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REFORMA TRHU PRODUKCIE ELEKTRINY NA UKRAJINE: KĽÚČOVÉ ASPEKTY

ELECTRICITY GENERATION MARKET REFORM IN UKRAINE: KEY ASPECTS

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Článok sa zaoberá otázkou procesu prechodu k zavedeniu novej štruktúry trhu s výrobou elektriny na Ukrajine. Trh s elektrickou energiou bol poznačený post-sovietskym „pozadím“, mal tendenciu demonštrovať monopolné vlastnosti a absenciu konkurenčných síl. V súlade s európskymi predpismi a požiadavkami, ktoré Ukrajina musí dodržiavať, je princíp unbundlingu (oddelenia) vyhlásený za dominantný, pričom sú rivalita a zabezpečenie kvality stanovené ako záruky trvalo udržateľného rozvoja energetického sektora v budúcnosti. V rámci tejto štúdie sa zameriame na načrtnutie charakteristických črt starého aj nového trhového modelu a opísanie niektorých základných historických a sociálno-ekonomických predpokladov. Osobitná pozornosť sa venuje otázke právnej a štrukturálnej konzistentnosti reformy trhu s výrobou elektriny v súlade s medzinárodným právom a globálnymi rozvojovými cieľmi. Záver je venovaný aspektu účinnosti nového modelu fungovania trhu podľa zásad unbundlingu a trvalej udržateľnosti.

Kľúčové slová: výroba elektriny, energetika, reforma trhu, udržateľnosť, unbundling

The paper deals with the issue of transitional shift to the establishment of the new structure of electricity generation market in Ukraine. Being predetermined by gradual post-soviet background, electricity market tended to demonstrate monopoly features and absence of competitive forces. Following the European regulations and requirements Ukraine is to adhere to, the unbundling principle is proclaimed as dominant, whereas rivalry and quality assurance are set as guarantees of sustainable energy sector development in the future. Within the current study significant focus was placed on outlining the distinctive features of both old and new market models, describing some underlying historical and socio-economic

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prerequisites. Special attention was paid to the issue of legal and structural consistency of electricity generation market reform in accordance with the international law and global development goals. The conclusion is dedicated to the efficiency aspect of new market operation model following unbundling and sustainability principles.

Key words: electricity generation, energy sector, market reform, sustainability, unbundling

JEL: O13, P28, Q43

1 INTRODUCTION

This paper aims at discussing the role of comprehensive energy sector transformation for the sustainable development of regions and countries, including Ukraine. Over years, the sustainability context, mainly declared at World Commission on Environment and Development (1987) and World Summit on Sustainable Development (2002), has been successfully incorporated into modern business practice, despite the global imperative status. However, positive point shifts within some energy companies, if any, are insufficient for complex market-based changes in structural forces and competitive advantages on the intergovernmental level.

Energy industry is one of the most required following the modern consumerism trends. The continuous transformation of global energy markets is mainly based on the restructuring of energy balance which occurred in response to gradual shifts in world energy consumption centers. Tremendous technological progress with lots of innovative advances has also contributed to the ongoing transition from traditional fuel-based production to clean and conscious energy generation. This matter is inextricable linked to sustainability. Indeed, renewable energy base with solar energy, wind power, and biofuels as well as energy efficiency are the twin pillars of sustainable energy (Prasad et al. 2019, p. 179).

Historically, the global energy system has already undergone several main deployment stages, ending up focusing on the parallel vertically-integrated value-added chains that purposefully link resource and end-user centers within the energy structure. Following this system logic, petroleum products are broadly used in transport industry, whereas heat and electricity are generated from coal and natural gas. One more crucial point is unbundling (Dubois 2009, Fuentes-Bracamontes 2016), which is aimed at establishing electricity and gas networks with independent operating processes. Moreover, unbundling of the network stage intends to eliminate incentives for price discrimination against rivals and to foster competition in the retail segment (Heim, Krieger and Liebensteiner 2020). Thus, new market rules are becoming more sector-oriented with specific procedures and codes (separate value chains, infrastructure, planning etc).

Ultimately, the urgent need for a coordinated policy in order to support such synergies led to the publication on 8 July 2020 of the European Commission's Communication on an EU Strategy for Energy System Integration. The new strategy is

particularly designed to strengthen the multi-sector transition towards a climate-neutral economy, including specific policies and legislative measures to move to a more integrated energy system.

