricultural sectors; 3) development of predictive models for achieving the energy potential from a particular RES source. Energy potential is the amount of energy reserves inherent in a particular type of RES. As a rule, the use of RES has a more significant impact on the economic development of rural areas than urban ones.

The growth rate of the installed capacity of power plants using RES is significantly higher than that of conventional power plants. The share of RES in the energy consumption of developed countries reaches 23.7% [1].

The European Union pursues a policy aimed at stimulating the use of RES. It has established several requirements governing the share of energy from RES in the energy consumption structure of member states and countries seeking integration with the EU. These measures give EU countries about 18% of electricity from renewable sources. Germany is a leader among European countries in terms of the share of non-conventional energy sources, resulting from the implementation of relevant legislation and

established practices in this area. The EU's most common types of RES are biomass energy, wind, and geothermal energy [2].

Given the priority of ensuring stable power, expanding the use of RES requires a systematic approach and considering the balance between the load on the power system and the generated power. The key factors affecting this balance are:

1. Revision of the Strategy for the use of pumped storage power plants.
2. Integration of many different RES and ensuring their systemic interaction.
3. Monitoring and regulation of reverse electricity supplies from thermal power plants.
4. Use of reserve capacities and regulatory mechanisms.
5. Implementation of energy-efficient consumption schedules and energy storage technologies.
6. Research and development of technologies for the use of hydrogen as a potential energy storage.

Competitiveness in the electricity generated from renewable sources is based on consumers' free choice of suppliers and the absence of administrative and economic barriers to entry into the energy supply and sales market. The modern European model of the renewable (alternative) electricity market, characterized by integration and globalization, poses new challenges and potential threats to business entities in this sector, especially newly established enterprises. This concerns ensuring transparency and objectivity of the conditions for access to consumption and operation of energy networks, as well as impartial and accelerated market development in line with the dynamic needs of the economic system and growing consumer demands. The emphasis on transparency in market relations should reassure stakeholders about the fairness of the market. Compliance with European standards and norms is also an important aspect.

Reforming the electricity sector involves achieving interrelated goals: organizational, economic, technical, technological, social, and environmental. However, integrating these goals can lead to ambiguous consequences and risks, especially in the context of cost optimization and ensuring the financial stability of enterprises. Potential conflicts of interest between stakeholders, such as large market players and independent suppliers, should be considered.

The definition of strategic goals and objectives requires a systematic analysis of the energy market in the following main areas: identification of reform priorities, taking into account national peculiarities, a detailed analysis of potential benefits and risks for all market participants, as well as an assessment of possible threats caused by external factors, such as fluctuations in energy prices, the emergence of new renewable energy generating facilities, and changes in regulatory policy.

While an important step, strengthening the system operator's role does not guarantee its complete independence from external risks and the influence of large market players. The liberalization of the electricity market provides access to the wholesale market for other participants, including independent suppliers, who can enter into direct contracts with generating companies and sell electricity generated using renewable sources in the retail market to end consumers. Such participants are usually large industrial consumers and associations of smaller consumers. On the supply side of the retail market, a competitive environment is being formed that is an alternative to existing regional energy supply and generation companies and encourages them to improve efficiency. The formation of consumer choice will ultimately determine the price parameters, quality of services, reliability of supply, and transparency of competitive relations in the market.

In 2014, the volume of investments in European countries aimed at developing renewable energy sources amounted to USD 211 billion, and according to forecasts, this figure could reach USD 0.5 trillion by 2020 [5].

In addition, the development of RES has a much more significant positive socio-economic impact on regional development and national economic growth than traditional energy systems. According to the "Renewables 2017 Global Status Report" (Paris REN21 Secretariat), in 2017, more than 4.5 million people were employed in the renewable energy sector worldwide, including 800 thousand people in the solar energy sector, 3.6 million people in wind energy, and about 2 million people in bioenergy. This indicates an increase in the number of jobs in this industry, especially in countries such as the United States, Japan, Germany, China, and Brazil, where research and development activities are actively conducted for the commercial use of renewable energy. The technological development of renewable energy is a dynamic process that depends on existing and new mechanisms to stimulate the development of renewable energy and the gradual abandonment of traditional energy sources. According to IEA estimates, the annual cost of subsidizing fossil fuels in developing countries and countries with economies in transition is about USD 0.5 trillion [6, 10].

