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INSTITUTIONAL FRAMEWORK FOR REFORMING REGIONAL ELECTRICITY MARKETS TO STIMULATE AN INCREASE IN ENERGY GENERATION USING RENEWABLE ENERGY SOURCES: STRATEGY, MECHANISMS, RISKS

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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.

Keywords: *institutions, institutional framework, reforms, region, regional renewable energy market, incentives, increase in volumes, energy generation, renewable energy sources, alternative energy, renewable energy sources, energy efficiency.*

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PROBLEM STATEMENT IN GENERAL FORM AND ITS CONNECTION WITH IMPORTANT SCIENTIFIC OR PRACTICAL TASKS

Understanding the new European format of the electricity market model is crucial. It implies consumers' free choice of supplier without barriers to the supply and sales market. This understanding is key to navigating the new challenges and threats it presents to the functioning of electricity market enterprises. It ensures that all stakeholders are knowledgeable and aware of the transparent and objective conditions for access to consumption and operation of electricity networks and the impartial accelerated development of the electricity market to meet the requirements of the dynamism of the economic system.

Reforming the electricity market is a complex process that requires a balanced approach. It involves achieving organizational, economic, technical, social, and environmental goals. However, this balance is crucial to mitigate the various consequences and risks associated with cost minimization, providing reassurance and confidence to all involved.

Elucidating long-term goals and objectives necessitates a comprehensive analysis of the electricity market. This includes setting reform priorities, identifying benefits and risks, and assessing potential environmental impacts. Such a thorough understanding is crucial for successful reform.

ANALYSIS OF RESEARCH AND PUBLICATIONS

Studies of the principles of the functioning and efficiency of electricity markets and electricity generation from renewable sources are reflected in the works of domestic and foreign scholars. In particular, these aspects were covered in the works of authors such as V. Vilkha [1], I. Halytsia [21],

S. Galiant [13], O. Novosad [14], M. Korotia [11], V. Kupchak [3], L. Matiychuk [4, 20], R. Romanyiuk [8], O. Pavlova [4, 8-13, 19, 21, 22], K. Pavlov [4, 8-13, 19, 20-22], D. Sala [21, 22], B. Słupski [15], O. Strinets [16, 17], R. Chornyi [22], N. Chorna [22], I. Fartushnyi [18], A. Yakymchuk [12].

Despite the significant scientific achievements in this area, current trends in globalization development determine the growing role of electricity resources. In addition, a comprehensive study of investment and innovation processes in the electricity sector at the regional level and the formation of organizational and economic priorities for the national electricity Strategy are needed.

FORMULATION OF THE ARTICLE'S OBJECTIVES

This article provides an in-depth study of the institutional framework, promising mechanisms, and potential risks of reforming regional energy markets to offer intensive incentives for increasing the volume of electricity generation with the mandatory use of renewable energy sources.

PRESENTATION OF THE MAIN MATERIAL

Reforming Ukraine's electricity sector requires urgent measures in several key areas. These include upgrading regional power grids, transforming the market environment and information infrastructure, improving financial and credit support mechanisms, deepening integration processes, optimizing human resource management, and modernizing communications.

1. The state of regional power grids. Regional power grids are in poor condition and require significant investment. Reform priorities in this area should include:

- Improving the reliability and safety of electricity transmission and distribution systems;
- optimizing costs by eliminating inefficiencies in operations.

2. Development of the market environment. Creating a fully competitive electricity market is a strategic task. This task can be accomplished by achieving a balance of interests in the ancillary services market and a clear separation of the functions of commercial metering administration and consumer settlements.

3. Modernization of the information environment. Introducing modern information technology solutions is critical to ensuring competitiveness in the electricity market. This will allow:

- to balance the energy system in real-time;
- automate accounting and financial settlements between market participants
- ensure accurate electricity metering and control over payments;
- Improve the quality of dispatch management for power grid operators.

4. Financial and credit support: The key to successful reform is providing the industry with financial and credit resources [7].