The world community as well as the European Union have finally reached the understanding of insufficiency of this separation model, taking into account quite ambitious climate goals and preliminary directions. Moreover, achieving climate neutrality by 2050 in a cost-effective way is in danger of being failed due to the existing circumstances. The very first approach to be thoroughly investigated is *sector coupling*, is being discussed at the EU level since October 2018. It is painstakingly focused on the broad integration of electricity and gas markets by means of new ways on how to use the already present synergies in production, transportation and distribution. Thus, in combination with other industries it is considered as the concept of *sector integration* – the coordinated planning and operation of the energy system ‘as a whole’, across multiple energy carriers, infrastructures, and consumption sectors. It is the pathway towards an effective, affordable and deep decarbonization of the European economy in line with the Paris Agreement and the UN’s 2030 Agenda for Sustainable Development (European Commission 2020).

Following the green policy recommendations, provided by The International Renewable Energy Agency (IRENA 2018, p. 3), the most significant areas of intensive international collaboration in the future are:

- innovation in the integration and operation of the energy system (systemic innovation), which is key to integrating more variable renewable energy and electrifying end-use sectors;
- innovation in industrial processes – particularly cement, iron and steel, and chemicals, which together account for 17% of current carbon dioxide (CO₂) emissions;
- innovation in transport – particularly in freight and aviation, which together account for 11% of current CO₂ emissions.

Climate change and local air pollution are among the key drivers for energy transition worldwide. Local air pollution is a main driver in countries such as China and India. But also, in Europe, there is increasing attention for the harmful health effects of air pollution, largely related to energy supply and use. As projected, renewable energy and energy efficiency, combined with electrification of end-uses, make up 94% of the emission reductions (Gielen et al. 2019). The challenge, of course, is that even though the outlines of a new environment have begun to emerge, the power industry operates with time horizons in the decades. The implication is high-stakes strategic decision making under uncertainty, from utilities, regulators, and investors, and an innovation imperative that will vary considerably by market and company

(Finkelstein, Frankel and Noffsinger 2020, p. 5). Energy transition will require a holistic innovation approach tailored to the needs of each renewable energy and energy efficiency technology since a wide range of approaches will be required across all sectors of the energy system. While aiming at increasing investment in R&D for low-carbon technologies benefits the energy transition, more attention can be paid to monitoring and verifying that those investments have the desired impact and R&D budgets and priorities are impact driven (Gielen et al. 2019).

The abovementioned facts as well as directive goals for the international development and compliance of Ukrainian energy sector, several gradual changes are required in order to provide Ukrainian energy industry with modern competitive advantages within the new normal platform, particularly in electricity generation.

2 COMPARATIVE ANALYSIS OF OLD AND NEW ELECTRICITY MARKET MODELS

The model of the electricity market, existing for a long time in Ukraine, was built on the principle of wholesale purchase of this energy from its various producers for resale at prices set by the National Commission for Electricity Market – the *single buyer* model. The only trading platform for the interaction of all market participants was the wholesale electricity market, the operation of which was ensured by *Energorynok*.

According to the *single buyer* model, the load schedule was determined by directive, and the forecast balances of the system and the volumes of dispatching were established. It formed the value of the electricity generation volume as a whole. *Oblenergo* combined the functions of distribution and supply and was able to buy electricity from the wholesale market at a regulated tariff, whereas independent suppliers – at free prices, due to the peculiarities of the functioning of these participants within the existing model. *Oblenergo* provided electricity to both domestic and industrial consumers, while independent suppliers served mainly the industrial sector. *Oblenergo* operated only within the assigned territory and engaged in the transmission and distribution of electricity at a regulated tariff. According to the unregulated tariff, the relevant activities could be carried out by other independent suppliers without owning their own networks.

Relations in the field of pricing were also regulated. In particular, for generation companies, the price of energy was determined separately for each entity. *Oblenergo*, buying electricity in the *Energy Market*, mainly selling it to consumers at a regulated tariff, while only a few companies operated at an unregulated tariff (contract prices). It should also be clarified that the population received electricity at prices that were significantly lower than the market (actual) and the existing difference was repaid by the industrial sector. These tariffs were formed based on the weighted average energy consumption in a particular area per hour, regardless of the operating modes during peak periods or around the clock. Within the framework of this market

model, the process of cash flow is also clearly defined, from consumers to *Oblenergo* and *Energorynok* and then distributed to generators and *Ukrenergo* – the main network operator.

Comparative analysis of the old (*single buyer*) and new (*separation of monopolies*) market models are presented in Table 1.