Several countries have implemented incentive policies for the development of RES. In particular, China has reduced the tax burden on fossil fuel energy producers; Canada has abolished accelerated depreciation for investments in oil and tar sands; Germany plans to stop financial support for the coal industry by 2022; the Republic of Korea has stopped mining anthracite; Turkey does not support the policy of expanding coal mines. In addition, with the establishment of limits on these emissions, greenhouse gas emissions trading is one of the tools used to reduce the use of fossil fuels [2, 6].

The intensification of scientific and technical research in RES development began in the 1970s and 1980s in countries that had created the appropriate state, regulatory, and economic support. Considering the need to comply with environmental safety standards, industrialized countries have increased energy production and consumption expenditures to 3% of their gross domestic product (GDP) to minimize or eliminate environmental impacts [5].

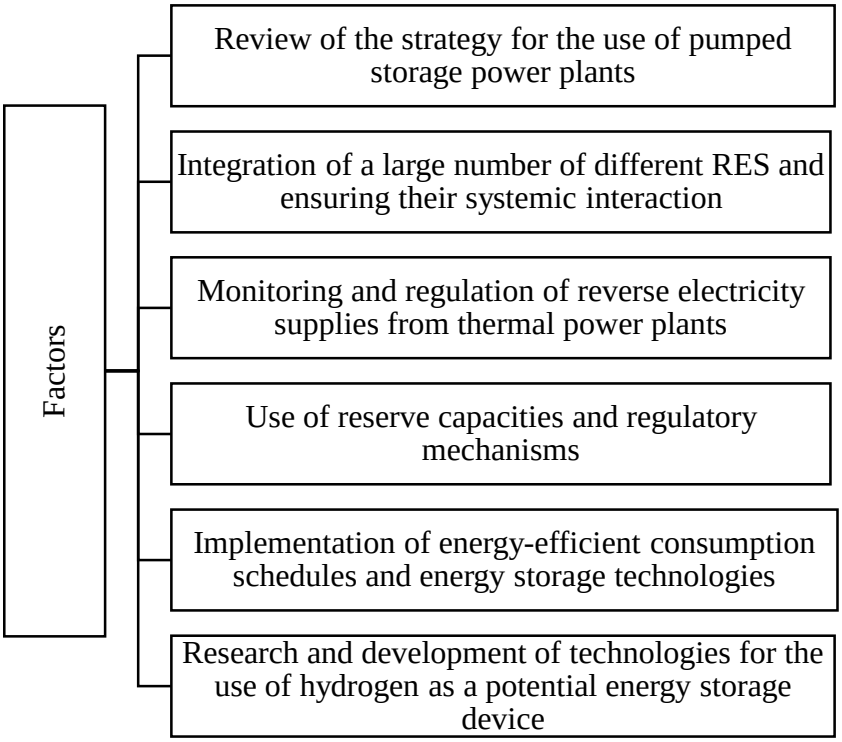

Fig. 1. Factors affecting the balance between the load on the power system and the generated power when integrating renewable energy sources

Research institutes have monitored and developed a strategic forecast of coal, oil, and natural gas reserves. According to the results, oil reserves will ensure its use as a resource for about 40 years. According to optimistic forecasts, natural gas reserves are expected to be depleted in 50 years, while significant gas deposits are located in regions remote from European countries, which creates risks of manipulating gas shortages for economic and political reasons. Coal, as an organic energy resource, is available in sufficient quantities. However, its use is accompanied by significant emissions of harmful substances that negatively affect the state of the atmosphere and public health. For example, a 2,400 MW coal-fired thermal power plant (TPP) emits 2,300 tons of carbon dioxide, 34 tons of sulfur dioxide, 9 tons of nitrogen oxides, 192 tons of ash, and 35 tons of solid waste annually [2].

Until recently, the prospects for providing humanity with new energy resources were associated with nuclear and fusion energy. However, the negative experience, especially for Ukraine, shows that the operation of nuclear power plants (NPPs), even with the introduction of modern safety technologies, is associated with a high risk of regional, national, or even global accidents. Nuclear resources also tend to be depleted, and rising costs and energy intensity characterize their extraction and supply. In addition, using nuclear energy leads to the accumulation of radioactive waste, which creates the problem of its safe storage and disposal.

