

ENERGY AND RESOURCE POLICY

**POTENTIAL CHANGE IN RUSSIA'S POSITION
IN THE GLOBAL GAS MARKET AS THE
OPTIMIZATION OF THE LOCAL ENERGY
SECURITY MODEL**

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ABSTRACT

Today, ensuring energy security is one of the key tasks for every state, whether it is a net exporter, net importer or a transit country. With regard to the EU countries, the declaration of energy security as the priority issue of energy policy is largely due to low endowments of their own reserves of hydrocarbon resources and hence a high dependence on the suppliers of energy resources. As it happens, the EU's own natural gas production is able to supply only 35% of the aggregate demand, with the rest being provided by Russia, Norway, Algeria and Qatar. Since about a third of the total volume of gas imports comes from Russia,¹ it creates a de facto dominant position of the Russian Federation in the EU gas market. The study of the transportation aspect of energy security of the EU has become a particularly relevant subject since the escalation of the political crisis in Ukraine in 2014-2016. In the current circumstances, there remain uncertainties regard-

ing the prospects of the Russian gas deliveries to the EU countries through the territory of Ukraine and, in consequence, the question of transportation, as a component of the gas market, has become one of the most important on the agenda of the EU on the subject of cooperation with Russia. The problem of energy security becomes even more acute due to the actions of energy companies of the exporting countries, seeking to obtain access to the gas end-user and attempting to acquire equity shares in companies, involved in transportation and sales. These attempts are met with resistance on the part of the supranational agencies of the EU, which is reflected in the adoption of relevant legislative acts. The prospects for maintaining gas exports from Russia are significantly influenced by the vigorous actions of the EU countries on the implementation of energy-efficient technologies and the wider use of renewable sources of energy. Thus, the analysis of potential changes in the strategy of the EU countries in the context of contemporary trends for strengthening the energy security in the gas market is particularly important for improving the export strategy of Russia in this market.

¹ See: "BP Statistical Review of World Energy," June 2014 // BP, available at [http://www.bp.com/content/dam/bp/excel/Energy-Economics/statistical-review-2014/BP-Statistical_Review_of_world_energy_2014_workbook.xlsx].

KEYWORDS: *the fuel and energy complex, energy security, gas industry, export of energy resources.*

Introduction

The uneven distribution of the world's energy resources has long been the cause of many geopolitical conflicts and still remains the determinant factor of energy policies for many countries.²

There is no universally accepted definition of the concept of energy security: the meaning varies, depending on the level of economic development of a country, its geographical location, the

² See: B. Akhmetova, I. Karabulatova, P. Dudin, Zh. Dorzhiev, "Tension around the Problem of the South China Sea as a Factor of Geopolitical Confrontation and Transformation of the Present World Order," *Central Asia and the Caucasus*, Vol. 17, Issue 4, 2016, pp. 49-58; A. Shadzhe, I. Karabulatova, R. Khunagov, Z. Zhade, "Ethnopolitical Influence in Regulating National Security in Border Territories of the Countries in the Caucasian-Caspian Region," *Central Asia and the Caucasus*, Vol. 17, Issue 3, 2016, pp. 66-75.

availability of fuel and energy resources, political system, and commercial, economic and political relations with other states.³

The understanding of energy security of a specific state or region is determined to a large extent by the specific position of its fuel and energy resources in the world market, the situation in the domestic market, as well as the correlation between the vulnerability of energy system and the disruption of energy supplies. Russia simultaneously acts as a major exporter, a transit country, and the largest consumer of energy. Accordingly, its position involves ensuring energy security, which requires equal division of risks between all the participants in the energy chain, while taking into account the interests of energy-producing countries.

It should be noted that in the given work, the energy security is regarded primarily on the scale of a region (country, group of countries). The issues of security of energy facilities (mining, transport, energy generating and other equipment) do not constitute a part of the current study.

