

# Ukraine's energy security: conflicts potential and the prerequisites for sustainable energy sector development

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## I. Introduction

Energy security is the key element of the overall national security and that is why currently the issues of energy security assume global character. Energy dependence of developed economies (Table 1) raises serious political, economic, social and ecological risks. Senator Richard G. Lugar, the Republican leader of the Senate Foreign Relations Committee, argues that «in the years ahead, the most likely source of armed conflict in the European theater and the surrounding regions will be energy scarcity and manipulation» (Lugar, 2010). Such basic and determining imperatives of modern world as political relations, directions and intensity of economic cooperation, tendencies and dynamics of world markets of energy resources (first and foremost, oil and natural gas) are influenced by energy factor (Саприкін, 2004).

Table I. Use of imported energy resources by world countries\*

Country	Oil		Gas		Coal	
	%	<i>Dependence coefficient <math>o</math>.</i>	%	<i>Dependence coefficient <math>g</math>.</i>	%	<i>Dependence coefficient <math>c</math>.</i>
Japan	100	1,00	92	0,92	82	0,82
India	70	0,70	50	0,50	76	0,76
The USA	58	0,58	15	0,15	–	–
China	45	0,45	30	0,30	46	0,46
EU countries	40	0,40	54	0,54	50	0,50

\* *Source:* Institute of Oil and Gas Problems of the Russian Academy of Sciences; Prof. Boris Kuprin's materials, International Economic Institute

## II. Basic risks of energy conflict in the national economy and energy sector

Since Ukraine's independence (1991) the problem of energy resources supply has been the cornerstone of energy independence. For Ukrainian producers this problem increases over time especially in metallurgy, chemical and machine- building industries because energy resource consumption of these Ukrainian industries considerably exceeds the world's. Imported energy resources, first of all oil and natural gas, form the industrial basis of the national economy (Прейпер, 2009).

According to the Programme of Ukraine's economic reforms, in 2010-2014 «Ukraine has excess capacity for electric energy production. However, its capability to provide economy with electric energy is restricted by several problems such as:

- moral and physical depreciation of fixed assets of electric power plants (nearly 60% of fixed capital assets of energy distributing companies and 80% of fixed capital assets of heat and power plants are completely depreciated) as a result of insufficient state financing and unattractiveness for private investments;
- low efficiency of energy production and transmission (consumption of energy resources during energy production is 35% higher and the level of transportation expenses is two times higher than in OECD countries);
- critical financial and economic state of heat generating companies and energy distributing companies, high liability of economic agents in energy markets (Програма, 2010).

The following are major risk factors with respect to the national system of energy security:

- 1) high energy capacity of the national economy: one unit of GDP requires 3–5 times more energy on average than in other East European countries;
- 2) critical dependence (Добыча, 2010) (absolute non-diversification of energy resources market) of the national economy on a single energy resource supplier (Russia). Earlier Ukraine made some attempts to diversify energy resources supply but unsuccessfully because of Russia's strict energy policy. Some insignificant progress was made only at the beginning of 2001. During the World Economic Forum in Davos (Switzerland, January 2001) Ukraine's and Azerbaijan's Energy Ministers signed the Partnership Memorandum regarding natural gas supply to Ukraine. According to the terms of the Memorandum, natural gas supply to Ukraine from Azerbaijan should be 2 billion cubic meters in 2014 and 5 billion cubic meters in 2015 (Янукович, 2011).

It is necessary to emphasize that energy conflict can strengthen if energy resource country-producer is not a direct energy resource supplier (e.g., Russia has purchased all Middle Asia natural gas until 2015 and became a monopolist-exporter of this resource to European markets). Monopoly power is usually accompanied by political and economic pressure: For example, Russia has constantly put pressure on Ukraine to sell Ukrainian national natural gas transport system. Eventually, the lack of agreement on the above issue pushed Russia to undertake two very expensive alternative projects of natural gas transportation to Europe bypassing Ukraine – «Nord Stream» and «South Stream» (see Fig. 1). In turn, Europe who learned from 2009 Russian-Ukrainian energy crisis, is developing an alternative to Russian «streams» projects its own project called «Nabucco», trying to secure itself against Russia's manipulation with energy resources supply in the future (Nabucco, 2011).



