European Research Studies Journal
Volume XXI, Issue 4, 2018

pp. 162-173

Diversification of Transit Risks of Russia as a Basis for Economic and Energy Security in European Countries

A.M. Chernysheva[1], N.P. Gusakov[2], A.A. Trofimova[3]

Abstract:

The paper examines the dependence of energy security against the European Union (EU) and Russia, where the main threats are the insufficient diversification of supplies, the difficulties in gas transportation and the high transit tariffs.

It covers the threats of location of the gas transportation system in Ukraine, through the territory of which a significant volume of gas purchases to the EU countries is delivered.

The ways of diversifying transit risks have been identified through the Yamal-Europe, Blue Stream, and Nord Stream gas pipelines, as well as by the implementation of the Nord Stream 2 gas pipeline. This will allow diversifying the EU transit risks and supplying gas to Austria through the territory of Germany, the Czech Republic and Slovakia.

In turn could be determined by political and economic instability. In the methodological part of the paper, an analysis of gas consumption in the countries of Central and Eastern Europe was made, which showed fairly stable consumption with a slight decrease in demand.

Keywords: *Energy security, economic stability, contracts, threats, energy risk, gas pipeline, fuel and energy sector, gas transportation system, South Stream, Nord Stream, Nord Stream 2, diversification.*

JEL Classification: *O10, O40.*

[1]*People's Friendship University of Russia (RUDN University), chernysheva-am@rudn.university*
[2]*People's Friendship University of Russia (RUDN University), gusakov_np@rudn.university*
[3]*People's Friendship University of Russia (RUDN University), trofimova_aa@rudn.university*

1. Introduction

National energy security in the face of the complex geopolitical situation has an important strategic task for countries dependent on energy supplies. The guaranteed reliability of supply creates the basis for national economic stability, the basis for the development of national industry, national security and the living standards of the population. Accordingly, the regulatory role of the authorities in ensuring national energy security comes to the forefront. The goal of any state with respect to energy security is to provide consumers with energy resources that are acceptable in price and quality. Accordingly, the object of energy security will be the energy facilities, the energy infrastructure, as well as power equipment of end users, both of industrial users and utilities.

The threats to energy security in relation to the object can be divided into external and internal. Internal threats are formed, first of all, by the organizational and financial-economic state of the national fuel and energy complex, as well as by the state's economic policy in this area. Internal threats include reduced investment, deterioration of nuclear energy facilities, lack of innovation, high energy intensity of industry, energy resources shortage, etc.

In this paper, the authors will speak, first of all, of external threats to the energy security of the country, which can be foreign political and foreign economic. Such threats are formed by hostile or discriminatory actions of foreign states and national/transnational companies. In relation to the EU, the main threats to energy security are insufficient diversification of supplies, highly politicized relations, the unstable situation in the global financial and energy markets, difficulties in gas transportation, high transit tariffs, and the likelihood of military conflicts.

Both domestic and foreign economists are engaged in the study of problems of economic energy security, since economic security is based on the formation of the necessary volume of energy resources for the implementation of reproductive processes and ensuring social stability. Meantime, energy security ensures the realization of functional components of economic security at the state level.

For the first time, the problem of energy protection (security) began to be considered by foreign and Russian scholars in the early 1970s. The works of Russian and foreign scientists Braginsky, Bushuev, Voropai, Dmitrievsky, Yergin, Zhukov, Konoplyanik, Laverov, Makarov, Milovidov, Mironov, Mitrova, Salygin, Simoniya, Telegina, Feigin, Khartukov, Shafranik, Yangs and others are devoted to the dilemmas of the world energy related to the formation of the gas sector of the economy, natural gas markets, international energy-related political activity and energy security. The influence of the problems of the formation of the European gas market on the energy security of the EU is examined in the works by Leveque, Marin-Kemada, Pashkovskaya, and Proedrou. The works of Boon Von Okse,

Braginsky, Konoplyanik are devoted to the prospects of Russian exports of natural gas to Europe.

