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In Times of Pandemic and War: Security of Natural Gas Supplies to Consumers in Romania and Bulgaria (January 2020 – August 2023)

W czasach pandemii i wojny. Bezpieczeństwo dostaw gazu ziemnego do odbiorców w Rumunii i Bułgarii (styczeń 2020 – sierpień 2023)

Summary

Until April 2022, by far the largest external supplier of gas to Bulgaria and Romania was Russia. For Bulgaria, Russian gas was of primary importance; for Romania, it supplemented its own production. In this article, the extent to which the pandemic, the energy crisis, and the armed conflict affected the availability of gas for Bulgarian and Romanian customers was compared. In 2020, in Bulgaria and Romania, the security of gas supplies to consumers was compromised by, among other things, an increase in gas consumption, a further decline in gas production in both countries, and declining transit through their territories. The expansion of their infrastructure after April 2022 accelerated the implementation of measures planned before 2020. Bulgaria focused on diversifying its supplies through Greece and Turkey. Romania, among other actions, continued its efforts to build infrastructure enabling it to exploit gas resources from fields under the Black Sea bed.

Keywords: energy security; natural gas; Romania's energy security; Bulgaria's energy security; gas infrastructure

Streszczenie

Do kwietnia 2022 roku zdecydowanie największym zewnętrznym dostawcą gazu ziemnego do Bułgarii i Rumunii była Rosja. Dla Bułgarii gaz rosyjski miał znaczenie podstawowe. W Rumunii uzupełniał własne wydobycie. Porównano, w jakim stopniu pandemia, kryzys energetyczny i konflikt zbrojny wpłynęły na dostępność gazu dla odbiorców bułgarskich i rumuńskich. W 2020 roku w tych krajach bezpieczeństwo dostaw gazu do odbiorców pogorszył m.in. wzrost jego konsumpcji, dalszy spadek wydobycia (w Bułgarii i Rumunii) i tranzytu przez te kraje. Rozbudowa infrastruktury po kwietniu 2022 roku była w dużej mierze przyspieszeniem realizacji działań zaplanowanych

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przed 2020 rokiem. Bułgaria skupiła się na dywersyfikacji dostaw za pośrednictwem Grecji i Turcji. Rumunia m.in. kontynuowała starania o zbudowanie infrastruktury umożliwiającej wykorzystanie gazu ze złóż pod dnem Morza Czarnego.
Słowa kluczowe: bezpieczeństwo energetyczne; gaz ziemny; bezpieczeństwo energetyczne Rumunii; bezpieczeństwo energetyczne Bułgarii; infrastruktura gazowa

Introduction

Bulgaria and Romania are among the countries of particular importance for the EU authorities' energy policy. Carrying out a comparative analysis of these countries in terms of the security of natural gas supplies to domestic consumers is justified by a number of similarities in the economies of these countries.

The two countries have similar GDP per capita. In December 2022, they ranked last in the EU in this respect.[1] Differences in the sizes of their economies are partly offset by Bulgaria's 50% higher per capita primary energy consumption (data for 2021).[2] In 2021, Bulgaria and Romania were among the EU countries with record-breaking final energy consumption by product.[3] The analysed countries are strongly economically linked to each other, as well as to Germany, Turkey, and until 2022, Russia (in terms of imports).[4]

Declining extraction of energy resources in Bulgaria and Romania over the past several years has made these countries more dependent on imports. Their opportunities for import diversification are limited by their direct access only to a semi-landlocked sea, that is, the Black Sea.

Due to the layout of their gas transmission networks, both countries used to be (and with respect to Hungary and Serbia, for example, still are) important intermediaries in the overland transmission of Russian gas. At the same time, the development of their gas infrastructure is influenced by the fact that they share their longest state borders with each other.

The governments of both countries have de facto complete control over key national gas production and transmission companies. In their energy policies, they have to take into account the presence of forces that oppose firm energy policy toward Russia in their

1 Trading Economic, *PKB per capita* https://pl.tradingeconomics.com/country-list/gdp-per-capita [accessed: 3.08.2023].

2 *BP Statistical Review of World Energy 2022*, London 2023, p. 11.

3 Final Energy Consumption by Product, https://ec.europa.eu/eurostat/databrowser/view/TEN00123/default/table?lang=en&category=nrg.nrg_quant.nrg_quanta.nrg_bal [accessed: 2.08.2023].

4 Romania: Trade Statistics, https://globaledge.msu.edu/countries/romania/tradestats [accessed: 2.08.2023]; Bulgaria: Trade Statistics, https://globaledge.msu.edu/countries/bulgaria/tradestats [accessed: 2.08.2023].

own territories (the case of Bulgaria[5]) or in their immediate political environment (the Hungarian authorities and the pro-Russian groups in Moldova in the case of Romania).

The reasons listed above prompted the author of this text to compare the extent to which the pandemic, the energy crisis, and the armed conflict have affected the availability of gas for Bulgarian and Romanian consumers, as well as the related implementation of major infrastructural investments in the gas sector, which has been promised for years.

The article uses the analytical-synthetic method and elements of system analysis.

A number of valuable observations on the energy policies of Bulgaria and Romania can be found in the source literature, in which the context of the energy policies of both countries (e.g. the EU's environmental and climate policies[6]) and the liberalisation of the gas sector[7] is analysed. As far as the security of gas supplies to consumers in these countries is concerned, the most valuable texts were written by Ł. Wojcieszak, A. Andreev, A. Łoskot-Strachota, Ł. Kobieszko, and K. Całus.[8] However, the literature lacks a synthetic comparative analysis focusing on the security of gas supplies to domestic consumers in the years 2020-2023.