Fig. 1. Projected routes of Nord Stream, Nabucco and South Stream pipelines

Recently two Baltic States – Lithuania and Estonia – initiated some activities in order to decrease monopoly power of the Russian natural gas monopolist “Gazprom” within the so-called Third EU Energy Packet. Estonia’s Prime Minister argues that measures directed towards liberalization of energy markets of these countries and competition can be the «... attempts to persuade Eesti Gaas share holders to willingly refuse main gas pipelines, otherwise «other measures» down to nationalization of pipes» are possible (Эстония, 2011).

It is important to note that issues of state energy security are geopolitical issues. With passage of time potential for conflict can only increase because states (especially energy monopolists) tend to take on strategically important positions from the point of view of possible influence on perspective decisions and development scenarios (OSW, 2011; Россия, 2011), which frequently includes manipulation and blackmail.

Formation of current system of energy security in the world is subject to the following aspects:

- fast post-crisis growth of the largest economies (including developed and developing) is impossible without huge amounts of traditional non-renewable energy resources (oil, natural gas, coal). Even today in recession, China (Китай, 2010), Brazil, India, being mostly energy dependent

economies, are still high energy consuming economies. According to International Energy Agency, China used about 2.3 billion tons of oil equivalent (it is nearly 4% more than the USA (about 2.17 billion tons)) in 2009. Thus, China can surpass the USA to become the largest oil importer in the nearest future (until 2020). As a matter of fact, traditional energy resources are scarce and (Сабадаш, 2007) mostly depleted (see Fig. 2);

- high capital intensity of energy sector (not only technological process of resource extraction but also modernization of processes);
- growing threat of terrorist attacks on energy objects (oil and gas pipelines, nuclear and thermal power plants, electric grids, other supply networks, etc.) (Теракт, 2010) requires additional high expenditures to protect energy infrastructure, as well as to correct premiums in international energy transportation insurance markets. Very often the above mentioned objects get involved into military activities and armed conflicts; as a result, new political and economic security threats appear as well as new large ecological conflicts;
- increasing dependence of the world economies on energy resources presents the problem of «energy blackmail» by producing countries (Чавес, 2010). As an example, 2009 «natural gas conflict» between Russia and Ukraine negatively affected Western Europe;
- problems associated with property rights and rights for mining and exploration of deposits of energy resources (oil and gas). Examples are: Energy market nationalization in Venezuela; occasional conflicts of property rights for oil and gas deposits in Nigeria, Ukraine, and Russia; potential conflicts in Brazil and the USA (oil disaster in the Mexican Gulf in June 2010);
- considerable level of ecological disasters associated with the majority of energy objects, especially nuclear power plants as well as oil and natural gas pipelines.

