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Shift in the role of power system of Ukraine in the European electricity market

Summary

The aim of this article is to present the changes that have taken place in Ukraine's role as an exporter of electricity to the European Union and the Commonwealth of Independent States and to outline the prospects for a new function of Ukraine in the European electricity market. The authors provide an analysis of the state of the electric power industry in Ukraine and its technical parameters. There has been considered the indicators of export and import of electricity. In addition, the problems of association with the EU and further possible cooperation have been defined. The study was conducted by analyzing the statistics of European countries, summarizing the academic literature and internal documentation of energy-generating and transmitting companies of Ukraine. The study has revealed that Ukraine is turning from an exporter into an importer of electricity due to the partial loss of access to cheap local raw materials and the need for significant investment into the modernization of power-generating and transmitting capacities. At the same time prices for electricity in the European electricity market are continuously cutting. However, the integration of Ukraine into the European electricity market will not only increase the range of consumers for European electricity producers, but it will also contribute to more stable work of the electrical power system in Europe. If necessary, the electric power system of Ukraine is able to supplement the European electricity market with its capacities, meanwhile offering attractive electricity transit tariffs.

Key words: electrical power, electricity market, energy community, export, import.

JEL codes: F15, F17

Introduction

The strategic goal of the foreign policy of Ukraine is the membership in the EU. Achieving this goal, among others, requires approaching the regulated by the European Union legal, organizational and technical requirements for the energy sector and related industries. The whole history of electrical power development clearly confirms the technological and economic feasibility for the integration of small and large power systems in global interconnected power utilities. The second half of XX century was characterized by a rapid growth and creation of large international electric power pool systems, including the existing European energy association (UCTE, CENTREL, NORDEL), North American power grid (USA, Canada) and former interconnected power utility "Mir" which included only electric power system of the former USSR and Eastern Europe. Being formed as a part of a single energy complex, the energy system of Ukraine has occupied an important place in the devel-

opment of energy system “Mir”. For nearly thirty-five years (1962-1996) in the Euro-Asian continent there was operating in a single technological cycle one of the most powerful in the world interconnected electrical power utility of jointly working power systems. The electrical grids of this power pool extended to 7000 km from Berlin westwards, to Ulan Bator and Chita eastwards and to 3200 km from Murmansk in the north to Yerevan and Sofia in the south. The united electrical power system of Ukraine is one of the largest interconnected power utilities in Europe. The total installed capacity of power plants is 54 826.1 MW. The length of the main electrical grid of the united electrical power system of Ukraine is more than 22 thousand km.

Current state of Ukraine’s integration into European electricity market

The high-powered arteries of transmission lines run from Ukraine to different directions. They connect Ukraine with the energy systems of Russia, Moldova, Belarus, Poland, Slovakia, Hungary, and Romania (План розвитку 2014). The geographical location of Ukraine has led to the availability of powerful lines of Integrated Power System (IPS) connecting Ukraine with the power systems of neighboring countries, which can provide significant power exchange, namely with power systems of Eastern Europe (Hungary, Slovakia, Poland, Romania, Belarus and Moldova) and power systems of Russian Federation (Table 1).

Table 1
Inter-state transmission lines of IPS of Ukraine

Country	Transmission lines of class of voltage (kV), units							
	750	500	400	330	220	110	35	6-10
Russian Federation	1	2	1	6	3	5	-	-
Moldova	-	-	-	7	-	11	1	1
Republic of Belarus	-	-	-	2	-	2	1	-
Poland	1	-	-	-	1	-	-	-
Slovakia	-	-	1	-	-	-	1	-
Hungary	1	-	1	-	2	-	-	-
Romania	1	-	1	-	-	-	-	-

Source: Беляев (2004).

Currently, the electricity export from Ukraine to the neighboring countries and technological cross-flow of electric energy between the IPS of Ukraine and power systems of neighboring countries are carried out in the following areas (План розвитку 2014):

- *“The Burshtyn Island”*

Having undergone a range of measures in order to modernize the power generating equipment of power plants as well as electric power networks, the south-western part of the IPS of Ukraine, the so-called “Burshtyn Island” (being a part of Burshtyn Thermal Power Station, Kalush Combined Heat and Power Plant and Tereblia-Rikhska Hydroelectric Power Station) functions in the mode of parallel operation with interconnected power utility ENTSO-E and is separated from the main part of IPS of Ukraine (Сахарнов 2004). The establishing of such “Islands” has enabled sustainable exports of Ukrainian electricity to Eastern Europe (Poland, Hungary, Romania and Slovakia) and reliable energy supply for domestic consumers connected to electrical networks of the Ukrainian part of the “Island”. Since 2012 the total volume of the maximum allowed power flow from “Burshtyn Island” to the power systems of the abovementioned countries are defined and maintained at 650 MW.