2. Statement of the problem

All of the above risks of the EU have emerged primarily due to the historical formation of the gas transport system in the USSR. For example, the points of delivery of gas were usually prescribed to the western borders of the bloc of Eastern European countries that were part of the Warsaw Pact, and the USSR (Energy Strategy of Russia for the Period till 2035, 2015). This arrangement led to a series of external threats faced by the EU countries, and first of all, the transit risk caused by the complex political and economic relations between Russia and Ukraine, through which a significant volume of gas purchases passes.

A significant amount of gas produced in Russia is supplied to Western and Central European countries under long-term contracts at a price that depends on world prices for petroleum products and gas quotes on European trading floors. At the same time, the value of the contract may fluctuate depending on the influence of such factors as:

— Political and economic developments taking place in oil-producing regions, such as North Africa, the Middle East;
— The current market situation and analysis of its changes in the future;
— Influence of OPEC countries and other oil-producing countries on the prices of gas contracts;
— Influence of actions by exchange speculators;
— A changing political situation in the world, including terrorist acts;
— Change in prices for alternative energy sources;
— Emergence of new technologies;
— Weather effects.

Long-term contracts, as a rule, contain the following components: contract gas price, conditions for possible price revision (once every two to three years); conditions of supply changes depending on consumer demand; the "take or pay" condition (Zobov *et al.,* 2017; Vetrenko *et al.,* 2017; Danilina *et al.,* 2015), which provides for either payment of a part of the untaken volume of gas, or unconditional take of the fixed gas volume.

The countries of Europe pay for gas supplies in euros, US dollars and British pounds sterling. They also have the opportunity to pay in Russian rubles. At the moment, Gazprom is in the course of arbitration proceedings with such EU companies as DONG Energy Salg & Service A/S, (formerly DONG Naturgas A/S) Denmark, Shell Energy Europe Ltd., UK, PGNiG SA., Poland, Overgas Inc., Bulgaria.

Arbitration proceedings with GasTerra B.V., the Netherlands, on May 31, 2017, the authorized representatives of the parties signed an amicable agreement, and on June 23, 2017 (What Will Russia Lose Refusing from Gas Pipelines Bypassing Ukraine?, 2017) the tribunal issued a procedural order to stop the arbitration and with the citizen of the Hellenic Republic D. Kopeluzos (in June 2017, the parties entered into an amicable agreement, on July 13, 2017, a procedural order was issued by the tribunal to terminate the arbitration) were terminated.

The existing system of gas supply to European countries provided for the possibility of transportation only through the territory of Ukraine, since this country was part of the USSR. The gas pipeline Urengoy – Pomary – Uzhgorod provided gas supplies to such countries as Bulgaria, Greece, Romania, France, Italy, Austria and Switzerland. The total length of this gas pipeline is 4,451 km, the designed capacity being 32 billion cubic meters per year. Also, through the territory of Ukraine (1,160 km), the Soyuz gas pipeline was passing, the designed capacity being 26 billion cubic meters per year. However, since 1991 the Russian Federation has sought to diversify its transit risks in the following ways:

1. The Yamal – Europe gas pipeline, which provides for supply of gas from Russia through Belarus, Poland and Germany to other European countries. This corridor has allowed maintaining and improving the reliability of supplies since 2006, when the last compressor station was put into operation. The length of the site across Russia amounted to 402 km, in the territory of Belarus – 575 km, in the territory of Poland – 683 km, then the pipeline goes through Germany, where it branches, delivering gas to the Czech Republic, the Netherlands, Belgium and France. The total length exceeds 2,000 km, the designed capacity being 32.9 billion cubic meters per year.

2. The Blue Stream gas pipeline provides for supply of gas from Russia to Turkey through the Black Sea. The length of the gas pipeline is 1,213 km; the transportation volume in 2016 was 12.99 billion cubic meters.

3. The Nord Stream gas pipeline runs along the Baltic Sea, which is located in the territories of Russia and Germany, the length being 1,224 km with the designed capacity of the two lines some 55 billion cubic meters.

The transit risk forced Gazprom not to negotiate new contracts after 2019. The route through the territory of Ukraine was the most optimal and low-cost transit from the Nadym – Pur – Taz deposit to Europe. This route has led to a strong interdependence between Russia and Ukraine. At the same time, until 2006, there were no separate contracts for transit through Ukraine, but in the relations between Russia and Ukraine some difficulties remained, which increased the transit risk for the EU. At the end of 2011, Beltransgaz was completely bought by the Russian party, which neutralized the transit risks through the Yamal – Europe system through Belarus and Poland, bypassing Ukraine. At the moment, the share of transit through the territory of Ukraine fluctuates around 40% (Konoplyanik 2017;

Pugachev *et al.*, 2017; Bibarsov *et al.*, 2017). Meantime, Ukraine, in the case of a new contract concluded after 2019, announced its desire to double the price for transit.