Methods and Materials

The essential theoretical foundations of the study were based on the scientific works of Russian and foreign scholars on various aspects of the development of the global power engineering in general and gas markets in particular, as well as the works on relevant issues of interaction between Russia and the EU countries in the gas sector in the current conditions of the European gas market.

As a methodological basis of the study, the authors used a combination of the methods of systems analysis and synthesis, analogies and comparisons of economic phenomena and processes, organizing and compiling statistical data, as well as modern methods of economico-mathematical modeling. The long-term forecast for the development of this market is projected up to the year 2030.

Information and empirical basis of the study was provided by the data from international energy organizations (the International Energy Agency, the Energy Charter Secretariat, the International Gas Union, etc.); research centers and institutes (Energy Research Institute of the RAS (Russian Academy of Sciences), Institute of World Economy and International Relations of the RAS, Cambridge Energy Research Associates, etc.); regulatory and legal acts and statistical information of national and supranational bodies of legislative and executive branches of power and their structural subdivisions (the Ministry of Energy of the Russian Federation, Ministry of Economic Development of the Russian Federation, European Commission of the EU, etc.); economic forecasts and public development programs in the field of energy; press publications on industry topics, as well as official information of the largest companies of the world oil and gas sector (BP PLC, Statoil ASA, OAO Gazprom, NC Rosneft, etc.).

The proposed method of evaluation of energy security is based on the optimization of the target function and reflects a well-founded presentation on the status of the structure of energy sources in the future. The target function is based on the indicator (optimization criterion), developed on the basis of existing quantitative methods of evaluating energy security, i.e. the method of levelized risk adjusted cost of gas. The economico-mathematical model, created on the basis of this method, allows to calculate the balance of sources of gas supply, providing the optimal level of economically sound regional energy security for the gas market in the long term (until 2030). Economic viability of

³ See: M.S. Golovina, "Energeticheskaya bezopasnost—aspekty, printsipy, opredeleniya," *Nadezhnost i bezopasnost energetiki*, No. 1 (20), 2013, pp. 12-17; *Energetika i geopolitika*, ed. by V.V. Kostyuk, A.A. Makarov, Russian Academy of Sciences, Nauka Publishers, Moscow, 2011, p. 92.

the indicator is determined by the possibility of calculating the purchase cost of gas and cost of appropriate infrastructure development of gas supply, while its minimization allows for deducing the optimal level of energy security.

Results

On the basis of the results of the computing experiment for defining the optimal level of energy security on the market of the EU gas, using three scenarios of development of the key parameters for gas market, the potential (optimal) structure of gas sources portfolio for the EU is determined, and forward-looking indicators of volumes of gas exports from Russia to the EU are calculated. According to the calculations, a significant increase in the share of liquefied natural gas is anticipated in the total amount of imports by the EU countries—from 18% in 2012, to 47-62% by 2030, depending on the scenario, mainly due to an increase in exports by Qatar and Norway. By retaining the current export strategy, in two of the three scenarios, both Russia's share in the gas market of the EU and the absolute volumes of supplies may be reduced by the year 2030, compared to the year 2012 (by 26% and 66%, or to 82 and 38 bcm, respectively).

Based on the comparative analysis of the existing routes for gas conveyance to the EU with respect to key aspects of the transport component of energy security (technological, economic and political) and the results of the calculations of the economico-mathematical model, the expediency of the current Russian strategy for the development of routes for gas delivery to the EU, as alternative to the transit through Ukraine, is confirmed. Gas deliveries, utilizing the gas transmission system of Ukraine, according to all three scenarios of comparative analysis, contain the highest inherent risk. According to the calculations by the authors, it would be better to abandon gas transit through the territory of Ukraine in 2018-2019, in favor of alternative, less risky routes.

It should be noted that the calculated model structure of the sources of yearly supplies of gas to the EU does not represent a prognosis of real volumes of transfers: these volumes are affected by many factors, including unpredictable conditions, such as terms of contracts, political events, etc. The calculated structure reflects a fundamentally sound, from the point of view of optimization of the level of the energy security of the EU, procurement volumes of gas and their distribution to sources, i.e. the parameters, which the EU will seek, but not necessarily fully attain.