The chronological boundaries of this text are set by serious concerns about gas supplies to EU consumers in the face of worsening Ukrainian-Russian relations in the winter of 2019/2020, the launch of the TurkStream pipeline in January 2020, and the beginnings of the COVID-19 pandemic in the EU. The analysed period ends in August 2023, when it became clear that both countries had secured their gas supplies for domestic consumers for the coming heating season.[9]

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5 V. Samsonov, *The Geopolitics of Russia's Natural Gas Exports in the Context of European Sanctions during the Ukrainian Crisis*, p. 23-30, https://doi.org/ 10.13140/RG.2.2.17630.92486.

6 R. Youngs, O. Lazard, *Climate, Ecological and Energy Security Challenges Facing the EU. New and Old Dynamics*, in: *Handbook on European Union Climate Change Policy and Politics*, ed T. Rayner, K. Szulecki, A. Jordan et al., Cheltenham 2023, p. 158-172.

7 i.a. M. Busu, A.C. Nedelcu, *The Liberalization Process of the Natural Gas Market in Romania*, in: *Conference: 8th SWS International Scientific Conferences On Social Sciences – ISCSS Proceedings*, vol. 8, Vienna 2021, p. 119-126.

8 Ł. Wojcieszak, *Ewolucja bezpieczeństwa gazowego Bułgarii – studium przypadku*, „Zeszyty Naukowe PWSZ w Legnicy", 2021, no. 40 (3), p. 57-69; А. Андреев, *Място и роля на енергийната сигурност в бизнеса на Република България*, "Икономическа Мисъл" [A. Andreev, *Myasto i rolya na energiynata sigurnost v biznesa na Republika Bălgariya*, "Ikonomicheska Misăl"], 5 (2021), p. 22-38; K. Całus, A. Łoskot-Strachota, *BRUA i rumuńskie pomysły na środkowoeuropejski rynek gazu*, 24.11.2020, www.osw.waw.pl/pl/publikacje/komentarze-osw/2020-11-24/brua-i-rumunskie-pomysly-na-srodkowoeuropejski-rynek-gazu#_ftn12 [accessed: 24.07.2023]; Ł. Kobeszko, A. Łoskot-Strachota, *Bułgaria po wstrzymaniu dostaw rosyjskiego gazu*, 13.05.2022, www.osw.waw.pl/pl/publikacje/analizy/2022-05-13/bulgaria-po-wstrzymaniu-dostaw-rosyjskiego-gazu [accessed: 24.07.2023]; eidem, *Bułgaria. Zima bez rosyjskiego gazu*, 23.12.2022, www.osw.waw.pl/pl/publikacje/analizy/2022-12-23/bulgaria-zima-bez-rosyjskiego-gazu [accessed: 24.07.2023]; Ł. Kobeszko, A. Łoskot-Strachota, A. Michalski, *Bułgaria zacieśnia współpracę gazową z Turcją*, 11.01.2023, www.osw.waw.pl/pl/publikacje/analizy/2023-01-11/bulgaria-zaciesnia-wspolprace-gazowa-z-turcja [accessed: 21.07.2023].

9 The status of the research discussed in the article is presented as of 20 September 2023.

1. The energy mix of Bulgaria and Romania in 2019

It should be emphasised here that the energy mixes of both countries have a very large share of coal and nuclear energy. These come mostly from the nations' own resources. For example, ¾ of the electricity consumed in Bulgaria come from Bulgarian coal and nuclear power.[10]

The countries under discussion have long been distinguished by the proportion of energy resources exploited in them. In this respect, much larger amounts of oil and gas are extracted in Romania than in Bulgaria, and the latter has a markedly higher extraction and consumption of coal. That being said, before 2020 Bulgaria was, in some aspects, more successful in improving its energy efficiency than Romania,[11] where gas consumption per population equivalent was higher. Also, in Bulgaria, industry had a higher percentage share in gas consumption, and gas prices between 2016 and 2020 were consistently lower than the EU-28 average.[12]

As can be seen from Il. 1 and 2, the importance of gas in the energy mixes of the two countries over the last 30 years has declined several times. It should be noted, however, that this downward trend slowed down after both countries joined the EU in 2007.

In 2019, Romania satisfied approximately 90% of its need for gas (10 bcm per year) from onshore fields,[13] and compensated for the shortfall by importing this raw material from Russia. However, there has been a steady decline in gas production in Romania over the last five years.

Bulgaria's dependence on gas imports from Russia is far greater. Despite the authorities' efforts, in the years 2013-2022 gas production from conventional onshore fields in Bulgaria fell more than 22 times.[14] In 2019, it met only 1% of the country's demand[15] and was expensive[16] because of its low efficiency.

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10 А. Андреев, *Място и роля на енергийната сигурност в бизнеса на Република България*, p. 34.

11 T. Mirowski, *Energy Efficiency*, in: *Energy Policy Transition. The Perspective of Different States*, ed. M. Ruszel, T. Młynarski, A. Szurlej, Rzeszów 2017, p. 84.

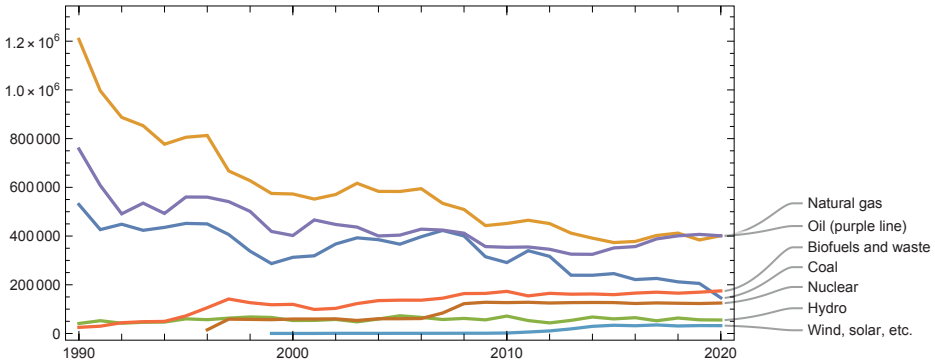
12 A.F. Erias, E.M. Iglesias, *The Daily Price and Income Elasticity of Natural Gas Demand in Europe*, "Energy Reports", 8 (2022), p. 14601.