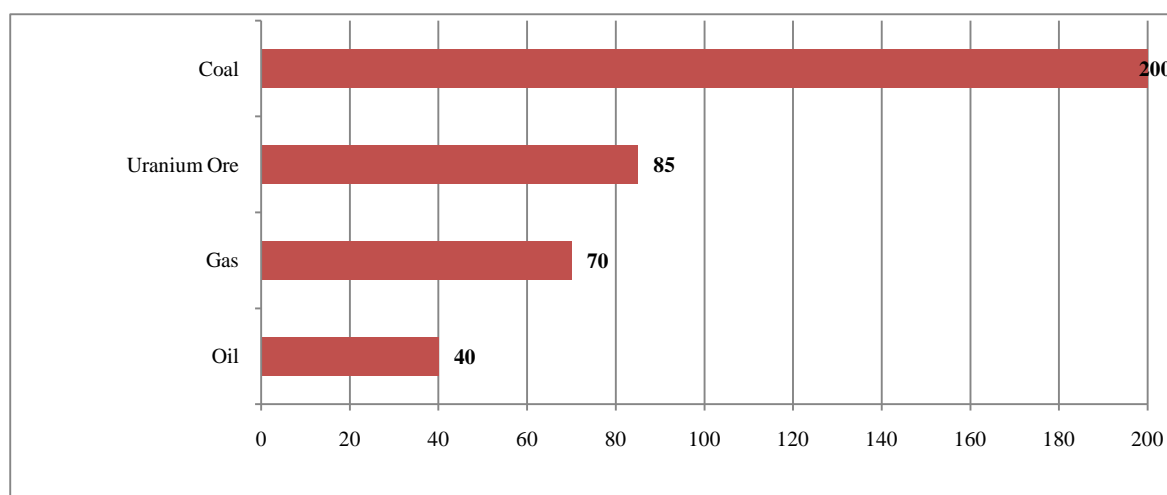


Fig. 2. Confirmed non-renewable energy resources, years of consumption

For Ukraine, as an active player in energy market, issues of efficient system of energy security are extremely important and urgent. The necessity of immediate solution of energy problems is being

strengthened by the fact that national electric-energy and oil-gas systems are mostly integrated into a common European energy system because:

- (a) Ukraine is the importer of such key energy resources as oil and gas;
- (b) Ukraine is the net exporter of electric power to Central and East European countries (Slovak Republic, Hungary, Belarus, Poland and Romania). According to forecasts, total amount of electric energy exports from Ukraine achieved 5.4–5.9 billion kw/h in 2010. According to the state balance of electric power of the United Energy System (UES), Ukraine planed to export 11.4 billion kw/hour of electric power in 2010 (Україна, 2010);
- (c) Exports of electric power to Russia can be profitable (considering proper terms of the agreement!) for Ukraine, because during the last few years Ukraine has occasionally had electric power surplus;
- (d) There are no technical restrictions for electric power exports to Russia: Inter-energy power grid allows transmitting about 2000 megawatt – equivalent to capacity of two 1000 megawatt nuclear power blocks. In this regard, Ukrainian energy generating companies «Zahidenergo», «Shidenergo» «Dniproenergo» can be potential electric power suppliers for Russia. If Ukrainian nuclear power plants keep running at full capacity, then thermal power plants will have excess capacity;
- (e) Ukraine is still a key natural gas transit country for Western Europe. Therefore, according to the above presented features, energy security and the associated mechanisms must be coordinated by energy market participants as much as possible.

### **III. Economic and organizational prerequisites for sustainable energy sector development**

In our opinion, the following are key points Ukraine has to address in terms of national energy security:

- 1) Financial problems associated with modernization of Ukraine's gas transport system. Since Ukraine cannot afford the required investments on its own it is necessary to finally decide on whose investment proposals, Russia's or the EU's, are more attractive and economically efficient for Ukraine.
- 2) Diversification of supply of energy resources through more flexible and economically grounded policy of alternative energy markets (Middle Asia, Azerbaijan, Africa). In this regard, other countries' experience can be useful (Росія, 2010; Беларусь, 2010);
- 3) Natural gas consortium with Russia or independent energy policy. In any case, if Ukraine manages to attract investments for modernization of its gas transport system, then Ukraine will have to take on some corresponding obligations;

- 4) Efficient price of imported natural gas as well as efficient price of natural gas transportation through Ukrainian gas transport system;
- 5) Natural gas storage facilities to store Russian gas during summer, when gas consumption is reduced, with the following transportation of the stored gas to Europe;
- 6) Legal resolution of the situation in the Prykherchensky shelf of the Black Sea between the Cabinet of Ministers of Ukraine and Vanco International Company: It was already announced on July 8, 2010 about the beginning of negotiations between the two (Коломойський, 2010; Уряд, 2010);
- 7) Resolution of organizational, economic and legal issues with Russia associated with construction of the 3<sup>rd</sup> and 4<sup>th</sup> energy blocks of Khmelnytsky Nuclear Power Plant: Russia has already agreed to provide the major part of funding via Russian commercial banks (Бурда, 2010).