Table 1. Comparative analysis of old and new electricity market models

<i>Single buyer model</i>	<i>Competitive market – Separation of Monopolies</i>
Requires targeted government regulation	Self-regulation, leveling of system imbalances
Contributes to corruption and lobbying	Restricts the access of individual participants to the levers of influence in the market
Weakens the financial mechanism of transaction control	Causes relatively higher short-term costs associated with the long-term contract terms
Does not require the participation of third parties	Provides system transparency due to the multiplicity of relationship agents
Creates a surplus of capacity, balance regulation and policy influence	Facilitates the system balance (planned and actual volumes)
Sets tariffs and prices for electricity, depending on the national development priorities of individual industries	Enables pricing flexibility due to competitive market mechanisms
Categorizes consumers with subsequent fixing of tariffs, eliminating the need for qualitative changes in the structure of the cost of products (services)	Increases the role of economic incentives and competition for the rationalization and efficient operation of enterprises

Source: processed by author.

In the real absence of market liberalization for the interaction processes between market participants, any incentives to establish competition or improve the quality of services were also absent. To replace this inefficient model, a new model of the electricity market was introduced in July 2019, aimed at ensuring the functioning of six separate markets under the conditions of effective interaction of different types of suppliers and consumers. In particular, the new energy policy of Ukraine provides the launch of the following components within the competitive market model:

- intraday market (continuous trading within the current day of physical electricity supply);
- day-ahead market (short-term contracts regime);

- balancing market (provides the introduction of financial liability for violation of the balance of real and projected consumption to ensure sufficient capacity);
- market of bilateral agreements (long-term agreements outside the represented market segments);
- market of ancillary services (ensuring the reliability of the system by purchasing the operator of the transmission system of relevant ancillary services from existing suppliers).

The new market model is based on the process of property unbundling (Pollitt 2007) provided by the Third Energy Package (Kanapinskas and Urmonas 2011). As the part of Ukrainian implementation of agreements with the European Union in the energy sector, the function of energy production should be separated from the function of its transfer.

The reform in the framework of corporate unbundling in Ukraine provides for a clear separation of functions of electricity distribution and supply in order to form a retail electricity market. The latter covers the range of relationships between the final consumer and the electricity supplier, as well as the entities involved in the process of providing the relevant services. In particular, the legislative regulations clearly enshrined the legal status of the functional division of *Oblenergo* into two independent entities:

- distribution system operators (electricity distribution and network operation);
- electricity suppliers (provide only supply).

The reform also stipulates that the supplier formed as a result of the separation of distribution functions will perform the universal service supply functions formed as a result of the separation of the electricity supply function for two years. In each of the regions the state will designate one electricity supplier for household and small non-household consumers (universal service provider).

Another difference between the old and new market models is a radical change in the approach to the organization of system management processes. If the old model preferred a *top-down* approach with a centralized regulatory impact and a high level of monopolization, the new market is built on the principle of *bottom-up*, which stimulates demand for electricity from by different groups of consumers and the intensification of the development of the competitive environment, provided that the interests of the consumer take precedence.

3 NEW ELECTRICITY MARKET MODEL: PRICING ISSUES

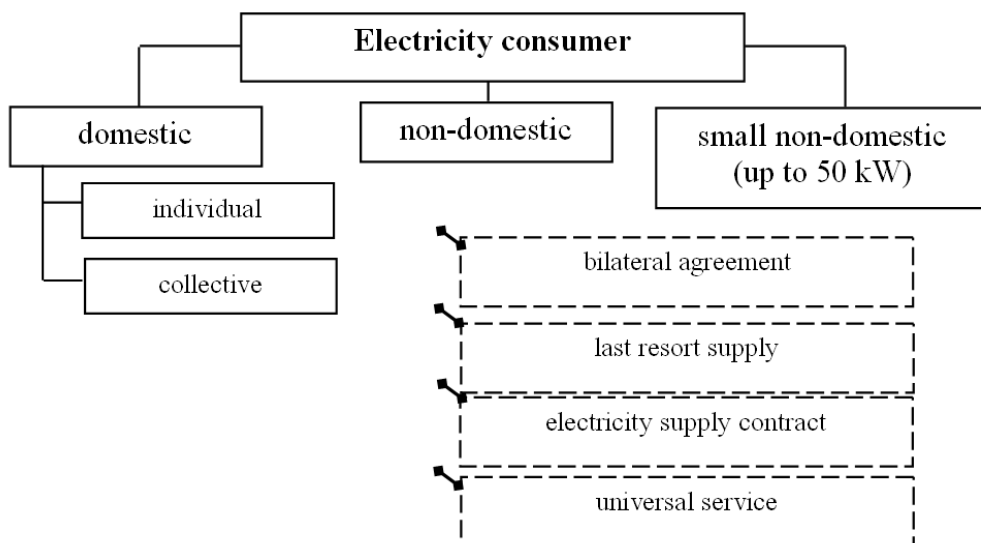
One of the determining factors of qualitative transformation of the electricity market is pricing. As the legislation provides the possibility of new entrants to the

market and overcoming monopoly factors in the process of new market functioning, the development of competition will not only improve quality standards and range of services, but also lead to a possible price increase under the contract. Despite the volatility of the pricing process, this kind of flexibility in the wholesale market allows the consumer to choose a service provider and gradually change both their own demand and increase energy efficiency in general. The two-way effect of the relationship enables the consumer to influence suppliers and manufacturers, latently encouraging them to innovate and modernize, as well as transform the entire generation structure.