- *“Directive transmission” Dobrotvir Thermal Power Station – Zamosc (Poland)*

The Dobrotvir TPS – Zamosc electricity transmission line, 220-kV, can provide in the mode of “directive transmission” electric power export to Poland with the maximum capacity up to 235 MW. A further increase in the electricity export from Ukraine to the European Union is possible by switching to synchronous operation of IPS of Ukraine and interconnected power utility ENTSO-E, but the technical aspects of these perspectives have not yet been considered as they have to precede by the relevant decision of the central executive authority that has to assure the formation of state policy in the electric power sector and a central executive body that would implement the said state policy in the electric power sector.

- *Electric power system of the Russian Federation*

Electric power transmitting system between IPS of Ukraine and IPS of Russia enables to carry out the flows of electric power up to ± 3000 MW (transmission capacitance of the interstate intersection consists of two cross-sections: “IPS Ukraine – IPS Center” and “IPS Ukraine – IPS North Caucasus”) (Вільха 2010). Nowadays, in order to ensure parallel operation of electric power systems of Ukraine and Russian Federation there are in force relevant contracts, which establish the commercial conditions for the sale of electricity flows between Ukrainian IPS and Russian IPS. In the light of the current developments between Ukraine and Russia, the situation at the electricity market has changed as well. Russian Federation shows no intend to renew the contract for the supply of its electricity to Ukraine after the rejection to purchase Ukrainian electric energy for occupied by Russia Crimea. Moscow has stopped any negotiation on the electrical power supply from Russia to Ukraine, and it is not going to be resumed hence it was originally associated with the contract for the supply of electricity from Ukraine to Crimea.

- *Moldovan electric power system*

Based on the transfer capacity of internal sections of the IPS of Ukraine, the value of electric energy cross-flow from the IPS of Ukraine to the Moldovan electric power system might constitute about 700 MW, though during the maximum demand hours it is signifi-

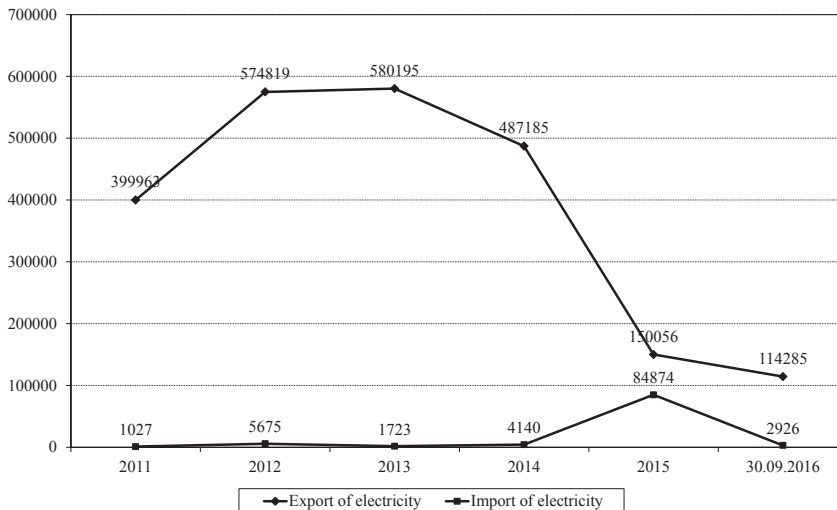
cantly limited or during the repair works at the nearby 330 kV high voltage transmission lines it falls down to zero.

