

**ЕКОНОМІКА ТА УПРАВЛІННЯ НАЦІОНАЛЬНИМ ГОСПОДАРСТВОМ**

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**REFORMING OF THE INFRASTRUCTURE BRANCHES OF ECONOMICS ACCORDING TO REQUIREMENTS NEEDED FOR EUROPEAN INTEGRATION**

**РЕФОРМУВАННЯ ІНФРАСТРУКТУРНИХ ГАЛУЗЕЙ ЕКОНОМІКИ У ВІДПОВІДНОСТІ ДО ВИМОГ ЄВРОІНТЕГРАЦІЇ**

**Urgency of the research** is specified by the potential of infrastructure sectors to multiply the negative effects of natural monopoly in the economy, as well as by the commitment of their reforming to minimize those effects that is coming out from the EU Association Agreement.

**Target setting.** Determination of the European vector of economic development brings up to date the need for delineation of the actually ways of infrastructure sectors reforming.

**Actual scientific researches and issues analysis.** Among the researches of this problem are R. Pittman, J. Tirole, I. Borovyk, A. Ignatiuk, H. Fyliuk.

**Uninvestigated parts of general matters defining.** There is a lack of researches of the tools of competition penetration into the infrastructure sectors under the modern institutional challenges of European integration.

**The research objective.** This article determines the existing approaches to infrastructure sectors reforming in the context of the 3<sup>d</sup> Energy package, as well as draws the optimal way of such a reform.

**The statement of basic materials.** The article brings the comparative analysis of the variety of models of infrastructure sectors' reforming, which are in the use in the EU. It also assesses their adequacy to the Ukrainian environment and to the institutional requirements of the obligations incurred by Ukraine. It determines the current state and the perspectives of the Ukrainian infrastructure sectors development.

**Conclusions.** The article defines that the most effective model of infrastructure sectors' development is the full ownership unbundling. On the interim stage of the reform, the models of an independent operator (ISO and ITO models) may be used to gear the Ukrainian regulatory system to the requirements of the model of full ownership unbundling.

**Keywords:** infrastructure sector; natural monopoly; competition; European integration.

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**Актуальність теми дослідження** полягає у здатності інфраструктурних галузей до мультиплікації негативних ефектів породжуваних їх природно монопольним статусом та визначеними Угодою про асоціацію з ЄС зобов'язаннями щодо їх реформування у цілях мінімізації відповідних негативних ефектів.

**Постановка проблеми.** В умовах детермінації євроінтеграційного вектору економічного розвитку України актуалізується потреба окреслення траєкторії подальшого розвитку інфраструктурних галузей та конкретних шляхів їх реформування.

**Аналіз останніх досліджень і публікацій.** Серед дослідників цієї проблематики – Р. Пітман, Ж. Тіроль, Ю. Боровик, А. Ігнатюк, Г. Філюк.

**Виділення недосліджених частин загальної проблеми.** Недостатньо розробленим є інструментарій запровадження конкуренції в сучасних інституційних умовах функціонування інфраструктурних галузей на етапі їх євроінтеграції.

**Постановка завдання.** Заданням статті є детермінація переваг та недоліків існуючих підходів до реформування інфраструктурних галузей в контексті вимог III енергопакету ЄС, окреслення оптимальної траєкторії такого реформування.

**Виклад основного матеріалу.** забезпечує порівняльний аналіз множини застосовуваних в Європі моделей реформування інфраструктурних галузей, оцінку їх відповідності українським реаліям та інституційним вимогам взятих Україною на себе зобов'язань. Визначення сучасного стану та перспектив реформування інфраструктурних галузей національної економіки.

**Висновки.** Встановлено, що найбільш ефективною моделлю реформування інфраструктурних галузей є повне вертикальне відокремлення, втім у цілях адаптації вітчизняної регуляторної системи до вимог цієї моделі, на проміжному етапі реалізації реформи на місцевому рівні доцільно скористатися моделями незалежного оператора (ISO та ITO).