Calculation of the LRACOG (Levelized Risk Adjusted Cost of Gas) parameter involves the quantification of the value of the parameter on the basis of a corresponding function—depending on the variables considered in the parameter. As variables in the model, the shares of gas from different sources are examined:

- domestic production in the EU;
- gas imports by pipelines from various exporting countries;
- liquefied natural gas imports from various exporting countries.

There is proof for the relevance of developing new directions for Russian gas exports outside the EU countries and the need to increase the volumes of production and sales of LNG. In all the scenarios, the existing objective for the preservation of the share of the European gas market in aggregate exports may not be attainable and its inevitable reduction should be offset by the growth of gas sales to other regions. It is evident that in the case of the deterioration of the situation on the EU gas market and growth of competition between the existing and possible new suppliers (the countries of the Middle East, the Caspian Sea region, the U.S., etc.), it may be appropriate to refrain from future construction of some of the planned gas pipelines. Also, the proactive change in the arrangements for

the contractual agreements and pricing, corresponding to the expectations of the EU, in exchange for higher volumes of deliveries of Russian gas and admittance of Russian companies to the European projects and assets for storage, transportation, distribution and marketing of natural gas may be required. Proven and justified is the usefulness of supply of LNG from Russia to the EU.

Discussion

In most modern scientific works on the issues of energy security, the main emphasis is placed on the study of the vulnerability of energy supplies (mostly oil and gas) and its influence on the price and physical accessibility of fuel for importing countries, as well as on the dependence of their economic well-being on exporters of fuel and energy resources. At a global level, energy security is to be considered as a “sound balance between energy supply and demand serving the purpose of facilitating sustainable economic and social development for both importers and exporters.”⁴

Table 1

**Definition of the Energy Security Concept
in the Public Documents of Russia, the U.S. and EU**

| Country | Source | Definition of the Energy Security Concept |
|---------|---|---|
| Russia | National Security Strategy of the Russian Federation up to 2020 | The stable supply of sufficient standard quality sources of energy; the effective use of energy resources by increasing the competitiveness of domestic producers; the prevention of possible fuel-energy resource deficits; the creation of strategic stocks of fuel, reserve capacities and standard equipment; and ensuring the stable functioning of the system of energy and fuel provision. |
| Russia | Energy Strategy of Russia for the Period up to 2030 | The country's security, that of its citizens, society, state and economy from the threats to reliable supply of fuel and energy. |
| Russia | Russia's Draft Energy Security Doctrine | National energy security (in the broad sense) is part of the national security of the country, dependent on the energy factor, as well as the quantity (volume), quality (cost-effectiveness and reliability) and constructiveness (organization) of energy deliveries to the consumers. Energy security is provided and determined by resource sufficiency, economic availability, environmental admissibility and technological acceptability of balanced distribution to ensure the demand and supply of energy resources. |
| U.S. | The Congressional Budget Office Report* | The ability of U.S. households and businesses to accommodate disruptions of supply in energy markets... Households and businesses are “energy secure” with respect to a particular source of energy if a disruption in the supply of that source would create only limited additional costs. |

⁴ F. Proedrou, *EU Energy Security in the Gas Sector: Evolving Dynamics, Policy Dilemmas and Prospects*, Ashgate, Farnham, 2012, p. 4.