- *Power system of the Republic of Belarus*

The existing inter-state relations today can provide commercial exchange of electricity between the power systems of Ukraine and the Republic of Belarus with the capacity up to 900 MW. Technically, strengthening international electrical connections between the electric power systems of Ukraine and Belarus will increase export opportunities of IPS of Ukraine towards the IPS of Belarus and electric power systems of Baltic region. However, while arranging the supply of electricity from Ukraine to the countries of Baltic region by the transit of electricity through the electric network of the IPS of Belarus, it is necessary to address a number of related issues, especially connected with the setting of the basic principles for parallel operation of power systems of Ukraine, Republic of Belarus, Russian Federation and Baltic countries. At present, the Belarusian nuclear power plant is being built. As planned, the first nuclear power plant unit is to be commissioned in 2018, the second – in 2020. The main consumer of the Belarusian power is supposed to be Sweden, since the country has closed the local nuclear power plants and the shortage of electric power is expected. Obviously, putting into operation the nuclear power plant will reduce the need for Belarus to import electricity from Ukraine.

Thus, Ukrainian system for electric power supply has both broad and successful experience in the supply of electricity to the neighboring countries and relevant transportation

Figure 1
Import and export of electricity of Ukraine (thousands USD)



Source: compiled by the authors on the basis of: ДССУ (2016).

facilities. However, as can be seen from Fig. 1, the amount of electric energy supplies from Ukraine in recent years have reduced. Ukrainian power grid is increasingly confined to its own market. Accordingly, the problem of finding the causes of this phenomenon and directions of further development of the electricity market of Ukraine and Europe becomes substantially topical.

Theoretical findings on the problem

In spite of some fluctuations we witness ongoing economic grows in long term perspective. Steady economic grows still causes grows in electricity consumption in long-term perspective. Current researches from different parts of the world prove this statement. Charles B.L Jumbe (Jumbe Ch. B.L 2004) shows evidences from Malawi; Fazil Kayteza, M. Cengiz Taplamacioglu, Ertugrul Cam, Firat Hardalac (Kayteza 2015) and Eyup Dogan (Dogan 2015) present such results from Turkey; Mohammad Salahuddin, Jeff Gow, Ilhan Ozturk (Salahuddin 2015) – from Arab states of the Persian Gulf; Abdulkadir Abdurashid Rafindadi, Ilhan Ozturk (Rafindadi 2016) – from Japan; Boqiang Lin, Chang Liu (Lin 2016) – from China; Mohammad Salahuddin, Khorshed Alam (Salahuddin 2016) – from OECD countries.

The evidenced of the Single European Electricity Market are more and more observed (Bower 2002; Boisseleau F. 2004; Böckers 2014; Biskas 2014; Pellini 2014). Nevertheless European electricity market shows a set of problems. It has a poor track record at encouraging the deployment of smart meters and the development of demand response (Rious 2015). The security of supply is still not guaranteed (Sencar 2014). There is a need for optimization problem implementing current market rules for European short time electricity markets (Madani 2015). It is still a difficult task to improve energy efficiency and achieve environmental targets (Bergaentzlé 2014). The uncertainty about renewable electricity generation affects existing network infrastructure and power production planning of electricity generators (Abrell 2015), creates an additional burden for industrial consumers (Vasileva 2015), a controversial debate about the real effects of the electricity liberalization on electricity prices (Moreno 2012), makes difficult to balance power plant investments in the long run and power plant dispatch in the short run (Spiecker 2014).

That is why, the future integration and spread of single European electricity market over the whole Europe is not certain (Glachant 2014). Of course, there are significant difference in according to Fatih Karanfil and Yuanjing Li (Karanfil 2015) caused by regional differences, countries' income levels, urbanization rates and supply risks. Nevertheless there are few publication devoted to the complexities of introducing market-based reforms in energy sector in less-developed and transition economies. Rabindra Nepal and Tooraj Jamas (Nepal 2015) analyzed smaller electricity systems of Belarus and Nepal. They found "The need to balance economic efficiency, sustainability and social equity, and to maintain adequate investment, remains challenging despite more than two decades of experience with reforms." The issues of restructuring and development of Ukrainian energy market in line with the in-

ternational trends, energy markets liberalization and establishing cross-border relations and international integration of electric power markets have been raised in the academic works of O. Kushnir (Кушнір 2014) and A.V. Vilha (Вільха 2010). Although the conducted studies were considerably broad, the issues of export development as well as export realization of Ukrainian electric power potential are not sufficiently highlighted.

The aim of this paper is to analyze the prospects for Ukraine as a player on European electricity market.