**Ключові слова:** інфраструктурна галузь; природна монополія; конкуренція; євроінтеграція.

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**Urgency of the research.** The importance of infrastructure industries for any economy is difficult to overestimate, primarily because of their multiplicative effect on the economy. Prices of gas and electricity are factors in almost every production process in the country. Therefore, any troubles in these sectors have a significant negative effect on the economy and require for careful state control and regulation.

**Target setting.** While the Soviet times, state control was provided by state ownership of infrastructural assets. Since the early 1990s, marked with privatization, this role has been played by a strict system of state regulation of natural monopolies. The latter has done its job by preventing the actors of infrastructure markets from massive abuses caused by their monopoly position, on the one hand, and, on the other hand – blocking the development of these sectors. Nowadays, when Ukraine has chosen the vector of its geopolitical development and has undertaken the appropriate commitments by signing the Association Agreement with the EU, which clearly states the requirements for the gradual harmonization of existing standards and regulatory systems, including in the infrastructure sectors, it has become relevant to outline the future path of their development, as well as to assess the potential effects of the reforming.

**Actual scientific researches and issues analysis.** The problems of infrastructure sectors reformation is investigated in the works of famous foreign scientists such as R. Pittman, P. Ray, J. Tirole, W. Kip Viscusi, A. Shastitko, as well as Ukrainian researchers among whom are I. Borovyk, V. Venger, V. Heyets, A. Ignatiuk, V. Lagutin, H. Fyliuk and others.

**Uninvestigated parts of general matters defining.** The abovementioned scientists investigate the matter mostly from the standpoint of ensuring the effectiveness of existing and projected systems of state regulation, being a mechanism of overcoming market failures. Only some of them raise the problem of the introduction of competitive regulation mechanism in the infrastructure sectors based on unbundling of natural monopoly from potentially competitive activities. A lack of the researches investigates the ways of introducing competition in such industries in the current institutional context of European integration.

**The research objective.** The purpose of the article is critical analysis of the approaches to reforming the infrastructure sectors of the national economy in the context of the European integration requirements for the unbundling of natural monopoly activities from competitive ones, identifying their advantages and disadvantages, and outlining the optimal path for such a reforming.

**The statement of the basic materials.** The analysis of the EU set of directives related with the functioning of the infrastructure sectors provides the possibility to distinguish one clear trend in the evolution of their regulation in the EU – the unbundling of natural monopoly from potentially competitive markets within the structure of natural monopoly industry, known as vertical unbundling. In order to understand the essence and the benefits of such an unbundling, let us analyse the whole range of alternatives of organization of a natural monopoly industry. There are three organizational structures of the natural monopoly industry:

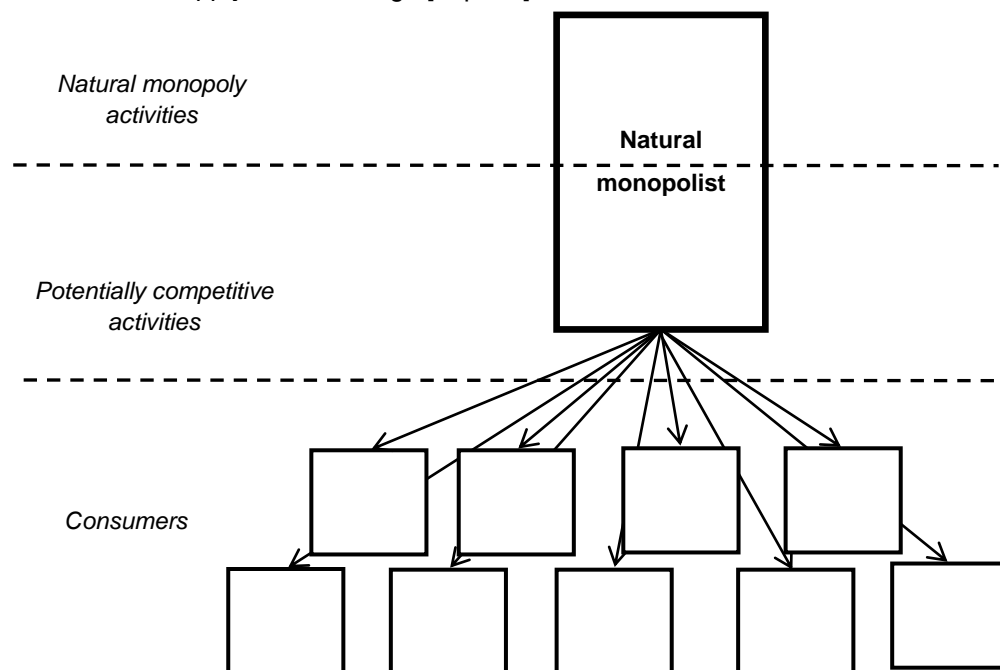
- 1) the model of vertically integrated monopoly;
- 2) the model of vertical unbundling;
- 3) the mixed model [1, p. 9; 2, p. 4; 3, p. 12].