Table 1 (continued)

| Country | Source | Definition of the Energy Security Concept |
|---------|---|---|
| U.S. | The Congress of the United States | The future, when economically affordable energy is securely produced in excessive amounts with little impact on the environment and regardless of the will of the hostile nations. |
| U.S. | The Department of Defense of the United States | The capacity to avoid adverse impact of energy disruptions caused either by natural, accidental or intentional events affecting energy and utility supply and distribution systems. |
| EU | The EU European Commission Communication Green Paper—Towards a European Strategy for the Security of Energy Supply (2000) | The uninterrupted physical availability of energy products on the market, at a price which is affordable for all consumers [the population and industry]. |

* The report is presented to the head of the Committee of the United States Senate on Energy and Natural Resources on a regular basis. The Congressional Budget Office is a subsidiary body of the Congress of the United States, responsible for the consideration of the state budget draft, submitted to the approval of the legislative authority. Its responsibilities include the provision of the Congress with information and analytical data on financial and budgetary matters, independently of the executive branch and the Office of Management and Budget. Established in 1974 by the Law on the State Budget.

Sources: Compiled by the authors from data: *National Security Strategy of the Russian Federation up to 2020, Approved by the Decree of the President of the Russian Federation of 12 May, 2009, No. 537*, Security Council of the Russian Federation, Section 4, Art 60, 2009, available at [<http://www.scrf.gov.ru/documents/99.html>]; *Energy Strategy of Russia for the Period up to 2030, Approved by the Decree of the Government of the Russian Federation of 13 November, 2009. No. 1715-r*, Ministry of Energy of the Russian Federation, 2009, p. 13, available at [<http://minenergo.gov.ru/aboutminen/energostrategy/Strategiya/Energostrategiya-2030.doc>]; *Russia's Draft Energy Security Doctrine (conceptual statement)*, Laboratory "Energy Initiative", 2011, p. 1, available at [www.labenin.z4.ru/Docs/en_bezop_project.doc]; *Energy Security in the United States*, Congressional Budget Office, 2012, p. 9, available at [<http://www.cbo.gov/sites/default/files/cbofiles/attachments/05-09-EnergySecurity.pdf>]; J. Kessels, S. Bakker, B. Wetzelaer, *Energy Security and the Role of Coal*, IEA Clean Coal Centre, London, 2008, p. 12; D. Kleber, "The U.S. Department of Defense: Valuing Energy Security," *Journal of Energy Security*, June 2009, available at [http://ensec.org/index.php?option=com_content&view=section&layout=blog&id=22&Itemid=345]; *Green Paper —Towards a European Strategy for the Security of Energy Supply —European Green Paper*, European Commission, 2000, p. 4, available at [http://ec.europa.eu/energy/green-paper-energy-supply/doc/green_paper_energy_supply_en.pdf].

Some of the works on energy security are dedicated to the impact of the vulnerability of international energy trade on the economic component of energy security of the countries exporting energy resources. For example, in the study of A.F. Alhaji,⁵ the main emphasis is placed on the economic aspects of the certainty of demand on the part of the importers of energy resources, as well as

⁵ See: A.F. Alhaji, "What is Energy Security?" *Energy Politics*, Vol. IV, 2008, pp. 62-82.

on the influence of social and political factors. Terry Karl, Ian Bannon, Paul Collier⁶ explore the validity of the theory of the “paradox of plenty”⁷ for exporting countries.

As far as the interpretation of the concept of energy security by international organizations (see Table 1 on p. 30) is concerned, in many ways it is determined by the geopolitical and economic interests of the countries within a particular organization, as well as the objectives of the activities of the organizations themselves. At the same time, most of them are in agreement on the fundamental issues of the importance of a stable export and import flows, economic accessibility of energy, technological development of power engineering and environmental responsibility of the industry. In the documents, formulating the modern concept of energy security of the EU, the explicit definition of energy security is missing, but it is indirectly presented in the form of a list of current priorities in the regional energy security: “Establishment of a competitive, low carbon economy, which allows for reducing energy imports.”⁸

In connection with the polysemy of the concept of energy security, its quantitative assessment is also a complex and mixed task. In general, the method of evaluating the energy security depends on how the term “energy security” and its relevant elements are defined, on the goals and tasks of the quantification, the input data and their specification, and on critical assumptions of the methods used and available information necessary for their implementation.