New situation in production and on international market

As seen from Fig. 1, in 2015 there was a significant decline in electricity export of Ukraine. In 2014 electrical power generation was reluctantly declined due to the lack of coal, which Ukraine had to buy in South Africa. Hence, the coal in the amount of 65 mln tons, which Ukraine was able to produce in that period, turned out insufficient to cover the needs of power generation, thus the practice of rotating power cuts was introduced (<http://www.ukrenergy.gov.ua>). The military engagement in the east of the country rendered impossible not only the supply of the coal but also blocked its output. Therefore, in 2014 State Enterprise "Ukrinterenergo" signed a contract with the Russian company "Inter RAO" on electricity imports and during the year the first was able to request the volumes of import to cover the deficit of its own facilities. Moreover, it took place despite the fact that in 2013 our country exported electricity not only to the EU countries but also to Belarus and Moldova. In 2015 Ukraine had the lowest ever stocks of coal. For 11 months of 2015 its production decreased by 12.9%. Industrial production showed almost the same volumes of drop by 14.4% (compared to 11 months of 2014) and electricity exports in monetary calculation decreased 3.2 times from 580.195 million USD in 2013 to 150.056 mln USD in 2015. In January 2016 exports amounted to more than 14 mln USD. In January - May 2016, 1,859.5 mln kW*h were exported that is by 424,3 mln kW*h or by 29,6% more than in the corresponding period of 2015. According to current data, 1842,8 mln kW*h was exported to the countries of Eastern Europe.

Speaking about tariffs for electricity transmission in European countries and Ukraine, one should note that the tariff in Ukraine is lower than in other countries (Table 2).

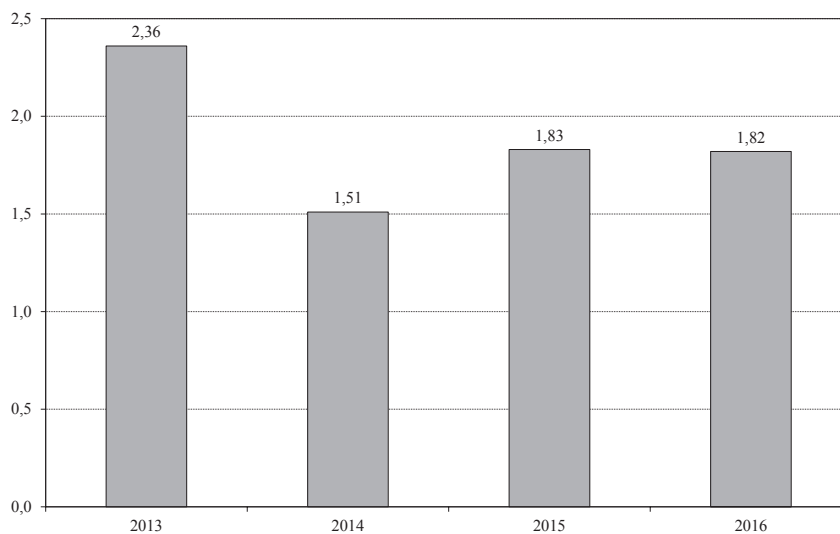
Additionally, if we consider the tariff for electric energy transmission by the years, the tendency of tariff reduction in 2014 if compared to 2013 was present then the increase of the tariff in 2015 in relation to 2014 was made. Since 2015 the tariff remains stable. The tariff for electricity transmission in Ukraine is still several times lower than in other European countries, thus Ukraine remains attractive for the transit of electricity through its territory.

The presence of international electrical communications provides the situation of the mutual influence on the electricity markets of the countries engaged in export and import of electricity. Ukraine, having direct interstate electrical communications with the CIS and the EU, can influence the situation on electricity markets of these countries. However, market factors, like demand, supply, price, affect the structural changes in the export of electricity of Ukraine to partner countries.

Table 2**Tariffs for electricity transmission in European countries and Ukraine in 2016**

Countries	Tariffs for transmission , euro/MW*h
Austria	17.25
Belgium	16.4
Bosnia and Herzegovina	15.23
Estonia	10.06
France	9.09
Germany	9.05
United Kingdom	8.7
Hungary	8.29
Italy	6.68
Poland	4.97
Romania	4.41
Slovakia	3.79
Spain	3.56
Ukraine	1.82

Source: compiled by the authors on the basis of SE NEC "UkrEnergo" data.