It is the consumer who has the opportunity to choose between the average daily and hourly price, depending on the mode of own consumption. The efficiency of the system as a whole will be ensured by gradually reducing the energy consumption of networks, overcoming imbalances and regulating generation capacity through price containment during peak periods.

The classification process of electricity consumers according to the new market model has become complex. Thus, instead of the two generally accepted categories – domestic and industrial consumers – there are already three groups of consumers. The general characteristic of the last is given in Figure 1.

Figure 1. Classification of electricity consumers and contract options for electricity purchase within the new electricity market model



Source: processed by author.

The *universal service* supplier contract is appropriate for small non-domestic consumers, consumers with a capacity of up to 150 kW, as well as budgetary

institutions. In general, the supply of electricity to household and small non-household consumers will be carried out at retail prices set by the National Commission for State Regulation of Energy and Utilities. The contract is standard and special conditions of interaction are defined in the commercial offer.

Under an *electricity supply contract* that is relevant to large consumers and industrial facilities, the terms of interaction and price are negotiable, whereas the consumer only chooses the option offered by the supplier.

Ukrinterenergo last resort supply for those consumers who have lost their own electricity supplier or did not choose it in time provides a much higher price compared to other sales contracts by establishing a large margin for the services provided.

A *bilateral agreement* is a specific form of interaction between the consumer and the supplier, as it provides its conclusion between two independent market participants outside certain segments, causing high risks of such cooperation. The peculiarity is the fact that it is necessary to conclude an agreement on the settlement of electricity imbalances, as the level of responsibility of these participants from such independent interaction is much higher than under other agreements.

Market of bilateral agreements allows a certain supplier to buy electricity directly from the power plant. The day-ahead market and the intraday market, operating on the basis of the reformed energy market (the so-called *Guaranteed Buyer*) create conditions for the generation and sale of a certain part of the energy produced in order to maintain the efficiency of the system as a whole. The balancing market provides a daily balance of supply and demand for electricity to avoid possible system imbalances.

Given the opportunities for the development of different markets and the activities of participants, special focus within the new model is to establish mechanisms in order to ensure a high level of competition, free pricing and moderate power concentration in the electricity market. Due to the artificial distortion of prices in terms of different types of generation, when domestic thermal electricity is much more expensive than European, and the price of nuclear is significantly understated, the key priorities for creating a competitive model in Ukraine are, first, free imports and access to new generation.

6 CONCLUSION

The complex and comprehensive transformation of different energy sector, including electricity generation, is the undoubted basis for the sustainable growth of Ukraine. Given the long way of nullifying the political and economic setback, existing shifts in the structure of energy production, supply and consumption, Ukraine has successfully chosen the path of energy sector integration in accordance with the European requirements. Such broad cooperation and long-lasting collaboration with

the European Union are aimed to increase the level of energy security as well as improve the competitiveness and stability for market integration in the energy sector.

Ukraine as a reliable neighboring country for the European Union has already identified key tasks and mechanisms to ensure the transition to a carbon-neutral economy proclaimed within the European Green Course. Current direction is extremely important following the priority of foreign and domestic policies compliance. This applies to the energy sector reformation, sticking to the prevalence of ownership unbundling, efficient energy resource usage, state security, continuous transition to circular economy, resource intensity reduction, social support, climate change prevention etc.

The energy strategy of Ukraine for the period up to 2035 – *Security, energy efficiency, competitiveness* (Cabinet of Ministers 2017) – reflects the necessity of multi-sector complex relations provision in order to regulate different markets within the unified scenario. It declares a shift from a fossil fuel energy sector, inefficient networks and non-transparent markets to a new model that provides equal market opportunities and competitiveness for the sustainable development of all types of energy production. Huge emphasis is placed on the importance of constant improvement of energy efficiency and the use of energy from renewable and alternative sources. In particular, Ukrainian government is to focus on the creation of modern infrastructure to reduce costs and advance energy management, as well stick to ownership unbundling and technological progress imperative for all types of energy markets.

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