13 D.N. Fita, D. Pasculescu, F.G. Popescu et al., *National Power Grid from Romania. An Approach to Energy Security Strategy*, "New Trends in Physical Science Research", 3 (2022), p. 27.

14 *Бюлетин за състоянието и развитието на енергетиката на република България през 2022 г.* [*Byuletin za săstoyanieto i razvitieto na energetikata na Republika Bălgariya prez 2022 g.*], p. 5, www.me.government.bg/uploads/manager/source/VOP/Buletin_Energy-2023-25.04.2023_1_1.pdf [accessed: 9.09.2023].

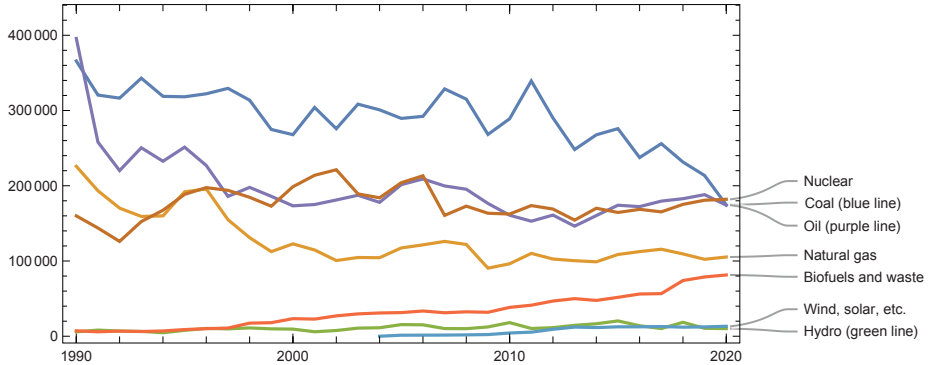
15 Е. Йонева, *Енергийната сигурност в Югоизточна Европа в контекста на пандемичната геополитика* [E. Yoneva, *Energiynata sigurnost v Yugoiztočna Evropa v konteksta napandemičnata geopolitika*], www.researchgate.net/publication/359143402_Energijnata_sigurnost_v_Ugoiztocna_Evropa_v_konteksta_na_pandemicnata_geopolitika [accessed: 15.08.2023].

16 P. Zlateva, S. Demirova, *Logistics Chain of Natural Gas in Bulgaria*, "Acta Technica Corviniensis. Bulletin of Engineering", 9 (2016), fasc. 4, p. 68-69.



Il. 1. Total energy supply in TJ by source, Bulgaria 1990-2020.

Data source: IEA, Bulgaria, https://www.iea.org/countries/bulgaria [accessed: 3.07.2023].



Il. 2. Total energy supply in TJ by source, Romania 1990-2020.

Data source: IEA, Romania, https://www.iea.org/countries/romania [accessed: 3.07.2023].

Due to Russia's counteractions and the influence of pro-Russian factors, in Bulgarian territory no significant shale gas fields were exploited. In 2019, Bulgaria, for the first time, obtained gas from as many as 7 different countries. Gas import negotiations were conducted with Turkey, and exploration work was underway in Bulgaria's economic zone on the Black Sea.[17] However, Russian gas accounted for a whopping 85.7% (2,778 mcm) of domestic consumption of this commodity.

Geological surveys indicate that, in the long term, it is impossible to stop the decline in production from conventional onshore fields in both countries.[18] The situation is

17 *Successful End of the Third Drill of 1-21 Khan Asparuh Block, 2019*, https://bonmarine.com/projects/successful-end-of-the-third-drill-of-1-21-khan-asparuh-block [accessed: 9.09.2023].

18 M. Paszkowski, *Perspektywy wzrostu wydobycia gazu ziemnego w państwach Europy Środkowej*, "Komentarze IEŚ", 2022, no. 598, May 10, p. 1, https://ies.lublin.pl/komentarze/perspektywy-wzrostu-wydobycia-gazu-ziemnego-w-panstwach-europy-srodkowej/ [accessed: 23.09.2023].

much better with regard to fields located under the Black Sea bed. In Romania's exclusive economic zone, natural gas reserves amount to approximately 170-200 bcm. The most important field is Neptun Deep (see Il. 3). For two fields located closer, the start of production was planned for 2020-2022.

Closely linked to the planned offshore gas production is the BRUA gas pipeline, which has been under construction since 2018 (see Il. 3). Among other things, it is intended to ensure Romania's independence from imports during an average heating season (which usually accounts for ⅔ of its annual gas consumption) and, through Bulgaria, diversification of its supplies thanks to access to Azeri gas and LNG.[19] The first phase of the construction was more than 80% financed from EU funds and loans from its banks.