Figure 2**Electric power transmission tariff in Ukraine, EUR/MW*h in 2013-2016**

Source: compiled by the authors on the basis of SE NEC "UkrEnergo" data.

Table 3
Export of electricity from Ukraine in 2014-2015

Country	Data by years in million kW*h	
	2014	2015
Belarus	2400.9	0.8
Hungary	4145.1	3531.0
Moldova	730.7	17.6
Poland	685.8	66.5
Russian Federation	-	3.8
Slovakia	90.3	21.9
Total	8052.8	3641.7

Source: Державна фіскальна служба України (2016).

In 2015, along the necessity to supply internal market with enough electricity, the price factor at the external electrical power markets happened to be one of the reasons for the shortage in export. The study of the data from the leading European energy exchanges like *EEX* (Germany), *EXAA* (Austria), *TGE* (Poland), indicates the gradual drop in prices for electrical power starting from 2011. In 2015 the minimal prices for electricity at the energy exchanges ranged between 0.020-0.025 euro/kW*h; in 2014 they reached between 0.027-0.035 euro/kW*h, while in 2011 the prices were 0.060 euro/kW*h. It should be mentioned, that the price for electricity under unregulated tariff in the wholesale electricity market in Ukraine amounted to 1,149.75 USD/MW*h, which is equivalent to 0,042 euro/kW*h (<http://www.er.gov.ua/doc.php?f=3171>). Therefore, the cost of electricity in the Ukrainian market is higher than in international one. Accordingly, an electricity export from Ukraine becomes unprofitable.

Expanding a synchronous area of the electrical power system of continental Europe ENTSO-E by joining the IPS of Ukraine is a part of ensuring the integration of Ukrainian electricity markets with internal energy market of the European Union, which includes 41 system operators and 34 member-states. The arrangements on the above mentioned are set up in the Memorandum of Understanding on Co-operation in the Field of Energy between Ukraine and the EU concluded on December 01, 2016 (http://zakon5.rada.gov.ua/laws/show/994_694). Setting parallel operation with a powerful energy system of Europe will significantly increase the efficiency and reliability of the national IPS, reducing Ukraine's dependence on Russian Federation. Synchronous interconnection of Ukrainian and Moldovan energy systems with the continental European grid ENTSO-E provides a preliminary assessment of the implementation level of ENTSO-E technical and operational standards into Ukrainian and Moldavian power system; it also provides the analysis of discrepancies in the relevant legislation in the energy sector of Ukraine and Moldova as well as the EU. The study of possibility for synchronous interconnection of Ukrainian and Moldovan energy systems with the continental European grid ENTSO-E is part of the initiated procedure of

synchronous interconnection of the Ukrainian power grid to the one of continental Europe. The main goal of the project is to explore the possibility of parallel operation of Ukrainian and Moldovan energy systems with synchronous zone of continental Europe. According to “Ukrenergo” (Фінансова звітність 2016) the costs of study reaches 7,067,377 euro, including the cost for Ukraine in the amount of 1,836,767 euro and they are financed by the cost of cross-border cooperation of the European Neighborhood and Partnership Instrument under the Grant Agreement between the Ministry of Economy of the Republic of Moldova and Ministry for Economy, Trade and Business Environment of Romania and Ministry of Energy and Coal Mining of Ukraine.

Although the European Union has not yet become a key player in the Ukrainian energy market, Ukraine is a member of a number of EU initiatives in the energy sector (Table 4).

Table 4
Treaties between Ukraine and the EU

Title of the document	Short description
The Energy Charter Treaty	The mechanism of harmonization of interests between miners, transit countries and consumers
The Memorandum of Understanding on Co-operation in the Field of Energy between Ukraine and the EU	The main bilateral documents on cooperation in the field of energy
Joint Statement by the results of EU-Ukraine Joint International Conference on the Modernization of Ukraine’s Gas Transportation System	Not being implemented due to lack of state guarantees from Ukraine for the procurement of loan to modernize gas transportation system of Ukraine
Energy Community Treaty	Cooperation with countries
Eastern Europe Energy Efficiency and Environment Partnership	The initiative anticipates the creation of a fund under the European Bank for Reconstruction and Development

Source: compiled by the authors.