The approaches mentioned above also contribute to the introduction of organized control and a structured approach to creating renewable energy facilities, particularly within the "green" auction mechanism framework. The key aspects here are:

1. Human resource management. Achievement of high labor productivity, modernization of the remuneration system, stimulation of professional development of personnel, and implementation of comprehensive training programs.

2. Corporate governance. An important area is the transformation of state-owned enterprises into private structures, considering the principles of corporate governance and social responsibility.

3. Communications. Ensuring uninterrupted supply and effective analysis of information requires continuous improvement of internal, external, and international communications. This involves developing a new information policy and actively promoting activities [7].

Therefore, the Strategy for reforming Ukraine's electricity market resembles a closed cycle of essential components of its activities (Figure 1).

The reform of the domestic electricity sector, guided by these key principles, holds the promise of a stronger integration with European partners and a more robust energy market.

- Ensuring transparency and competition: By creating a level playing field in both electricity generation and supply, we are fostering a fair and competitive market environment.

Enhancing energy security is a critical aspect of the reform. It involves the systematic modernization and technological upgrading of energy infrastructure facilities to improve both internal and external energy security.

- improving the quality of services: Raising the quality standards of services provided by regional electricity market participants;

- Minimizing the negative impact on the environment: Limiting the harmful effect of the electricity industry on the environment.

- Formation of an adaptive pricing system: Establishing electricity prices that are in line with consumers'consumers'consumers' ability to pay;

- Further integration into the European energy space: Continuing regional electricity markets' organizational and regulatory integration into the pan-European energy system [9].

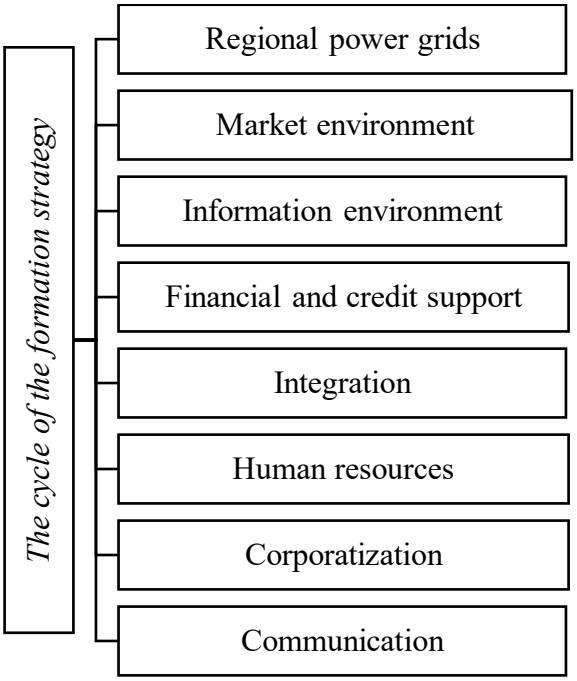

Fig. 1. Closed cycle of the electricity market development Strategy

Based on the analysis of the optimal reform scenario, which provides for the implementation of relevant legal norms and directives, and considering the experience of the EU member states, it is advisable to identify the following key elements of the transformation of regional electricity markets.

- Bilateral contracts market: a market segment where electricity is supplied based on direct purchase and sale contracts between producers, suppliers, and consumers. - automate accounting and financial settlements between market participants

- ensure accurate electricity metering and control over payments; - improve the dispatch management of power grid operators.

4. Financial and credit support:

Providing the industry with financial and credit resources is key to successful reform [7].

The abovementioned approaches also contribute to introducing organized control and a structured approach to creating renewable energy facilities within the "green" auction mechanism framework. The key aspects here are: 1. Human resource management. Achievement of high labor productivity, modernization of the remuneration system, stimulation of professional development of personnel, and implementation of comprehensive training programs. 2. Corporate governance.