Gas extraction from conventional fields under Bulgaria's Black Sea economic zone was suggested a dozen or so years ago.[20] The gas reserves there are considerably smaller than those of Romania. Their exploitation was mainly prevented by the lack of political will on the part of some authorities, the low price of Russian gas, and the need to bring in investors from outside Bulgaria. Unlike Romania,[21] Bulgaria had a significant surplus in electricity production.[22]

The transmission infrastructure of the analysed countries was mainly adapted to importing and intermediating in the transmission of gas from Russia to other Balkan countries and Turkey. Once the possibility of real reversion was introduced, Bulgaria was able to import gas from outside Russia via Greece and Turkey, and had advanced projects of connecting its systems with those of Greece and Serbia.[23] Among those projects, it was the second gas pipeline connecting Greece and Bulgaria that was of special importance (the IGB, see Il. 3). At the time, its target flow capacity was planned at 3-5 bcm of gas per year. The commodity was to be sourced from LNG terminals in Turkey and Greece. There were plans to import much more gas to Bulgaria than was needed by domestic consumers because the BRUA and IGB pipelines increased the importance of Bulgaria as a supplies intermediary. Among the major challenges in building the gas transmission

19 К. Албу, *Стратегические интересы Румынии в Черноморском регионе. Аспекты энергетической безопасности*, "Проблемы постсоветского пространства" [K. Albu, *Strategicheskie interesy Rumunii v Chernomorskom regione. Aspekty energeticheskoy bezopasnosti*, "Problemy Postsovietskogo Prostranstva"], 5 (2018), p. 73-74, 76.

20 B. Nitzov, R. Stefanov, V. Nikolova et al., *The Energy Sector of Bulgaria*, p. 2, www.files.ethz.ch/isn/114810/BulgariaEnergy_ECIssueBrief.pdf [accessed: 23.08.2023].

21 *Hungary Electricity Security Policy*, https://www.iea.org/articles/hungary-electricity-security-policy [accessed: 9.08.2023].

22 А. Андреев, *Място и роля на енергийната сигурност в бизнеса на Република България*, p. 33.

23 A. Borówka, *Three Seas Initiative Capabilities in Terms of Diversification of Natural Gas Supply versus Russian Federation Foreign Policy. A Geopolitical Approach*, "Scientific Journal of the Military University of Land Forces", 52 (2020), no. 3 (197), p. 503, 506-507.

infrastructure was widespread corruption in the country and managing such a large investment.

Despite the small reserves in the gas storage facilities of neighbouring countries, Bulgaria's significant role as a gas supply intermediary resulted in postponing the expansion of its gas storage capacity from 550 mcm to 1 bcm (see Il. 4), which had already been planned a dozen or so years earlier.[24] In 2013, this expansion was included in the list of EU projects. Assessed in terms of a country's annual need for gas (see Il. 1, 2), the Romanian storage facilities (see Il. 4) were ¼ more capacious than the Bulgarian ones.[25] The use of the very large capacity of Ukrainian and Hungarian underground gas storage facilities was made more difficult for Romania by the consequences of Russia's policy toward Ukraine and Romania's political conflict with Hungary.[26]

2. The pandemic and increasing tensions in Russia-West relations (January 2020 – February 2022)

In 2020, there were no drastic changes in the energy mix of Bulgaria or Romania.[27] In 2021, both countries ranked first among the 14 largest European producers of coal in terms of an increase in its extraction. In both cases, the extraction was lower than the consumption.

The growth dynamics of the analysed countries' gas consumption in 2020–2021 differed (see Table 1). At the same time, both countries diverged from the average of the UE (5.7%) and other Balkan countries. Meanwhile, in 2021, the consumption of nuclear energy in Bulgaria and Romania decreased by 1% and 1.7%, while that of hydropower increased by 58.9% and 9.8% respectively. [28]

Despite international efforts toward energy transition,[29] in 2021 energy production from other RES in both countries declined by 0.6% and 2.3% respectively.[30] It thus deviated from the average growth in their production and consumption on the continent (2.9% and 2.6%). Due to natural conditions, in 2021 RES accounted for 20% in Bulgaria

24 B. Nitzov, R. Stefanov, V. Nikolova et al, *The Energy Sector of Bulgaria*.

25 *GIE Storage Map*, www.gie.eu/publications/maps/gie-storage-map/ [accessed: 30.08.2023].

26 Cf. P. Visnovitz, E.K. Jenne, *Populist Argumentation in Foreign Policy. The Case of Hungary under Viktor Orbán, 2010-2020*, "Comparative European Politics", 19 (2021), p. 683-702.

27 *Total Energy Supply*, 2020, https://www.iea.org/regions/europe [accessed: 7.08.2023].

28 *BP Statistical Review of World Energy 2022*, p. 37, 41, 42.

29 Е. Йонева, *Енергийната сигурност в Югоизточна Европа в контекста на пандемичната геополитика*, p. 1.

30 *BP Statistical Review of World Energy 2022*, p. 44.

and 44% in Romania.[31] The decrease in electricity generation in both Bulgaria and Romania during the first year of the pandemic was quite moderate and similar in magnitude (3.3 TWh and 3.7 TWh respectively).[32]

Despite the pandemic, the construction of the first part of BRUA continued. The first phase of the project envisaged the possibility of transporting gas, among others, to Bulgaria (1.5 bcm). In September 2020, the construction of the pipeline to transport gas from offshore fields to BRUA began. The announced dates of its completion in 2021 were unrealistic.

The main reasons for the delays in the implementation of the plans to exploit the Romanian offshore fields were the high taxation on the investors, international disputes about the second phase of the BRUA construction,[33] and the scale of the use of the Turk-Stream.

At the same time, gas production was falling in both countries, as exemplified by a 1.3% decrease in Romania in 2021.[34] In the case of Bulgaria, the proven presence of gas hydrates in its territorial waters made little difference.[35]

In 2020, in both countries, another important reason for delaying decisions related to investments enabling diversification of gas supplies and sources[36] was the EU's reluctance to subsidise investments in gas infrastructure.[37] In Romania, the postponement of legal changes favourable to entities investing in offshore production was additionally influenced by the unstable political situation.