In order to conduct joint activities with European operators Ukrainian partners are required to master on the high level such areas as control of frequency, capacity and voltage in the single grid, ensuring the criteria of reliability, operational and technological control over the grid, information interaction with neighboring energy systems of European countries (Новиков 2009). Given to the huge amount of works to be done for technical re-equipment of all power assets, meaning thermal and nuclear power plants, transmission lines, substations, the need for funds may reach billions of US dollars. For the purpose of rehabilitation of the extremely worn out power assets, over the past 20 years there have been adopted a lot of governmental and ministerial programs, energy strategies, though almost nothing that was planned for the years of independence has ever been implemented.

It was obvious that the possibilities to reequip all the power plants with completely modern technologies for coal combustion were present, as the tariffs for electricity during this

Table 5
The need for funds to improve cross-border electricity grids

Nature of work	Total 2016-2020		Data by years					
	thousand euro (excl. VAT)	%	2016		2017	2018	2019	2020
			thousand euro (excl. VAT)	%	thousand euro (excl. VAT)			
Construction, modernization, reconstruction of electricity grids	31 897.63	75.00	2 425.10	75.01	4 280.37	4 280.37	7 492.71	7 588.29
Measures to reduce non-technical power requirement	2 977.13	7.00	226.36	7.00	667.82	667.82	699.32	708.24
Introduction and development of the automated systems for supervisory and technology control	1 977.64	4.65	148.73	4.65	455.6	455.6	464.55	470.47
Information technologies introduction and development	1 998.41	4.70	151.46	4.68	460.50	460.50	469.54	475.53
Introduction and development of communication systems	1 978.91	4.65	151.61	4.69	455.6	455.6	464.55	470.47
Modernization and procurement of wheeled vehicles	1 489.13	3.50	113.75	3.52	342.93	342.93	349.66	354.12
Other	211.10	0.50	14.61	0.45	48.99	48.99	49.95	50.57
Total	42 529.95	100	3197.30	100	9 797.89	9 797.89	9 990.28	10 117.72

Source: own calculation based on: Фінансова звітність (2016).

period have increased tenfold. The biggest obstacle for the integration towards the ENTSO-E is exceptionally poor state of power generating units. There are about a hundred of them in Ukraine and almost all of them have already worked out their design service life as being built yet in 60-70ss of the previous century (Фінансова звітність 2016). Let us consider the data on the costs of improving the technical condition of electric networks of Western Ukrainian power system.

Conclusions

The biggest problem of Ukraine which prevents it from playing the role of a key exporter of electric power is outdated equipment that needs to be replaced. In turn, this requires considerable investments that have not been found yet. Moreover, the cost for electricity generation of Ukraine is higher than in the EU countries.

As it is found, there are certain specifications that shall be followed in order to perform the parallel and synchronous operation with the European power grid. Concurrently, the legislation of Ukraine shall be changed in accordance with the laws on energy generation being in effect in Europe. Thus, Ukraine can approach the open market, transparency of services and pricing, possibility for the consumer to choose acceptable power supplier. Nevertheless, in the electric power sector the transition to a new model of the market (from the model of “pool” to a fully competitive market), according to the directives of the European Union Third Energy Package, stopped at stage of adoption of the framework draft law No.4493 “About electric power market in Ukraine”. The absence of this law as a whole is blocking further work to develop secondary legislation and it delays the start of this important reform for the country, despite the Ministry of Energy and Coal Mining of Ukraine together with the National Commission for State Regulation in the Sphere of Energy and Utilities have commenced the work on the range of regulations required for the implementation of the new law provisions.

As a long term perspective by 2030 in the Integrated Power System of Ukraine there will be preserved the concept for transmission networks development, according to which the backbone functions of power output at power plants and securing an interconnected operation with power systems of other countries will have to be done by power transmission lines of 330 kV and 750 kV with gradually increasing role of 750 kV line networks.