The Nabucco gas pipeline, which was supposed to supply gas from Azerbaijan, Egypt, Iran and Iraq through Turkey, Bulgaria, Romania and Hungary, became a part of the diversification of the transit risks. However, suppliers could not guarantee the resource volume, and when the EU joined the anti-Iran sanctions, Iran withdrew from the project. Within the framework of the counteraction policy, the concept of the South Stream through Bulgaria was developed. The blocking by the EU countries of this project led to its realization through the territory of Turkey. This project, called Turkish Stream, is a gas transportation system with a length of 2,339 km with 10 compression stations of 1,516 MW and a throughput capacity of 63 billion cubic meters of gas per year (Bushuev 2012). Accordingly, the first line of the gas pipeline is intended for consumers from Turkey, and the second – for gas delivery to the countries of South and South-Eastern Europe. At the same time, the first line will start functioning already in 2019; the introduction of the second line depends on the approval by the European Commission.

Another way to diversify the risks of transit is the construction of the Nord Stream 2 gas transportation system. The construction of these two projects is quite an expensive securing for leveling the transit risk for gas supplies to the EU. The existing Nord Stream project, according to the European regulations, is only half loaded. In this case, the remaining half should be given to a third party, which is missing. Nord Stream 2 will allow diversifying the transit risks of the EU after 2019 and delivering gas to Austria through the territory of Germany, the Czech Republic and Slovakia.

The transit risks of gas supplies through the territory of Ukraine are caused by political and economic instability, as well as a fairly high debt of Naftogaz Ukrainy to Gazprom. Gazprom diversifies transit risks because of the latter reason, including through the use of the Yamal – Europe gas transportation system, which runs through the territory of Belarus and Poland.

For the EU countries, contracts for gas supply have a longer term than the contract for transit through the territory of Ukraine, for example, the contract between Gazprom and ENI (Italy) is valid until 2035 (European Energy Security Strategy, 2014). Accordingly, the reduction in transit risk is possible in three ways:

1. Countries interested in cooperation with Russia (Germany, Italy, Austria, Hungary, Serbia, Slovenia, Croatia), within the framework of Energy Package form the infrastructure, while Ukraine completely ceases to be a transit country.

2. Extension of the transit contract after 2019 until the expiry of all gas supply contracts. At the same time, the transmission points are moved to the Russian-

Ukrainian border, while the transit risks are borne by the consuming countries. This way for European countries is less attractive, because transit through the territory of Ukraine is risky.

3. Conclusion of a new transit contract. This path is the least likely, since the diametrically opposed interests of Russia and Ukraine are faced, which, accordingly, threatens the EU economic and energy security.

3. Methods

The study covered 5 countries in Eastern Europe and 4 countries in Central Europe.

Table 1. *Analysis of natural gas consumption in Eastern Europe (PAO Gazprom, 2017; Eurostat, n.d.).*

Year	Natural gas consumption (billion cubic meters) (PAO Gazprom, 2017; Eurostat, n.d.).					Average natural gas consumption (billion m^3)	σ^2	σ	*v*
	Czech Republic	Hungary	Austria	Poland	Romania				
2005	8.59	13.44	9.88	13.59	15.47	12.19	6.52	2.55	20.94
2006	8.44	12.73	9.29	13.75	15.95	12.03	7.84	2.80	23.27
2007	7.86	11.89	8.79	13.75	14.15	11.29	6.53	2.56	22.63
2008	7.90	11.73	9.41	14.95	13.99	11.59	7.09	2.66	22.96
2009	7.44	10.17	9.16	14.42	11.71	10.58	5.61	2.37	22.39
2010	8.45	10.91	9.97	15.51	11.99	11.36	5.64	2.37	20.89
2011	7.66	10.43	9.38	15.72	12.28	11.09	7.59	2.75	24.83
2012	7.62	9.31	8.94	16.64	12.41	10.98	10.47	3.24	29.46
2013	7.72	8.68	8.57	16.63	11.30	10.58	10.60	3.26	30.78
2014	6.86	7.76	7.87	16.25	10.54	9.86	11.75	3.43	34.77
2015	7.20	8.32	8.35	16.34	9.94	10.03	10.70	3.27	32.62
2016	7.80	8.92	8.74	17.31	10.59	10.67	11.83	3.44	32.23