Following the divide-and-rule principle and the difficult situation on the gas market, on 2 March 2020 Russia made major concessions to Bulgaria (compared with other Central European customers) when determining a new way of setting its gas prices.[38] Therefore, imports via the Revithoussa LNG terminal in Greece and, from 2021, under

31 K.A. Firlej, M. Stanuch, *Forecasting the Development of Electricity from Renewable Energy Sources in Poland against the Background of the European Union Countries*, "Economics and Environment", 84 (2023), no. 1, p. 34.

32 *BP Statistical Review of World Energy 2022*, p. 50.

33 K. Całus, *Rumunia. Nowy projekt ustawy o eksploatacji szelfu czarnomorskiego*, 21.04.2022, www.osw.waw.pl/pl/publikacje/analizy/2022-04-21/rumunia-nowy-projekt-ustawy-o-eksploatacji-szelfu-czarnomorskiego [accessed: 20.07.2023]; K. Całus, A. Łoskot-Strachota, *BRUA i rumuńskie pomysły na środkowoeuropejski rynek gazu*.

34 *BP Statistical Review of World Energy 2022*, p. 15.

35 E. Marinovska, R. Pehlivanova, N. Botoucharov, *Potential Source Rocks, Hydrocarbon Migration and Reservoir Rocks of Gas Hydrates in the Bulgarian Part of Western Black Sea Basin – 3D Neozoic Model*, in: *Abstract Book of 37th TSOP Annual Meeting, Sofia 12-14 Sept. 2021*, ed I. Kostova, A. Zdravkov, N. Botoucharov et al, Sofia 2021.

36 А. Андреев, *Място и роля на енергийната сигурност в бизнеса на Република България*, p. 36.

37 Ł. Wojcieszak, *Ewolucja bezpieczeństwa gazowego Bułgarii – studium przypadku*, p. 65.

38 Ibidem, p. 61-62.

Tab. 1. Natural gas consumption in Bulgaria and Romania in 2018-2021 (in billions of m^3)

	2018	2019	2020	2021	Growth rate per annum 2011-2021	Growth rate per annum 2021
Bulgaria	3.0	2.8	2.9	3.3	0.8%	13.4%
Romania	11.6	10.8	11.3	11.4	−1,2%	1,8%
Total Europe*	547.4	554.5	542.0	571.1	−0.2%	5.7%

* Without the Commonwealth of Independent States
Source: *BP Statistical Review of World Energy 2022*, London 2023, p. 31.

Il. 3. BRUA project and key gas infrastructure in Central and Southeast Europe.
Source: K. Całus, A. Łoskot-Strachota, *BRUA i rumuńskie pomysły na środkowoeuropejski rynek gazu*.

a 25-year contract, imports of Azeri gas, were merely of supplementary importance. In 2020, Russia's participation in gas imports to Bulgaria dropped to 76%.[39]

Probably due to the favourable conditions of the long-term contract, in the face of rising prices, in 2021 the share of Russian gas offered to Bulgarian consumers increased

39 M. Seroka, *Asertywność wspomagana. Przemiany polityki Bułgarii wobec Rosji*, Warszawa 2021 (Punkt Widzenia, no. 86), p. 28.

to 88.88% (2,934 bcm). Azeri gas accounted for 8.15% (269 mcm).[40] Because of infrastructural limitations, imports of the whole contracted amount of Azeri gas (1 bcm) were not yet possible[41] by land.

In 2021, gas production in Romania fell to 8.9 bcm (82% of its consumption). This was influenced, among other things, by low gas prices. Most of the missing gas was imported from Russia and some of it from Azerbaijan.[42]

Gas transmission to Bulgaria via Ukraine was stopped in January 2020. As for Romania, it was stopped on 1 April 2021. However, supplies via the TurkStream began.[43]

In 2021, there was a threefold increase in gas transmission through Bulgaria compared to 2020. It reached 9,689 bcm. Of this, 32% was the gas sent to Romania (and Hungary).[44]

In July 2021, Bulgarian media assured consumers that the country's gas storage facility would be expanded by 2025 and stressed that the authorities planned to use it not only for their own consumers but also for North Macedonia and Greece.[45] This was to indirectly increase the security of supplies for Bulgarian consumers. Russia's gas policy influenced the tightening of security procedures at Bulgaria's only storage facility in October 2021. In 2021, Romania planned to increase its underground gas storage capacity by more than ¼.[46]

In 2020 and 2021, the pandemic, the energy crisis, and the armed conflict resulted in a slower pace of expansion of gas transmission infrastructure in Bulgaria and Romania. Yet, in 2021 both countries saw an increase in the number of households using gas. For example, supported by the expansion of distribution infrastructure, the 2021 share of Bulgarian households in gas consumption increased from 23% to 25% (y/y).[47] The continued predominance of energy from coal power plants and nuclear power plants in the energy mix of Bulgaria and Romania did not prevent their growing dependence on gas imports.

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40 *Бюлетин за състоянието и развитието на енергетиката на република България през 2021 г.* [*Byuletin za săstoyanieto i razvitieto na energetikata na Republika Bălgariya prez 2021 g.*], p. 7, www.me.government.bg/uploads/manager/source/VOP/buletin_systoqnie_energetika/Buletin_Energy-Finish-20.06.2022.pdf [accessed: 23.09.2023].

41 Ł. Wojcieszak, *Ewolucja bezpieczeństwa gazowego Bułgarii – studium przypadku*, p. 62-63.

42 M. Paszkowski, *Perspektywy wzrostu wydobycia gazu ziemnego w państwach Europy Środkowej*, p. 1.

43 Е. Йонева, *Енергийната сигурност в Югоизточна Европа в контекста на пандемичната геополитика*, p. 15.

44 *Бюлетин за състоянието и развитието на енергетиката на република България през 2021 г.*, p. 18.