Thus, virtually all existing traditional fuels (organic, nuclear, and fusion) hurt the environment to some extent, and the technological processes associated with their use lead to "thermal pollution". Scientists agree that increasing the average ambient temperature by more than 3.5°C will lead to global climate and atmospheric changes. According to forecasts, this could happen in the 2060s. Therefore, the transition from

traditional to non-traditional sources of energy consumption is considered the basis for humanity's sustainable development. Modeling the optimal energy future, which considers the impact of each energy source on all areas of application, especially the environment and the economy, is of key importance. However, comprehensive regulation of globalization problems is virtually impossible, so this aspect should be implemented within groups of states or specific regional associations.

Ukraine, with its significant applied and technical solutions, has the potential to significantly improve the energy efficiency of renewable energy's technological component. The volume of energy supply from renewable energy sources is specific and differs in each region of the country, depending on its socio-economic potential. This diversity and potential offer a promising future for renewable energy in Ukraine.

Despite the challenges, significant progress Has been made in developing renewable energy in Ukraine. The Institute of Renewable Energy of the National Academy of Sciences of Ukraine conducts significant research. It obtains significant research results on selecting locations for constructing renewable energy facilities, selecting equipment, etc. The development of "small wind energy" is a testament to this progress, with about 450 installations based on wind turbines with a capacity of up to 10 kW operating in different regions of Ukraine and more than 50 Ukrainian-made wind turbines successfully operating abroad.

An adequate level of mass production of solar photovoltaic cells, modules, and batteries based on semiconductor silicon has also been demonstrated, which helps reduce the cost of solar photovoltaic production. The production of solar equipment is increasing, considering the industrial potential of the regions and the practical regulatory and legal framework for research. Research is being initiated on the further use of various types of solar energy, improvement of existing technologies, and development of new technical and resource solutions and their combinations for autonomous power supply systems, hot water supply, and heating of residential and industrial buildings. Almost all regions of Ukraine have developed and are constantly improving regional and local programs to improve energy efficiency through renewable energy sources.

Given the scarcity and rarity of traditional energy resources and their ecologically destructive impact, the development of renewable energy in Ukraine is gaining priority in theoretical and practical research. This helps to increase the diversification of energy resources and strengthen the state's energy and environmental security.

The following factors contribute to the implementation of the policy of large-scale development of domestic RES: deepening deficit of the traditional energy supply system, rising energy prices in the consumer market and dependence on external supplies; unsatisfactory state of the material and technical base of the fuel and energy complex (FEC), insufficiency and inefficiency of use of traditional fuel and energy resources; negative impact of traditional energy on the environment and the need to fulfill Ukraine'sUkraine's obligations under the Kyoto Protocol.

Ukraine's share of renewable energy remains low—only 5% of the total energy supply, although this allowed it to rank first among the former CIS countries.

The regulatory framework that facilitated the development of renewable energy, including The Comprehensive Program for the Construction of Wind Power Plants, developed under the Decree of the President of Ukraine No. 137 of 03.02.1997 "On the State of Energy Security of Ukraine" dated December 9, 2005; Presidential Decree No. 1863; Law of Ukraine No. 106-UI of 2009 "On Amendments to Certain Laws of Ukraine on the Establishment of a Green Tariff"; Energy Strategy of Ukraine until 2030, and others.

It should be noted that Ukraine has a significant potential for large-scale development of RES. However, several obstacles exist to creating a practical framework for developing fundamental and applied research in Ukraine's scientific and technological support of RES. These include insufficient theoretical understanding of the essence, nature, and methods of realization of different types of energy; the need to develop a scientific, technical, and venture capital base for the creation and implementation of new technological solutions for RES-based energy systems; improvement of the system of operation of RES equipment; the need to combine various material resources by integrating RES with different types of related energy supply modes; synthesis of different types of RES in regional energy systems.

It is worth emphasizing the significant positive impact of RES on the environment and the social sphere. The combustion of fossil fuels produces a significant amount of harmful emissions that pollute the atmosphere and adversely affect public health and the state of economic infrastructure. In contrast, renewable energy uses existing and environmentally adapted heat flows, which does not lead to significant pollution of the atmosphere and society.