The above mentioned key points are associated with the existing external and internal challenges and threats that directly affect Ukraine's energy security. On the other hand, they define the key directions for increasing the level of Ukraine's energy security as follows:

- step by step transformation of the existing production and consumption models of traditional energy resources with simultaneous improvement of production infrastructure and decrease in energy consumption through broad utilization of alternative energy resources (Table 2);
- utilization of economically efficient technologies for production, transportation, distribution and consumption of Ukrainian energy resources. For this purpose, broader involvement of national machine-building sector is required accompanied by an increase in national energy research;

Table II. Potential of renewable energy sources in Ukraine\* (Прейсгер, 2009, p. 29]

Kind of energy potential	Annual technically achievable potential		Annual substitution of natural gas
	billion kw/h	million tons of equivalent fuel	billion m <sup>3</sup>
Wind energy	41,7	15,0	13,04
Solar energy	28,8	6,0	5,22
Geothermal energy	105,1	12,0	10,43
Bioenergy	27,7	10,0	8,70
Hydroenergy	162,8	20,0	17,40
Energy of the Environment	154,7	18,0	15,65
Total	520,8	81,0	70,44

\* *Source:* Institute of Renewable Energy of the National Academy of Sciences of Ukraine

- incentives/disincentives to stimulate efficient use of energy resources. It is important to emphasize the use of efficient resource management methods because national economy cannot quickly adapt to energy saving technologies due to limited financial resources, technological unpreparedness and considerable economic, financial and industrial risks;

- reasonable and economically grounded optimization of country's energy balance and diversification of domestic energy consumption;
- formation of strategic energy storages with simultaneous design of procedures in case of emergency to provide energy resources to industrial consumers and households;
- national computerized accounting systems to regulate consumption of energy resources;
- sustainability and rational use of energy resources to preserve them for future generations.

## Conclusion

Integration of the Ukraine's national energy security system into global system of energy security and first of all European currently seems to be the most important issue. It is so since it would result in multi-vector energy policy which is mutually beneficial. In order to realize this goal it is necessary to urgently solve some existing problems discussed in this article. Only resolution of these current problems can result in formation of efficient system of national energy security in Ukraine and Europe as a whole.

Eventually Ukraine can become an effective participant in collective energy security system not only as a consumer of energy resources but also as a reliable partner in extraction of energy resource (both domestically and internationally) and a reliable energy transit country.

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#### *Abstract*

The paper analyses the key political and economic issues associated with formation of national doctrine of energy security in Ukraine under uncertain external and internal environment. In the end, the key strategic directions and policies for improving energy security in Ukraine are specified. Implementation of these policies will help ensure the reliability and efficiency of energy production and consumption as well as integration of Ukraine's energy sector into global system of energy security.

*Keywords:* natural gas, conflict, oil, co-operation, energy security, energy dependence, energy resources

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#### **Энергетическая безопасность Украины: конфликтный потенциал и предпосылки устойчивого развития энергетического сектора**

Глобализация мирохозяйственных связей и активная политика экономического сотрудничества наряду с положительными моментами имеет и ряд негативных эффектов. Они являются следствием, прежде всего, новых угроз и вызовов, характерных для международного рынка ресурсов.

В условиях ограниченности сырьевых и энергетических ресурсов актуализируется проблема экономической безопасности в целом и энергетической ее составляющей в частности. Государства для реализации своих экономических интересов все чаще используют энергетические рычаги влияния. При этом возникает опасность манипулирования ресурсами и возникновения энергетических конфликтов, вследствие чего возможны кардинальные изменения вектора развития как отдельных стран, так и регионов и экономических союзов.

В работе проведен анализ основных политических и экономических проблем, актуальных для Украины в русле формирования эффективной национальной доктрины энергетической безопасности в условиях неопределенности внешней и внутренней среды. Выявленные риск-факторы системы энергетической безопасности позволили обозначить наиболее конфликтогенные направления выстраивающегося глобального энергодIALOGA.

В исследовании предложены и обоснованы ключевые тактические и перспективные задачи повышения уровня энергетической безопасности Украины (экономического, организационного, правового, технологического характера). Успешная реализация этих задач будет способствовать обеспечению надежности и эффективности энергоснабжения и последующему инновационно ориентированному развитию топливно-энергетической отрасли. Стратегическим императивом для Украины, как субъекта коллективной системы энергетической безопасности, в глобальном энергодиалоге, является формирование имиджа эффективного и ответственного партнера (поставщика, потребителя и транзитера) на рынке энергетических ресурсов.

*Ключевые слова:* газ, конфликт, нефть, сотрудничество, энергетическая безопасность, энергетическая зависимость, энергетический ресурс.



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