Conclusion

The threats to energy security at the level of a country or region depend, to a large extent, on the existing energy system, existing trends in its transformation, on the prevalence of the type of fuel used for generating electricity, transportation and industry. These factors largely determine the existing system of energy supplies, the value of the operating costs, and possible depth of the impact from external influences.

In the case of an excess, from the point of view of demand, throughput capacity of all the existing and planned gas pipelines from the exporting country, these pipelines, as the calculations show, will be filled in the following order:

- (1) existing direct routes;
- (2) direct routes under construction;
- (3) existing transit routes with a low country risk;
- (4) transit routes under construction with a low country risk;
- (5) existing transit routes with a high country risk;
- (6) transit routes under construction with a high country risk.

⁶ See: T.L. Karl, *The Paradox of Plenty: Oil Booms and the Petro-States*, University of California Press, Berkeley, Los Angeles, London, 1997, 343 pp.; *Natural Resources and Violent Conflict: Options and Actions*, ed. by I. Bannon, P. Collier, World Bank, Washington, DC., 2003, 429 pp., available at [<https://openknowledge.worldbank.org/bitstream/handle/10986/15047/282450Natural0resources0violent0conflict.pdf?sequence=1>]; P. Collier, *The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done about It*, Oxford University Press, New York, 2008, 211 pp.

⁷ The paradox of plenty is a phenomenon in the economy, associated with the fact that countries with significant natural resources are, as is often considered, economically less developed than countries with small stocks or with no stocks of energy resources.

⁸ “European Energy Security Strategy,” in: *Communication from the Commission to the European Parliament and the Council*, Brussels, 2014, p. 3 [http://ec.europa.eu/energy/doc/20140528_energy_security_communication.pdf].

The calculation of the potential shares of the sources of gas supply in the total procurement of gas for the EU does not take into account the amounts recorded in the long-term contracts, which have already been signed between exporting countries and the countries of the EU.

- First, the aim of the model is an objective evaluation of a possible EU action on the basis of the optimal, economically justified, level of energy security in the long term, which may not meet all the requirements of the existing contracts. In addition, as the interaction of the EU countries with foreign partners in the gas market shows, the concluded agreements may be revised regularly.
- Second, this information often represents a commercial secret that makes it impossible to allow for qualifying constraints.

Thus, the share of the sources of gas supply, calculated by the given model up to the year 2030, does not represent forecasted volumes of rigorously planned supplies, but an assessment of the potential of the EU strategy for optimization, focusing on energy security and economic feasibility of parity in the choice of suppliers for the gas market of the EU.

The conducted analysis of the prerequisites for the formulation of the concept of energy security of the EU has led to the following understanding of the threats to energy security of the European Union, establishing a modern concept of energy security of the region:

- high level of import dependence on oil and gas. Dependence on oil is approximately 87% and gas—66%.⁹ In accordance with the projections of the European Commission,¹⁰ these indicators will increase, but the main concern is with the complex political situation in key countries, which export and transport fuel resources;
- vigorous actions on the part of foreign suppliers of certain types of energy seeking to obtain access to the markets of end-users;
- high level of competition for energy with rapidly developing countries, mainly with India and China;
- high prices of energy resources with positive dynamics of growth;
- political instability in a number of exporting and transit countries;
- the complexity of solutions to environmental issues in the region and the achievement of desired objectives in crisis conditions.

At the current stage of development of the world energy, specifically the geopolitical and not the geological factor assumes growing importance in view of the political instability in many of the key exporting regions and transit countries, particularly in Ukraine, because of the political crisis of 2014, as well as in a number of countries of the Middle East and North Africa.

⁹ See: *EU Energy in Figures— Statistical Pocketbook 2014*, European Commission, Brussels, 2014, p. 26, available at [http://ec.europa.eu/energy/publications/doc/2014_pocketbook.pdf].

¹⁰ See: *EU Energy Trends to 2030*, European Commission, Directorate-General for Energy, Luxembourg, 2010, p. 31, available at [http://ec.europa.eu/energy/observatory/trends_2030/doc/trends_to_2030_update_2009.pdf].