It is worth noting that any reforms, by their very nature, entail inevitable consequences for regional electricity markets. These consequences are usually as follows:

1. Changes in the configuration of the competitive environment: The competitive environment in different sectors of the economy has transformed, and the balance of power between the main economic entities has changed.
2. Potential tariffs: Possible increase in electricity tariffs for final consumers.
3. Risks of external influence: The risk of lobbying the interests of certain groups and the impact of political and oligarchic structures on the regulatory function of the market.
4. Dysfunction of the Integrated Energy System (IES): Possible disruption of functional interaction between the elements of the IPS [12].

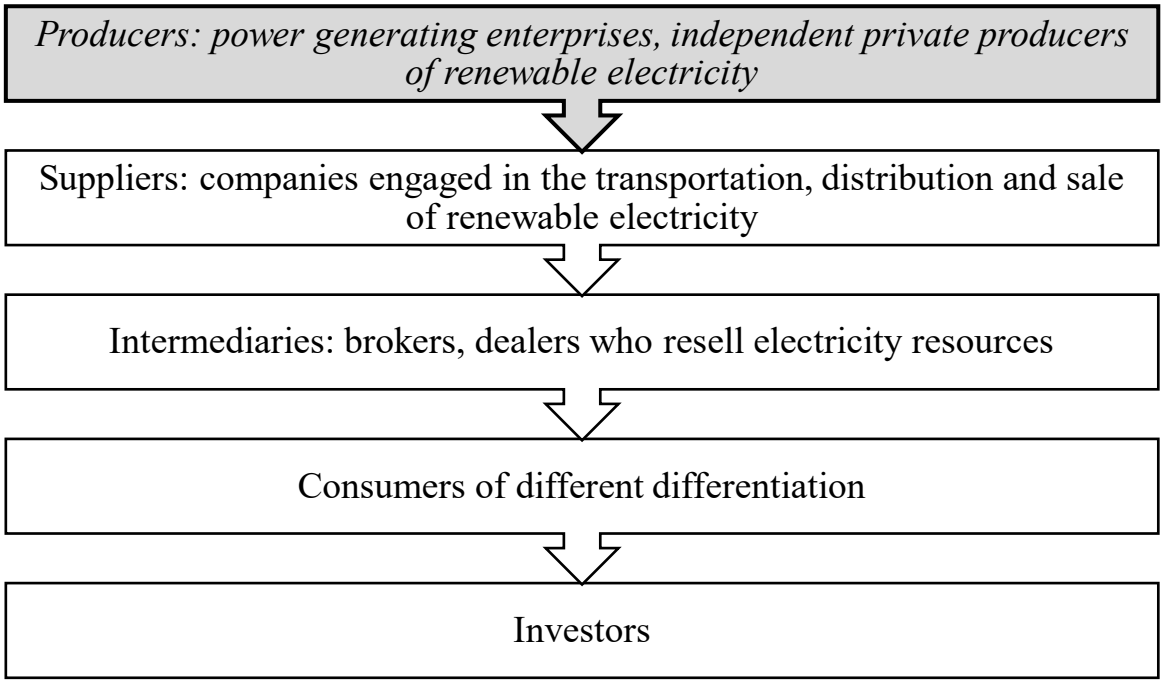

Fig. 2. Participants in regional electricity markets. Improved by the author based on [3].

Considering the first of these consequences, namely the transformation of the competitive environment in various sectors of the economy and the redistribution of influence between key business entities, it should be noted that the provisions of the Resolution of the Cabinet of Ministers of Ukraine and the Law of Ukraine "On the Electricity Market" have not been fully implemented.

These legal acts, aimed at implementing the requirements of the EU's Third Energy Package, provide an obligation for regional energy supply companies (oblenergos) to unbundle, i.e., to separate the functions of electricity distribution and supply. It was assumed that such a division of responsibilities between two newly created entities - a distribution system operator (DSO) responsible for the operation, maintenance, and development of networks and a transmission system operator (TSO) (supplier) that directly sells electricity to consumers - would facilitate the demonopolization of the industry. However, in practice, the current version of the Law of Ukraine creates preconditions not for reducing but, on the contrary, for potentially strengthening monopolistic tendencies in the market due to an increase in the number of dominant entities.