The social effect is also important, as it creates new jobs in related industries, improves the rural population's standard of living and quality of life, and develops territories. Unlike traditional sources, the inexhaustibility of some types of RES allows us to talk about the stability of the energy supply. The peculiarity of RES is their low energy density and spatial dispersion, which, if used efficiently and with appropriate regional incentives, will contribute to an even distribution of population and industrial facilities in rural areas rather than a concentration of energy consumption in megacities, which, in turn, will contribute to the development of the agro-industrial complex throughout Ukraine.

CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

Effective implementation of measures for the practical development of renewable energy in Ukraine, first of all, requires the development of its national model, promotion of a separate energy sector with effective regulatory mechanisms for each type of renewable energy, determination of an incentive state policy, including preferential conditions for energy producers and consumers, as well as the search for sources of financing. Achieving a balance of key technical and economic indicators of conventional and renewable energy in Ukraine is possible only if reforms in pricing for traditional energy sources are implemented. The experience of leading countries in using renewable energy sources shows that price is one of the most important factors in internationalizing global energy markets.

Thus, the primary tasks for introducing renewable energy in Ukraine are standardizing the educational and scientific framework to ensure highly qualified specialist training, improving the existing industrial and professional infrastructure for theoretical and practical activities, and organizing and conducting scientific, essential, and applied research, as well as research and development (R&D).

REFERENCES:

1. Shidlovskyi, A. K. (Ed.). (2007). Enerhoefektyvnist' ta vidnovliuvanni dzherela enerhii: kol'ektyvna monohrafiya. [Energy Efficiency and Renewable Energy Sources: Collective Monograph]. Kyiv: Ukrains'ki entsyklopedychni znannia.
2. Kudria, S. O. (2012). Netradytsiini ta vidnovliuvanni dzherela enerhii: pidruchnyk. [Non-traditional and Renewable Energy Sources: Textbook]. Kyiv: NTUU "KPI".
3. Pavlova, O. M., Pavlov, K. V., Kupchak, V. R., & Chervoniak, V. (2019). Funktsionuvannia merezhi pidzemnykh hazovykh skhovyshch v konteksti enerhetychnoi bezpeky krainy. [Operation of Underground Gas Storage Systems in the Context of the Country's Energy Security]. Ekonomichnyi Chasopys Skhidnoievropeiskogo Natsional'nogo Universytetu imeni Lesi Ukrainky. Economic Journal of Lesia Ukrainka Eastern European National University, 3(19), 105–112.
4. Pavlova, O. M., Pavlov, K. V., Spas, V. V., & Poltorak, O. V. (2023). Monitorynh protsesiv enerhozberezhennia u sotsial'no-ekonomichnykh systemakh. [Monitoring of Energy Saving Processes in Socio-Economic Systems]. Vseukrains'kyi Naukovi Zhurnal "AKTUAL'NI PROBLEMY INNOVATSIYNOYI EKONOMIKY TA PRAVA. All-Ukrainian Scientific Journal "Current Problems of Innovative Economics and Law", 3, 6–12. Retrieved from: http://apie.org.ua/uk/%D0%BC%D0%BE%D0%BD%D1%96%D1%82%D0%BE%D1%80%D0%B8%D0%BD%D0%B3-%D0%BF%D1%80%D0%BE%D1%86%D0%B5%D1%81%D1%96%D0%B2-%D0%B5%D0%BD%D0%B5%D1%80%D0%B3%D0%BE%D0%B7%D0%B1%D0%B5%D1%80%D0%B5%D0%B6%D0%B5%D0%BD%D0%BD/
5. Shidlovskyi, A. K. (2007). Enerhoefektyvnist' ta vidnovliuvanni dzherela enerhii: monohrafiya. [Energy Efficiency and Renewable Energy Sources: Monograph]. Kyiv: Ukrains'ki entsyklopedychni znannia.
6. International Energy Agency (IEA). (2020). Energy subsidies. Retrieved from: https://www.iea.org/
7. Pavlov, K., Pavlova, O., & Romanyuk, R. (2021). Features of development and prospects of transformation of the electricity industry of the region. International Scientific Journal "Internauka". Series: "Economic Sciences", 1. https://doi.org/10.25313/2520-2294-2021-1-6854
8. Pavlov, K., Pavlova, O., Haliant, S., Perevozova, I., Shostak, L., Begun, S., & Bortnik, S. (2022). Determination of the level of innovative activity of gas distribution enterprises of the Western region of Ukraine. AD ALTA: Journal of Interdisciplinary Research, 12(01), 130–134. https://doi.org/10.33543/1201
9. Pavlov, K., Pavlova, O., Kotsko, T., Novosad, O., Matiychuk, L., Tomashevska, A., Shabala, O., & Pylypiv, N. (2023). Functioning efficiency of the electricity market of the western region of Ukraine. Polityka Energetyczna – Energy Policy Journal, 26(2), 47–64. https://doi.org/10.33223/epj/163195 https://epj.min-pan.krakow.pl/Functioning-efficiency-of-the-electricity-market-of-the-western-region-of-Ukraine,163195,0,2.html
10. REN21. (2017). Renewables 2017 Global Status Report. Paris: REN21 Secretariat.
11. Sala, D., Bashynska, I., Pavlova, O., Pavlov, K., Chorna, N., & Chornyi, R. (2023). Investment and innovation activity of renewable energy sources in the electric power industry in the South-Eastern region of Ukraine. Energies, 16(5), 2363. https://doi.org/10.3390/en16052363 https://www.mdpi.com/1996-1073/16/5/2363