It is well known that the European countries have opened their energy market and the EU is trying to help Ukraine to get free access to the European energy market. Although Ukraine is a member of a number of EU initiatives in the energy sector, it has lost its role as an electricity exporter to the markets of Europe due to the series of objective circumstances. Except for few energy islands, the future chances of Ukraine to regain its export potential are rather little or not anticipated at all. However, Ukraine remains an attractive market for the supply of electricity from the EU and it offers favorable conditions for power transit across the country. Respectively, the cooperation between Ukraine and the EU in the energy sector

can be based on the principles of mutual benefit and common interests. Both consumers and electricity suppliers may only benefit from a gradual integration of Ukrainian power utility system into the single market of EU. Energy cooperation is one of the major components of the European integration course of Ukraine and it should be one of the driving forces for this course implementation. Notwithstanding, for Ukrainian energy system to be integrated into the power system and energy market of the EU, Ukraine has to overcome a number of obstacles, especially a lot of technical issues. Hence, a huge amount required to cover the abovementioned make it necessary to search for the attraction of foreign investments into the development of the IPS of Ukraine.

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Zmiana roli systemu energetycznego Ukrainy na europejskim rynku energii elektrycznej

Streszczenie

Celem artykułu jest zaprezentowanie zmian, jakie zaszły w roli Ukrainy jako eksportera energii elektrycznej do Unii Europejskiej i Wspólnoty Niepodległych Państw oraz zarysować perspektywy dla nowej funkcji Ukrainy na europejskim rynku energii elektrycznej. Autorzy przedstawiają analizę stanu przemysłu energetycznego na Ukrainie jego parametry techniczne. Rozpatrzono wskaźniki eksportu i importu energii elektrycznej. Ponadto określono problemy stowarzyszenia z UE i dalszej możliwej współpracy. Badanie przeprowadzono analizując statystyki krajów europejskich, rekapitulując literaturę naukową i wewnętrzną dokumentację firm wytwarzających i przesyłających energię na Ukrainie. Badanie wykazało, że Ukraina z eksportera przeistacza się w importera energii elektrycznej w związku z częściową utratą dostępu do tanich surowców lokalnych oraz potrzebą znacznych inwestycji w modernizację mocy wytwórczych i przesyłowych energii. Równocześnie stale spadają ceny elektryczności na europejskim rynku energii elektrycznej. Z drugiej strony, integracja Ukrainy z europejskim rynkiem energii elektrycznej nie tylko zwiększy krąg konsumentów dla europejskich producentów elektryczności, ale również przyczyni się do bardziej stabilnej pracy systemu energii elektrycznej w Europie. W razie potrzeby system energii elektrycznej Ukrainy jest w stanie uzupełnić europejski rynek energii elektrycznej o własne moce, równocześnie oferując atrakcyjne taryfy za przesyłanie energii.

Słowa kluczowe: energia elektryczna, rynek energii elektrycznej, wspólnota energetyczna, eksport, import.

Kody JEL: F15, F17

Сдвиг в роли энергетической системы Украины на европейском рынке электроэнергии

Резюме

Цель статьи – представить изменения, которые произошли в роли Украины как экспортера электроэнергии в Европейский Союз и в Сообщество Независимых Государств, а также зарисовать перспективы для новой функции Украины на европейском рынке электроэнергии. Авторы представляют анализ состояния индустрии электроэнергии в Украине и ее технических параметров. Рассмотрены показатели экспорта и импорта электроэнергии. Дополнительно определили вопросы ассоциации с ЕС и дальнейшего возможного сотрудничества. Изучение провели по методу анализа статистики европейских стран, представляя сводку научной литературы и внутренней документации украинских компаний по производству и передаче энергии. Изучение выявило, что Украина из экспортера электроэнергии преобразовывается в ее импортера из-за частичной утраты доступа к дешевому местному сырью и потребности в существенных инвестициях в модернизацию мощностей по производству

и передаче электроэнергии. Одновременно на европейском рынке электроэнергии постоянно урезаются цены электричества. С другой стороны, интеграция Украины с европейским рынком электроэнергии не только увеличит круг потребителей для европейских производителей электроэнергии, но и она тоже будет способствовать более стабильной работе системы электроэнергии в Европе. Если понадобится, система электроэнергии Украины тоже в состоянии дополнить европейский рынок электроэнергии своими мощностями, предлагая заодно привлекательные тарифы по транзиту электричества.

Ключевые слова: электроэнергия, рынок электроэнергии, энергетическое сообщество, экспорт, импорт.

Коды JEL: F15, F17

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