Thus, the primary task is to ensure compliance with the European vector of development, which includes limiting the influence of dominant companies, considering consumers' interests by stimulating electricity imports and stabilizing market pricing [16, 17].

Another important aspect is the potential risk of rising electricity tariffs for end users. The functioning of the retail segment of the electricity market in Ukraine is regulated by the updated version of the Law of Ukraine "On the Electricity Market" (No. 2019-VIII of 13.04.2017), which aims to implement the fundamental principles of EU Directives 2009/72/EC.

Two categories of entities supply the retail electricity market: 25 suppliers providing universal services at regulated tariffs and 33 suppliers operating in the unregulated market, primarily private companies specializing in electricity trading. The primary regulator in this area is the National Energy and Utilities Regulatory Commission (NEURC), which sets tariffs for all business entities, except for those operating in the unregulated market and supplying electricity mainly to non-household consumers based on free (contractual) prices [5].

One negative consequence of retail market pricing is excessive cross-subsidization, whereby industrial consumers finance electricity consumption by specific categories of consumers who receive it at fixed, low prices.

Despite these problems, reforming the electricity market is critical, especially regarding political instability and external aggression. This necessitates changing the model of electricity market development and introducing updated organizational and economic forms, as the existing "single buyer" model has proven ineffective in addressing new challenges facing the industry. The failure of the current model is related to the peculiarities of regional economic development, namely the presence of bad debts between

wholesale market participants, lack of funds for current settlements, artificial regulation of cash flows, unfair competition, lack of a full-fledged market for ancillary services, administrative interference in market processes, lack of effective mechanisms for credit guarantees and risk minimization [5].

The updated model, which implements the European scenario for the development of the electricity market, covers a key segment, the Bilateral Contracts Market. This market's functioning allows producers to sell electricity both to distribution companies and directly to end consumers.

The entities that enter contracts are electricity producers, independent suppliers, guaranteed suppliers, electricity distribution companies, and qualified consumers.

The following processes take place in the market of bilateral contracts:

- electricity suppliers provide the bulk of consumers' electricity needs;
- the regulator does not interfere in the pricing processes and relationships between market participants;
- Consumers have the right to purchase and sell electricity;

Suppliers have the right to enter into direct bilateral agreements with producers on a contractual basis to forecast financial policy.

1. Day-ahead market (DAM). Market participants submit applications to the market operator to buy and sell electricity with next-day delivery. The primary purpose of this market is to minimize imbalances among the participants. The DAM participants are electricity producers, independent suppliers, the guaranteed electricity supplier under the green tariff, electricity distribution companies, and the day-ahead market operator. This market functions as a stock exchange where pricing is based on a competitive supply and demand basis.
2. Balancing market. The system operator organizes it to achieve the following goals - balancing the volume of electricity supply and demand. [2].

One of the priority tasks of the system operator is to ensure its independence and equal interaction with all market participants. To achieve this goal, the following measures are provided for at the legislative level:

1. Competitive procurement of ancillary services: Organization of procurement of ancillary services on a competitive basis.
2. Transparency of information: Ensuring openness of information on the list of ancillary services, their scope, cost, terms of provision, and requirements to suppliers.
3. Separation of financial accounting: Clear separation of accounting for expenses and revenues from centralized dispatching and other activities.
4. Access to interstate networks: Ensuring access to interstate power grids' capacity through electronic auctions.
5. Planning the development of the Integrated Power System: Submit a plan for the development of the Integrated Energy System to the Cabinet of Ministers of Ukraine, even without consensus among stakeholders.

It should be noted that strengthening the role of the system operator is not a guarantee of its independence from external risk factors. The liberalization of the electricity market allows other participants to enter the wholesale market, which is entitled to enter into direct contracts with generating companies and sell electricity in the retail market. As a rule, such participants are large industrial consumers. On the supply side of the retail market, a competitive environment is being formed that is an alternative to the existing regional energy supply companies (oblenergos). Creating conditions for free consumer choice positively impacts pricing, quality of services, and transparency of competitive relations.