ІНСТИТУЦІЙНІ МЕХАНІЗМИ ЗАБЕЗПЕЧЕННЯ ЕФЕКТИВНОСТІ ВІДНОВЛЮВАНОЇ ЕНЕРГЕТИКИ: СУЧАСНИЙ СТАН ТА ПЕРСПЕКТИВИ РЕГІОНАЛЬНОГО РОЗВИТКУ

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У статті досліджується недостатньо вивчена проблема сутності, структури та соціально-економічного значення використання енергії з відновлюваних джерел (ВДЕ). На основі аналізу широкого спектру фундаментальних і прикладних наукових праць, а також вивчення досвіду розвинених країн, обґрунтовується актуальність розвитку ВДЕ в контексті обмеженості викопних паливних ресурсів, необхідності дотримання міжнародних зобов'язань щодо скорочення викидів парникових газів (Кіотський протокол) та забезпечення енергетичної безпеки. Проведено систематизацію специфічних характеристик та видів відновлюваних енергоресурсів з урахуванням рівня їх інтеграції в господарську діяльність регіональних систем. Оцінено енергетичний потенціал регіонів України щодо впровадження інноваційних технологій використання ВДЕ. Підкреслюється, що незадовільний стан довкілля та енергодефіцитність регіональних енергосистем України обумовлюють необхідність теоретичного обґрунтування та практичної реалізації заходів, спрямованих на подолання проблем енергозабезпечення населення та промисловості за рахунок використання ВДЕ. Аргументовано, що ефективне впровадження ВДЕ в Україні потребує формування власної національної моделі, яка включає створення окремої енергетичної галузі з ефективними нормативно-правовими інструментами для кожного виду ВДЕ, розробку стимулюючої державної політики (включаючи пільгові умови для виробників та споживачів енергії), а також пошук джерел фінансування. Досягнення збалансованості ключових техніко-економічних показників традиційної та відновлюваної енергетики розглядається як можливе за умови реформування системи ціноутворення в традиційній енергетиці, враховуючи, що ціна є одним з визначальних факторів інтерналізації світових енергетичних ринків. Визначено пріоритетні напрями впровадження відновлюваної енергетики, серед яких: інтенсифікація наукових (фундаментальних і прикладних) досліджень, а також науково-дослідних і конструкторсько-розвідувальних робіт; створення освітньої бази для підготовки висококваліфікованих фахівців у галузі ВДЕ; модернізація існуючої виробничої та професійної інфраструктури для забезпечення теоретичної та практичної діяльності у сфері ВДЕ; спрощення доступу об'єктів ВДЕ до електричних і теплових мереж енергетичних компаній на основі відповідних нормативно-правових актів; створення систем моніторингу, сертифікації та метрологічного забезпечення для комплексного дослідження ВДЕ; розвиток інституцій, що займаються розробкою, виробництвом, монтажем, введенням в експлуатацію, ремонтом і сервісним обслуговуванням обладнання для ВДЕ; забезпечення інвестиційної підтримки державних програм з розвитку ВДЕ, включаючи популяризацію на регіональному, національному та міжнародному рівнях; сприяння діяльності громадських організацій, що працюють у сфері ВДЕ.

Ключові слова: *відновлювальні джерела енергії, регіон, інституції, ефективність використання, регіональні енергетичні системи, енергетична безпека, енергетичний потенціал регіону.*