45 *Газохранилище "Чирен" – ключов обект не само за България* [*Gazohranilište „Čiren" – klyučov obekt ne samo za Bălgariya*], https://btvnovinite.bg/bulgaria/gazohranilishte-chiren-kljuchov-obekt-ne-samo-za-balgarija.html [accessed: 24.08.2023].

46 *GIE Storage Map*, www.gie.eu/publications/maps/gie-storage-map/ [accessed: 24.08.2023].

47 *Бюлетин за състоянието и развитието на енергетиката на република България през 2021 г.*, p. 18; *Бюлетин за състоянието и развитието на енергетиката на република България през 2022 г.*, p. 17.

Il. 4. Distribution of underground gas storage facilities in Bulgaria and Romania in 2021.
Source: GIE Storage Map.

3. The impact of the war in Ukraine

The scale of the gas price increase caused by Russia's policy threatened Bulgaria and Romania with gas rationing or the destruction of demand for this resource in wintertime. In that situation, gas consumption by domestic consumers, especially households, was subsidised, much like in other countries.[48]

In Romania, this resulted in a change in the structure of demand and the number of gas consumers. The consumption of gas by the industry was similar, but it was accompanied by a dynamic increase in the case of households. In April 2023, the latter used

48 *Extension of Electricity Price Ceiling of BGN 250/MWh*, 20.04.2023, https://www.iea.org/policies/17372-extension-of-electricity-price-ceiling-of-bgn-250mwh?s=1 [accessed: 23.09.2023]; *Extension of Electricity and Gas Price Caps until August 2023*, 9.05.2023, https://www.iea.org/policies/17406-extension-of-electricity-and-gas-price-caps-until-august-2023?s=1 [accessed: 23.09.2023]; *Subsidy for Household Energy Bills*, 9.05.2023, https://www.iea.org/policies/17407-subsidy-for-household-energy-bills [accessed: 23.09.2023].

44.64% of gas and accounted for 95.04% of its consumers.[49] The reason was the favourable price of natural gas for customers in 2020 and the first quarter of 2021. In Bulgaria, the trends were different. In 2022, the overall consumption fell by 11% (y/y). Compared to 2021, the amount of gas transmitted through distribution networks decreased by 19% (to 2.940 bcm).[50]

Nonetheless, the energy crisis was more noticeably reflected in the number of Romanian households affected by energy poverty. In 2022, it increased by 5.1% (the largest increase in the EU). In Bulgaria, the trend in home heating was the opposite.[51] This fact notwithstanding, Bulgaria retained its first place in the EU in terms of energy poverty.[52]

In the literature on the subject, there is an opinion that the increase in energy consumption by citizens due to lockdowns (e.g. due to remote working), resulting in peak gas demand, will be permanent.[53]

Anticipating a reduction or suspension of gas supplies from Russia from at least March 2022, Bulgaria was intensively searching for alternative suppliers of this commodity. In mid-April 2022, the government extended, by two years, the permission for gas exploration in the Bulgarian part of the Black Sea.[54] On 27 April – the day when Russia ended its supplies of gas to Bulgaria – Greece offered Bulgaria, among other things, gas supplies across their shared border (starting the next day) as well as an extension of its imports via the Revithoussa LNG Terminal. Bulgaria was also guaranteed 10-year transmission of about 500 mcm of gas per year[55] (1/6 of its annual demand) via the second Gas Interconnector Greece–Bulgaria (IGB), planned to be launched in September 2022.

Between 28 April and 5 May, the Bulgarian authorities held talks with the European Commission, Azerbaijan, and other countries in the region. In order to have a better position in negotations on the purchase of gas and to reassure its consumers, on 5 May the government aanounced its plans for joint Greek and Bulgarian LNG purchases.

On 10 May 2022, Bulgaria was promised LNG supplies from the US through the Revithoussa Terminal. The supplies started in June. From August, the US planned to supply

49 *Raport privind rezultatele monitorizării pieței de gaze naturale în luna aprilie 2023*, p. 17, 21, https://anre.ro/wp-content/uploads/2023/08/Raport-monitorizare-piata-gaze-naturale-luna-aprilie-2023.pdf [accessed: 23.09.2023].

50 *Бюлетин за състоянието и развитието на енергетиката на република България през 2022 г.*, p. 16.

51 *Inability to Keep Home Adequately Warm – EU-SILC Survey*, 20.07.2023, https://ec.europa.eu/eurostat/databrowser/view/ILC_MDES01__custom_137816/bookmark/bar?lang=en&bookmarkId=f4f90944-6627-4c6b-8035-f966532e2036 [accessed: 20.07.2023].

52 C.f. Т. Пенева, *Енергийната бедност в България. Измерения и фактори*, София 2022 [T. Peneva, *Energiynata bednost v Bălgariya. Izmereniya i faktori*, Sofia 2022].

53 A.F. Erias, E.M. Iglesias, *The Daily Price and Income Elasticity of Natural Gas Demand in Europe*, p. 14602.

54 M. Paszkowski, *Perspektywy wzrostu wydobycia gazu ziemnego w państwach Europy Środkowej*, p. 1.

55 Ł. Wojcieszak, *Ewolucja bezpieczeństwa gazowego Bułgarii – studium przypadku*, p. 59.

Bulgaria with gas under the March US–EU agreement. Efforts were also being made to obtain LNG from its other leading exporters (Qatar and Australia).

To calm domestic gas consumers down after Russia had cut off its supplies, the Bulgarian government emphasised that significant gas reserves were available from the Chiren storage facility.[56] As a result of Russia's policy, the anticipated date of completing the extension of the facility's storage capacity to 1 bcm was brought forward to the end of 2024. Although the project was officially launched at the turn of February 2023, the authorities postponed its completion date till 2025 due to the facilitiy's filling level and the mild winter.