CONCLUSIONS FROM THE RESEARCH AND PROSPECTS FOR FURTHER INVESTIGATIONS IN THIS AREA

Increasing the region's investment attractiveness is directly dependent on the success of the electricity market reform. However, the new electricity market model is being implemented quickly, covering the development and implementation of regulations, organizational and structural changes, and testing and implementing the necessary software.

Despite the time constraints, reforming the electricity market is a key component of the region's comprehensive investment Strategy.

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ІНСТИТУЦІЙНИЙ БАЗИС РЕФОРМУВАННЯ РЕГІОНАЛЬНИХ РИНКІВ ЕЛЕКТРИЧНОЇ ЕНЕРГІЇ З МЕТОЮ СТИМУЛЮВАННЯ ЗБІЛЬШЕННЯ ОБСЯГІВ ЕНЕРГОГЕНЕРАЦІЇ З ВИКОРИСТАННЯМ ВІДНОВЛЮВАЛЬНИХ ДЖЕРЕЛ ЕНЕРГІЇ: СТРАТЕГІЯ, МЕХАНІЗМИ, РИЗИКИ

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Конкурентоспроможність у сфері електроенергетики згенерованої з використанням відновлювальних джерел ґрунтується на принципах вільного вибору постачальника споживачами та відсутності адміністративних та економічних перешкод для входу на ринок постачання та реалізації енергії. Сучасна європейська модель відновлювального (альтернативного) електроенергетичного ринку, що характеризується інтеграцією та глобалізацією, ставить нові завдання та створює потенційні загрози для суб'єктів господарювання в цій галузі, особливо для новостворених підприємств. Це, зокрема, стосується забезпечення прозорості та об'єктивності умов доступу до споживання та експлуатації енергетичних мереж, а також неупередженого та прискореного розвитку ринку відповідно до динамічних потреб економічної системи та зростаючих вимог споживачів. Важливим аспектом є також відповідність європейським стандартам та нормам.

Реформування електроенергетичного сектору передбачає досягнення комплексу взаємопов'язаних цілей: організаційних, економічних, техніко-технологічних, соціальних та екологічних. Проте, інтеграція цих цілей може призводити до неоднозначних наслідків та ризиків, особливо в контексті оптимізації витрат та забезпечення фінансової стабільності підприємств. Необхідно враховувати потенційні конфлікти інтересів між різними групами стейкхолдерів.

Визначення стратегічних цілей та завдань вимагає системного аналізу енергетичного ринку за такими основними напрямами: ідентифікація пріоритетів реформування з урахуванням національних особливостей, детальний аналіз потенційних переваг та ризиків для всіх учасників ринку, а також оцінка вірогідних загроз, зумовлених зовнішніми факторами, такими як коливання цін на енергоносії, альтернативні енергогенеруючі установки (відновлювальні джерела енергії) та зміни у регуляторній політиці.

Посилення ролі системного оператора, хоча і є важливим кроком, не гарантує його повної незалежності від зовнішніх ризиків, а також від впливу великих гравців ринку. Лібералізація ринку електричної енергії передбачає можливість доступу до оптового ринку для інших учасників, зокрема незалежних постачальників, які мають можливість укладати прямі договори з генеруючими компаніями та здійснювати продаж електроенергії згенерованої з використанням відновлювальних джерел на роздрібному ринку кінцевим споживачам. Такими учасниками, зазвичай, є великі промислові споживачі, а також об'єднання менших споживачів. На роздрібному ринку, з боку пропозиції, формується конкурентне середовище, що є альтернативою існуючим регіональним енергопостачальним та енергогенеруючим компаніям та стимулює їх до підвищення ефективності. Формування споживчого вибору, в кінцевому результаті, визначатиме цінові параметри, якість послуг, надійність постачання та прозорість конкурентних взаємовідносин на ринку.

Ключові слова: *інституції, інституційний базис, реформування, регіон, регіональний ринок відновлювальної енергії, стимулювання, збільшення обсягів, енергогенерація, відновлювальні джерела енергії, альтернативна енергетика, відновлювальні джерела енергії, ефективність використання енергії.*