Now, the authors will calculate the average consumption of natural gas in the leading countries of Eastern Europe, using the average simple arithmetic. Then, estimate the reliability and typicality of the average value, using the variation indicators:

1. Variance is the average of the squares of variations in the values of consumption of natural gas in the leading countries of Eastern Europe from their mean.

$$\sigma^2 = \frac{\sum(x - x^2)}{n}$$

2. The mean square deviation is the square root of the variance, and it shows how much the individual values of natural gas consumption deviate from their mean.

$$\sigma = \sqrt{\sigma^2}$$

3. The variation coefficient characterizes the fluctuations in the consumption of natural gas and allows comparing the degree of variation of a characteristic. With a coefficient of variation less than 35%, the totality of coverage is considered homogeneous, and the average consumption of natural gas is reliable and typical.

$$v = \frac{\sigma}{\bar{x}} \cdot 100$$

Similarly, a study was conducted on the consumption of natural gas in the leading countries of Central Europe.

Table 2. *Analysis of natural gas consumption in Central European countries (PAO Gazprom, 2017; Eurostat, n.d.).*

Year	Natural gas consumption (billion cubic meters) (PAO Gazprom, 2017; Eurostat, n.d.).				Average natural gas consumption (billion m^3)	σ^2	σ	v
	France	Italy	Great Britain	Germany				
2005	45.62	79.08	94.90	86.25	76.46	348.46	18.67	24.41
2006	44.03	77.44	90.01	87.90	74.85	339.09	18.41	24.60
2007	42.75	77.26	91.00	84.68	73.92	347.55	18.64	25.22
2008	44.33	77.24	93.78	85.51	75.21	352.19	18.77	24.95
2009	42.70	71.00	86.97	80.66	70.33	286.83	16.94	24.08
2010	47.35	75.62	94.22	84.14	75.33	304.37	17.45	23.16
2011	41.11	70.90	78.08	77.25	66.84	228.38	15.11	22.61
2012	42.47	68.17	73.88	77.49	65.50	187.91	13.71	20.93
2013	43.14	63.76	73.04	81.18	65.28	201.43	14.19	21.74
2014	36.23	56.34	66.68	70.60	57.46	177.41	13.32	23.18
2015	38.95	61.45	68.14	73.52	60.51	173.33	13.17	21.76
2016	42.57	64.53	76.69	80.47	66.07	218.68	14.79	22.38

An analysis of the consumption of natural gas in the countries of Central and Eastern Europe showed a fairly stable consumption with a slight decrease in demand. In general, this means that in the future the countries of Europe will need to purchase natural gas. Meantime, the price will have significant impact. The price of natural gas is quite complex, one of the key parameters being the price of gas transit. When comparing the price of natural gas transit through the gas pipelines Urengoy – Pomary – Uzhgorod and Nord Stream 2, it will be more profitable for European countries to purchase gas supplied via the Nord Stream 2 gas pipeline.

Delivery to the German transfer point Waidhaus (Nord Stream):

$P_t = P_{ns} + P_g + P_{ch} = 16.9 + 7.8 + 6.3 = 31$ USD

P_{ns} is the price for transit via the Nord Stream 2 gas pipeline;
P_g is the GTS (gas transfer system) of Germany (open information disclosed by the operator Gascade);
P_{ch} is the GTS of the Czech Republic (open information disclosed by the operator Net4gas);

Delivery to the German transfer point Waidhaus (via Ukraine):

$P_t = P_u + P_s + P_{ch} = 45 + 5.9 + 6.3 = 57.2$ USD

P_u is the new tariff of GTS of Ukraine (disputed in arbitration, possible contract price since 2019);
P_s is the GTS of Slovakia (open information disclosed by the operator Eustream);
P_{ch} is the GTS of the Czech Republic (open information disclosed by the operator Net4gas);

The difference is 26.2 USD.