An important role in calming Bulgarian consumers down was played by media reports about the possibility of extracting gas from under the Black Sea bed. One example of this was the news on 8 July 2023 that 13 bcm of the resource was available there.[57]

There are calculations according to which, in 2022, the shares of RES in the Bulgarian and Romanian mixes were 19.62% and 42.00% respectively. Despite the declarations made in February 2023 by, among others, the Bulgarian and Romanian governments that the development of RES would be accelerated, there is little chance of this disproportion being significantly reduced in the coming years.[58] The shares of RES will be adversely affected by coal, gas, and uranium prices being lower than in 2022.

When starting its gas war with Bulgaria, Russia counted on social and political divisions in Bulgaria regarding military aid to Ukraine and sanctions against Russia. These overlapped with the difficulties in electing and maintaining a stable parliamentary majority. Part of the opposition and the president demanded concessions to Russia because of the stability of its supplies and concern for the poorest consumers of gas.[59]

The lack of rapid war success increased the importance that Russia attached to the transmission pipelines transporting gas from the TurkStream in Turkey via Bulgaria and Romania to Hungary. They were a valuable alternative to supplies via Ukraine. In 2022, transmission of mainly Russian gas through Bulgaria to Serbia, North Macedonia, Romania, and Greece increased by 31% (y/y). This was primiarily due to the twofold increase in transmission to Serbia (from 28.82% to 60% of the total transmission)[60] – hence the hopes of the Bulgarian authorities that the suspension of supplies from the

56 Ł. Kobeszko, A. Łoskot-Strachota, *Bułgaria po wstrzymaniu dostaw rosyjskiego gazu*.

57 *Greece and Bulgaria Seek to Boots Cross-Border Gas Flows*, https://www.upstreamonline.com/energy-security/greece-and-bulgaria-seek-to-boost-cross-border-gas-flows/2-1-1481335 [accessed: 23.09.2023].

58 K.A. Firlej, M. Stanuch, *Forecasting the Development of Electricity from Renewable Energy Sources in Poland against the Background of the European Union Countries*, p. 38-39, 42, 43, 44, 45, 46.

59 Ł. Kobeszko, A. Łoskot-Strachota, A. Michalski, *Bułgaria zacieśnia współpracę gazową z Turcją*.

60 *Бюлетин за състоянието и развитието на енергетиката на република България през 2022 г.*, p. 17; *Бюлетин за състоянието и развитието на енергетиката на република България през 2021 г.*, p. 19.

main supplier was temporary. The geopolitical situation rendered fruitless the talks with Russia announced by the government in the summer of 2022.[61]

In light of the Ukrainian government's position, transfer of Russian gas via pipelines in Ukraine is only possible until 2024. Romania reduced its imports of Russian gas via the TurkStream in the spring of 2022. Until ⅔ of its gas storage facilities were filled in the summer of 2022, it had imported large quantities of Russian gas via Hungary.[62] Later, an important role was played by imports from other suppliers via Bulgaria.[63]

Russia's policy resulted in the EU reinstating preferential terms for investments in gas infrastructure and strengthening its cooperation with other gas exporters, such as the US and Azerbaijan.[64] This made it much easier for Bulgaria and Romania to strengthen their cooperation with Turkey, Azerbaijan, and Greece, as well as to conclude their LNG purchase contracts. In October 2022, the opening of the IGB and the approaching heating season forced Bulgaria to fully implement its pre-war contract with Azerbaijan, as well as to import US[65] and Russian LNG.[66] The gas delivered until April from Russia (almost 30% of Bulgaria's annual needs), the supplies via pipelines from Azerbaijan, and the LNG delivered via Greece and Turkey allowed Bulgaria's gas needs (just under 3 bcm) to be fully met until the end of 2022.

Bulgaria's procrastination in signing contracts with Turkey and Greece also resulted from shortages of gas on the market and its high price, the scale of gas imports from Russia to Turkey and Azerbaijan, vivid hopes among parts of the Bulgarian elite for negotiations with Russia and a quick end to its armed aggression, the mild winter, the transformation of Turkey and Greece into important international gas hubs,[67] and the diversification of gas transport routes through Turkey.

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61 Ł. Kobeszko, A. Łoskot-Strachota, *Bułgaria. Zima bez rosyjskiego gazu*.

62 *Hungary Natural Gas Security Policy*, https://www.iea.org/articles/hungary-natural-gas-security-policy [accessed: 10.08.2022].

63 *Raport privind rezultatele monitorizării pieței de gaze naturale în luna aprilie 2023*, p. 9.

64 R. Youngs, O. Lazard, *Climate, Ecological and Energy Security Challenges Facing the EU. New and Old Dynamics*, p. 167, 168.

65 Ł. Kobeszko, A. Łoskot-Strachota, *Bułgaria. Zima bez rosyjskiego gazu*; Ł. Kobeszko, A. Łoskot-Strachota, *Bułgaria zacieśnia współpracę gazową z Turcją*.

66 А. Акулов, *Болгария и Греция перешли на импорт сжиженного природного газа из России в октябре* [A. Akulov, *Bolgarija i Grecija pierieszli na import szyżennogo prirodnogo gaza iz Rossii w oktjabre*], www.gazeta.ru/business/news/2022/10/29/18908107.shtml?updated [accessed: 23.09.2023]; S. Ritter, *Russia, Turkey Double Down on Turk Stream*, www.energyintel.com/00000183-f97b-d82d-a3fb-fd7fdb9a0000 [accessed: 20.09.2023]; cf. EU Gas Supply, www.consilium.europa.eu/pl/infographics/eu-gas-supply/ [accessed: 20.09.2023].

67 For Turkey, the intermediation of Bulgarian (and Romanian) gas pipelines was essential. Indeed, given the tense Turkish-Greek relations, the alternative overland route of gas supplies via transmission pipelines deep into Europe (the EU, Ukraine, Serbia, Bosnia and Herzegovina, Moldova) is fraught with significant political risk.