The simplest organizational structure is considered the vertically integrated monopoly (Fig. 1). The same company operates in natural monopoly and potentially competitive segments of the industry. There are several advantages and disadvantages of the model. Among the first ones are cost advantages. By minimizing transaction costs, as well as eliminating the double margin problem, a vertically integrated company can produce cheaper final product. However, a natural monopolist usually no incentive to do this, except the case of state coercion within the strict policy of infrastructure sectors regulation. Otherwise, a vertically integrated monopoly generates negative welfare effects. At the same time, the effectiveness of state regulation in terms of vertical integration of natural monopolies always remains low due to the problem of information asymmetry. When the regulator

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does not have adequate market benchmarks for the cost of certain products of a monopolist, it can easily become a victim of information manipulating concerning the structure and volume of costs of a monopolist. It results in the regulated tariffs that reflect a monopolist's interests more than the public interest.

The model of vertically integrated monopoly was typical for the vast majority of infrastructure industries in Europe in the mid-twentieth century. In the UK, for example, it persisted until the 1980's. All British infrastructure assets were state-owned and totally regulated. For a long time, such a structure was common with Ukrainian natural monopoly sectors, but nowadays it exists only in the field of water supply and sewerage [4, p. 46].

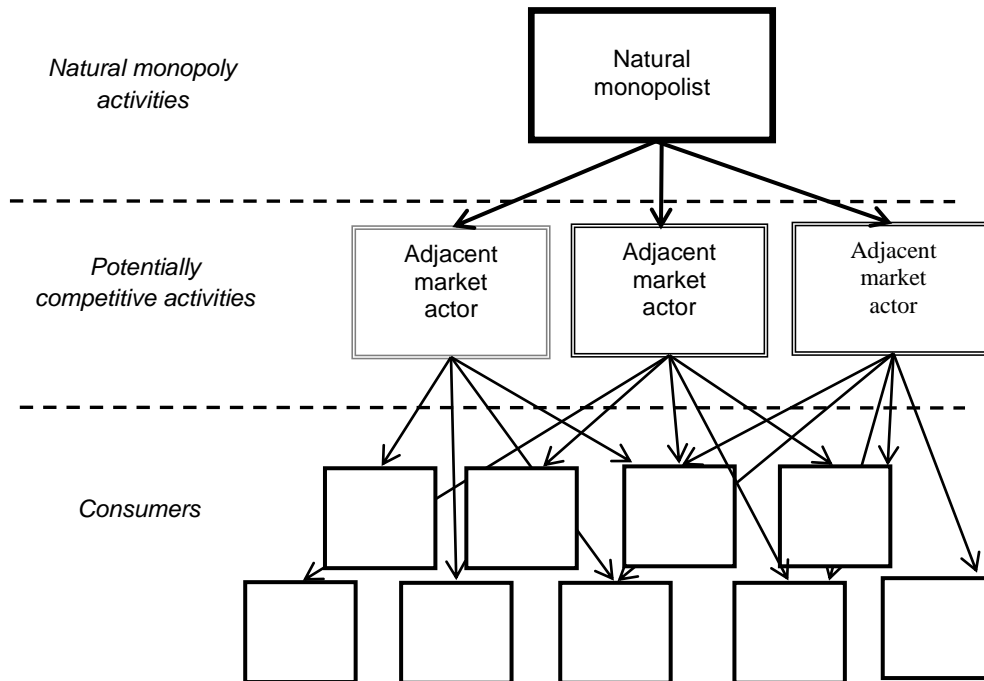


**Fig. 1. The model of vertically integrated monopoly**  
 Source: created by the authors on the basis of [2, p. 4; 4, p. 47]