Delivery to the Austrian transfer point Baumgarten (Nord Stream):

$P_t = P_{ns} + P_g + P_{ch} + P_s = 16.9 + 7.8 + 6.3 + 5 = 36$ USD

P_{ns} is the price for transit via the Nord Stream 2 gas pipeline;
P_g is the GTS of Germany (open information disclosed by the operator Gascade);
P_{ch} is the GTS of the Czech Republic (open information disclosed by the operator Net4gas);
P_s is the GTS of Slovakia (open information disclosed by the operator Eustream);

Delivery to the German transfer point Waidhaus (via Ukraine):

$P_t = P_u + P_s + P_{ch} = 45 + 6.3 = 51.2$ USD

P_u is the new tariff of GTS of Ukraine (disputed in arbitration, possible contract price since 2019);
P_s is the GTS of Slovakia (open information disclosed by operator Eustream);

The difference is 15 USD.

A similar situation relates to comparing the price of gas transit through the territory of Ukraine and the territory of Turkey.

Gas for Turkey (Turkish Stream): 8.59 USD
Gas for Turkey (via the territory of Ukraine):

$P_t = P_u + P_r + P_b = 45 + 5.2 + 5.8 = 56$ USD

P_r is the GTS of Romania (open information disclosed by the operator Transgaz);
$P_{b\ is\ the}$ GTS of Bulgaria (open information disclosed by the operator Bulgartransgaz EAD);

The difference is 47.41 USD.

Gas for Italy and Greece (Turkish Stream): 8.59 USD (the transfer point will be on the border of Turkey with Greece or Bulgaria).

Gas for Italy and Greece (via the territory of Ukraine):

$P_t = P_u + P_s = 45 + 6.2 = 51.2$ USD

The difference is 42.61 USD.

Gas for Hungary (Turkish Stream):

$P_t = P_{ts} + P_b + P_b = 8.59 + 5.8 + 5.8 = 20.19$ USD

P_b is the GTS of Serbia (Bulgaria's data);

Gas for Hungary (via the territory of Ukraine): 45 USD.

The difference is 24.81.

4. Discussion

Until 2020, the gas transmission system Turkish Stream can be loaded no more than 16 billion cubic meters. The second line can only be loaded as a result of investments in infrastructure in the EU territory by consumer countries, since for Gazprom, according to the Third Energy Package, it is economically impractical to invest.

Accordingly, currently the transit risk for the EU countries is quite high, since the contracts for supply of gas significantly exceed the term of the contract for transit through the territory of Ukraine (2019). A short-term extension of this contract may be a certain compromise, within which Russia will seek to reduce the volume of transportation and minimize investment in transit facilities in Europe. The lack of agreements between Russia and Ukraine could be the beginning of a "crisis of European contracts", which in turn could lead to significant problems with gas supplies.

It is also worth noting that the purchase of natural gas through the Nord Stream and Turkish Stream gas pipelines will allow Gazprom to reduce the price. In the conditions of stable consumption of gas in Europe, the price reduction will be one of the key factors for the support and development of the national industries and possible price reduction or keeping price level for the end users, which in turn will lead to economic stability, so necessary now for the European countries.

In turn, the implementation of the Turkish Stream project and the transit of Azerbaijani gas strengthen Turkey's position as a transit country, which will force Gazprom to pursue a more flexible pricing policy to counter the competitors. In 2016 and 2017, there was a trend of increasing gas demand in Europe, due to the increased demand for gas in the industrial and power sectors in these countries, as well as the low level of gas reserves in the UGS. The change in demand in the future will depend on the economic situation in Europe, the overall policy of the EU countries in the field of nuclear and renewable energy, the number and cost of greenhouse gas emission quotas.

According to the estimates of the International Energy Agency (IEA), having the world's largest gas reserves and occupying one of the leading places in oil reserves, Russia is ready to make a significant contribution to meeting the needs of the world economy, and especially the economies of Europe. Cooperation between Russia and the EU is an integral part of guaranteeing the security of energy supply in the long term.

5. Acknowledgement

The publication has been prepared with the support of the «RUDN University Program 5-100» in the frame of the project "Improvement of marketing tools to support and expand the import of consumer goods in the real sector of the Russian economy".