The model of vertical unbundling is opposite to the abovementioned one (Fig. 2). It provides the organizational unbundling of natural monopoly activities from potentially competitive ones: the natural monopolist is trapped within the natural monopoly segment, while other segments of natural monopoly industry operates under competition. The model of vertical unbundling provides state regulation of infrastructure access fee, while the potentially competitive activities are implemented on a competitive basis. Competitive firms operates on an equal footing in the sense that none of them is connected by the control relationship with a natural monopolist [4, p. 47].

Compared with the previous model, this one gets rid of the benefits of vertical integration, like costs' minimizing, as well as of disadvantages of ineffective regulation. At least, the area of manifestations of the latter is significantly narrowed – to the boundaries of the natural monopoly market. The Third Energy Package of the EU and adopted by it Laws of Ukraine “On the Natural Gas Market” [5] and “On the Electricity Market” [6] are oriented towards the introduction of such a model into the relevant infrastructure industries.

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**Fig. 2. The model of vertical unbundling**  
 Source: created by the authors on the basis of [2, p. 4; 4, p. 47]

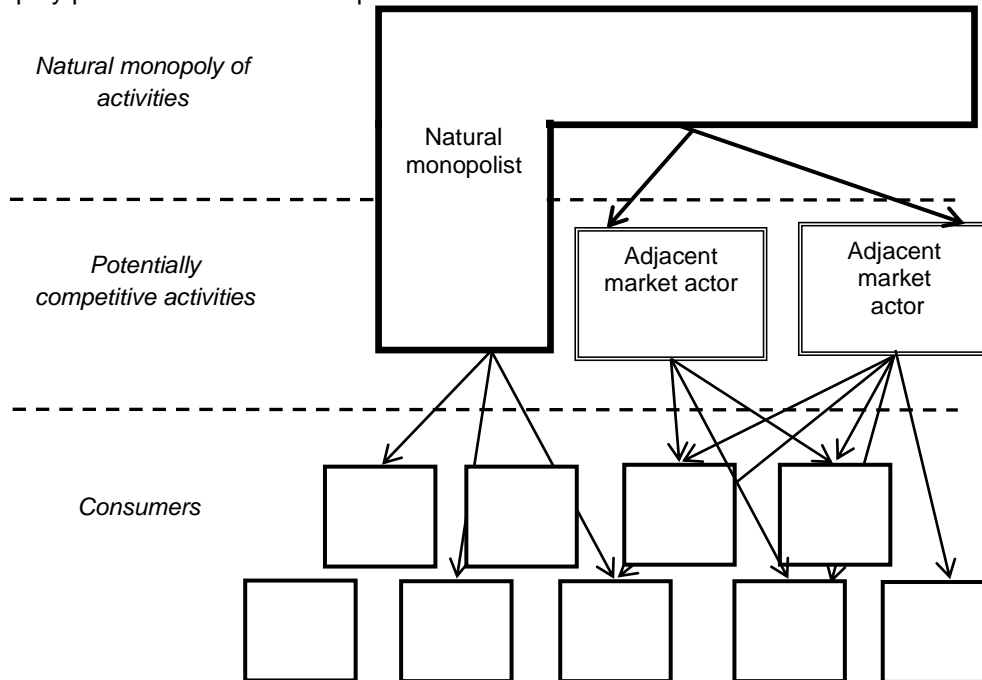
The third option – the mixed model – is a hybrid of the model of vertical integration and vertical unbundling model (Fig. 3). There are both a vertically integrated monopolist and competing enterprises in the sector. The monopolist retains its position in relation to natural monopoly networks and does not lose the right to operate in potentially competitive markets. Obviously, there is an asymmetry between the natural monopolist and its competitors, which cause the risk of abuse: the owner of the network, acting in the adjacent market of their exploitation (as a supplier), is motivated to restrict access of the competitors to the infrastructure assets. The less competitors get the access to infrastructure assets, the bigger market share is controlled by natural monopolist with all the consequences, which come with it [4, p. 48].

Such a model gives to the natural monopolist a tool of transferring its market power from the natural monopoly market to the adjacent one. In order to counteract this, the state must ensure not only the regulation of prices for natural monopoly products in all the relevant markets, including infrastructure access fee, but also the conditions for such access, while this model brings the same problem of state regulation failures, as the model of vertically integrated monopoly does.

This model is an intermediate between the two previous ones, not only essentially, but also chronologically, usually acting as one of the stages of the reformation of natural monopoly infrastructural industries. It is confirmed by the Ukrainian electricity industry, which has been existing within the mixed model since 1996, where OBLENERGOs are simultaneously the transport infrastructure operators and suppliers of electricity under the regulated tariff as well. They compete with electricity suppliers under the unregulated tariffs, which total market share in 2016, amounted to only 12%, being also a result of natural monopolists' abusing of their market power through raising entry barriers. The share of such kind of abuses in the structure of violations detected in the activities of transmission companies in 2016 amounted to 32% [7]. These data show the ineffectiveness of the existing mixed model of infrastructure industries' functioning in Ukraine at large and Ukrainian electricity sector in particular. Therefore, the adoption of the Laws of Ukraine "On the Market of

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Natural Gas” and “On the Electricity Market” has started the transition from the active mixed model to the vertical unbundling one. It is not only the reaction of the Ukrainian authorities to the requirements of the Association Agreement with the EU, but also a tool of overcoming the negative effects of state regulation within a mixed model, which is incapable of effectively eliminating incentives for abuse of a monopoly position of natural monopolist.



**Fig. 3. The mixed model**

**Source:** created by the authors on the basis of [2, p. 4; 4, p. 47]

The analysis of the abovementioned laws shows the use of unified approaches to gas and energy sector reforming based on the principle of vertical unbundling. As both industries are marked with the variety (not oneness) of natural monopoly markets, there is a need for the structuring of our research in accordance with kinds of them. Essentially, it is about the different levels of gas and electric energy transportation – trunk and local pipelines / power lines. Despite the fact that for each of the levels the reform involves the introduction of a vertical unbundling model, the tools of implementing the reform for them are different. The difference is in the strictness of the requirements for operator independence.

At the trunk level, the requirement for operator independence is as strict as possible, coming under so-called ownership unbundling model (OU model). Both laws provide that the operator of the transmission system:

1. is a legal entity that is not an integral part of a vertically integrated business entity and carries out an economic activity that does not depend on activities related to production, distribution, supply of electric energy / natural gas and trader activities;
2. must not carry out production, distribution, supply of electricity / natural gas and trader activities;
3. is the owner of the transmission system [5, art. 23, 27; 6, art. 32].

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Such statutory requirement does not entail any change in the structure of the Ukrainian electric power sector (the transmission system operator SE "NPC "Ukrenergo" does not operate in any other segments of electric power sector), while the situation is vice versa in the gas sector. The trunk operator PJSC "Ukrtransgas" is totally owned by NJSC "Naftogaz Ukrainy", which in turn is a vertically integrated oil and gas company and operates in the segments of gas sector: exploration and development operations, exploitation and exploration drilling, transportation and storage of oil and gas, supply of natural and liquefied gas to consumers. The CMU Resolution No. 496 of July 1, 2016, stipulates the implementation of the relevant changes through the creation of PJSC "Trunk Gas Pipelines of Ukraine" (totally state owned), transferring the infrastructure assets to it from NJSC "Naftogaz Ukrainy", ensuring the effective operation of the company [8]. At the time being only the first stage – the formal legal establishment of PJSC "Trunk Gas Pipelines of Ukraine" – has been implemented. The pressure from the European partners of reforms (first of all the Energy Community) let us expect the overcoming of the delays and successful implementation of ownership unbundling model in the sector recently, which will bring the positive effects of competition introduction in the fields of extraction and supply of natural gas. At least this perspective is evidenced by the European experience.