6. Conclusion

At present, the EU countries are afraid of transit gas risks associated, above all, with the Nord Stream 2 gas pipeline. However, the threat of risk occurrence is most likely, on the contrary, in the case of gas transit through the territory of Ukraine and non-launch of the Nord Stream 2 gas pipeline. In this case, the economic and energy security of the countries of Europe, and especially of Eastern Europe, is under considerable threat. The given threat is caused, first of all, by considerable economic and political instability, which is typical for Ukraine.

With fairly stable consumption of gas by European countries, analyzed in the methodology section, it is important to ensure its stable supply. The political situation in Ukraine does not allow giving long-term forecasts about stable management of the country's gas transportation system, while its general

deterioration and lack of modernization also testify to the technical risks of gas transit. Also, one should not forget about the economic threat, which is generally connected with the insolvency of the country.

For the EU countries, in addition to the impact of transit risk, the important component is the price of transit, which affects the total price paid by the country when buying gas. In the methodology section, the options for prices for transit through the territory of Ukraine were calculated, using the gas transmission systems Nord Stream 2 and Turkish Stream. Accordingly, this calculation showed a significant benefit of acquiring gas supplied through the Nord Stream 2 and Turkish Stream pipelines, in contrast to the purchase of gas supplied through the territory of Ukraine.

Diversification of risks is an important component for the economic and energy security of European countries, which determines the importance and relevance of constant monitoring of gas supply problems in the future.

References:

Bibarsov, R.K., Khokholova, I.G. and Okladnikova, R.D. 2017. Conceptual Basics and Mechanism of Innovation Project Management. European Research Studies Journal, 20(2B), 224-235.

Bushuev, V.V. 2012. Energy of Russia. Vol. 2: Energy Policy of Russia (Energy Security, Energy Efficiency, Regional Energy, Electric Power). Moscow: ITs Energiya, p. 616.

What Will Russia Lose Refusing from Gas Pipelines Bypassing Ukraine? 2017. Retrieved from https://eadaily.com/ru/news/2017/08/04/chto-poteryaet-rossiya-esli-otkazhetsya-ot-gazoprovodov-v-obhod-ukrainy

Danilina, E.I., Gaifutdinova, E.S. and Kuznetsof, N. 2015. Reduction in Budgetary Expenditure on Social Services as one of the Russian Economy Stabilization Plan Direction. European Research Studies Journal, 18(4), 247-260.

Energy Strategy of Russia for the Period till 2035. 2015. Retrieved from http://www.energystrategy.ru/ab_ins/source/ES-2035_09_2015.pdf

European Energy Security Strategy. 2014. Retrieved from https://ec.europa.eu/energy/doc/20140528_energy_security_communication.pdf

Eurostat. (n.d.). Database. Retrieved from http://ec.europa.eu/eurostat/portal/page/portal/energy/data/database

Konoplyanik, A.A. 2017. Quo Vadis: Assessment of the Effectiveness of the Third EU Package or the Preparation of a New Curzon Line?. Retrieved from http://www.konoplyanik.ru/ru/publications/konoplyanik_ngp4-2017-final%20printed%20version-part1%20of%203.pdf

PAO Gazprom. 2017. Annual Report of PAO Gazprom for 2016. Retrieved from http://www.gazprom.ru/f/posts/36/607118/gazprom-annual-report-2016-ru.pdf

Pugachev, A.A., Parfenova, L.B., Vakhrushev, D.S., Volkov, A.Yu. and Kalsin, A.E. 2017. Minimization of the Competitive Risk of the Tax System for Improving Public Administration at National and Regional Levels. European Research Studies Journal, 20(4A), 515-530.

Vetrenko, P.P., Mordovets, V.A. and Yaluner E.V. 2017. Development of Intellectual Capital in the Russian Economy to Ensure the Economic Security of a Corporation Under Competition. European Research Studies Journal, 20(4A), 604-618.

Zobov, A.M., Degtereva, E.A., Chernova, V.Y., Starostin, V.S. 2017. Comparative Analysis of the Best Practices in the Economic Policy of Import Substitution. European Research Studies Journal, 20(2), 507-520.