Other approaches to vertical unbundling of natural monopoly markets from potentially competitive ones are envisaged at the local level, as well as in relation to the operator of natural gas storage in underground gas storage facilities. They are known as the model of an independent system operator (ISO) and the model of an independent transmission operator (ITO). Both models include the legal, managerial, operational unbundling of an infrastructure operator's functions from other activities in the relevant infrastructure sector, while not prohibiting the operator from joining the vertically integrated infrastructure company. The difference between models is the distribution of ownership of infrastructure networks. The operator of ISO model does not own the infrastructure network, while the ITO model provides this right. Under dispersed ownership structure of European vertically integrated companies, such a distinction is sensible, but not in Ukrainian realities. Therefore, Ukrainian legislation is not strict in these issues. Both Laws provide both options for distribution networks. No one is imperative. Exemption only concerns the gas distribution networks owned by the state [5, art. 37; 6, art. 21, 49].

The undeniable advantage of this approach is the simplicity of its implementation compared with ownership unbundling. Other advantages include the operational and financial synergies of the vertically integrated company, the bargaining power in relations with foreign energy monopolists, such as PJSC "Gazprom" and others. However, it does not allow taking full advantage of vertical unbundling. Being a part of the vertically integrated company, such an operator remains informally dependent on the will of the final owner and beneficiary. The independence of the operator management from the owners can still be mentioned when the equity structure is dispersed and is represented by portfolio investors, but this does not correspond to Ukrainian realities. Even in developed countries, the most common antitrust violations incurred by an operator after unbundling consider to his partisanship of the companies – former partners in vertical integration [9, p. 297-301]. One can hardly hope to avoid this in Ukraine, leaving the operator as a part of a vertically integrated company.

Another failure of independent operator models is the lack of incentives for the development and expansion of infrastructure networks. Being uninterested in competition with suppliers from other regions, vertically integrated companies constrain investments in the construction of cross-regional networks. This is especially actual for the ISO model, in which networks are owned by the vertically integrated entity instead of system operator. Conversely, in a model of ownership unbundling the operator is interested in the development of infrastructure networks, since the effectiveness of its work depends on their efficiency and reliability.

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It is a reason of growing expansion of ownership unbundling model the EU, where 70% of the naturally monopoly markets in the electricity sector were reformed according to the ownership unbundling model [10, p.14]. In the gas sector, this share is much lower, amounting to about 40% [10, p.15], due to the shorter history of industry reforms, compared with electricity and, consequently, deeper vertical integration. We have already mentioned above the evolutionarily intermediate role of the mixed model in sector reforming, as a step towards vertical unbundling. Now we are talking about the same evolutionarily intermediate role of the independent regulator models on the way to ownership unbundling: first, the operator acquires legal, managerial, operational independence, after which it will be possible to talk about full unbundling of vertically related activities in a natural monopoly industry.

**Conclusions.** Ukraine has already made some steps on the way of infrastructure sectors reforming under the requirements of the Association Agreement with the EU, which includes the requirements of the III energy package of the EU. Among them are: the adoption of the Laws of Ukraine “On the Natural Gas Market” and “On the Electricity Market”; the creation of PJSC “Trunk Gas Pipelines of Ukraine”; the operational and managerial unbundling of the activity of transmission network operators from production of electric energy / natural gas, as well as their supply, trading, etc. The implementation of further reforms aimed at the full unbundling of naturally monopoly from competitive activities in these sectors is a key to reducing the risks of institutional monopoly, lowering the cost of both transmission services and the final product because of increased transparency of the commodity movement in the industry, improvement the quality of services provided. Obviously, the achievement of these positive effects of reforming is not automatic and requires intensive work in order to transform the formal independence of market actors into real ones. This work should be guided by European integration commitments, as well as the best European practices of infrastructure provision of the economy.

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