An important role in the security of gas supplies to consumers in Bulgaria and Romania is played by the construction of the Greek FSRU Alexandroupolis, supported by the EU authorities and both countries, which started in May 2022, as well as the commissioning, in April 2023, of an FSRU in the Saros region of the European part of Turkey.[68] Agreements with Turkey and Greece regarding gas imports were signed by Bulgaria on 3 and 4 January 2023 respectively, including a 13-year agreement on 1.5 bcm of gas from Turkish LNG terminals.[69] According to some politicians, this agreement opened the way for Russian gas supplies.

As for Romania, it mainly focused on gas extraction. The exploitation of the Ana and Doina offshore fields started in June 2022, with a 15-month delay.[70] The plan was to extract 1 bcm of gas per year until 2026. However, the concurrent decline in production from onshore fields[71] made it impossible to meet Romania's growing demand (Il. 5 on next page). As a result, for example, a short-term contract was signed with Azerbaijan on 16 December 2022 for the import of 0.3 bcm in 2023.[72]

A decisive factor in Romania's complete self-sufficiency is the commencement of the expensive exploitation of the Neptun Deep offshore field.[73] Foreign investors promise the launch of a pipeline from this field to the BRUA corridor in 2025 and the start of production in 2027. However, they are not satisfied with the scale of the tax cut introduced in May 2022. Contrary to official assurances,[74] Romania's stance on Russia's aggression poses a serious threat to the planned production infrastructure. It seriously increases the risk of, among other things, cyber, drone, and secret-service attacks.

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68 H. Papachristou, *Turkey's Saros FSRU Completes First Ship-to-Ship Gas Transfer*, https://www.tradewindsnews.com/gas/turkey-s-saros-fsru-completes-first-ship-to-ship-gas-transfer/2-1-1437916 [accessed: 21.04.2023].

69 S. Domaradzki, J. Muś, *Republika Bułgarii*, in: *Raport. Bezpieczeństwo energetyczne państw Europy Środkowej i Wschodniej*, ed. B. Surmacz, M. Paszkowski, Lublin 2023, p. 59; M. Paszkowski, S. Domaradzki, *Bułgaria. Rozliczenia rządu technicznego z umowy gazowej*, "Komentarze IEŚ", 2023, no. 955, September 20, p. 1, https://ies.lublin.pl/komentarze/bulgaria-rozliczenia-rzadu-technicznego-z-umowy-gazowej/ [accessed: 23.09.2023].

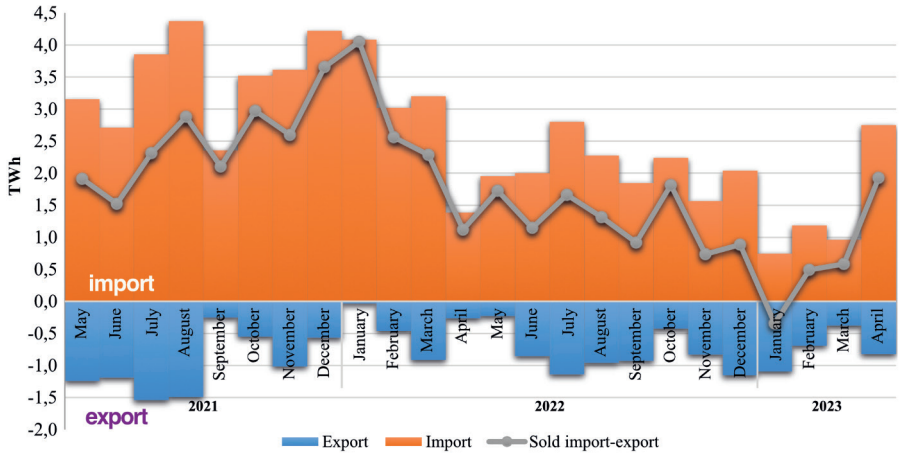
70 *Midia Gas Development Project, Black Sea*, www.offshore-technology.com/projects/midia-gas-development-project-black-sea/ [accessed: 21.08.2023].

71 *The Romanian Natural Gas Market in 2023*, 17.02.2023, https://cepconsult.com/publications/the-romanian-natural-gas-market-in-2023/ [accessed: 15.09.2023].

72 K. Całus, A. Łoskot-Strachota, *Rumunia. Umowa z azerskim SOCAR-em na dostawy gazu*, 23.12.2022, www.osw.waw.pl/pl/publikacje/analizy/2022-12-23/rumunia-umowa-z-azerskim-socar-em-na-dostawy-gazu [accessed: 10.07.2023].

73 S. Beyer, G. Molnar, *Accelerating Energy Diversification in Central and Eastern Europe*, 14.09.2022, https://www.iea.org/commentaries/accelerating-energy-diversification-in-central-and-eastern-europe [accessed: 2.08.2023].

74 *OMV Petrom Neptun Deep FID Conference Call. Q&A Transcript*, www.omvpetrom.com/services/downloads/00/omvpetrom.com/1522240386653/transcript-q-a-session.pdf [accessed: 9.08.2023].



Il. 5. Monthly changes in the balance of import, export, and import-export of natural gas in Romania, May 2021 – April 2023.

Source: Raport privind rezultatele monitorizării pieței de gaze naturale în luna aprilie 2023, p. 14.

Conclusion

Despite the various investment activities and agreements on gas imports to the two analysed countries, until April 2022 Russia was by far the largest external supplier of this commodity. The only difference was that in the case of Bulgaria Russian gas was of primary importance, whereas in the case of Romania it merely supplemented its own production.

In 2020, a serious weakening of the role of gas transit through the analysed countries, a decline in gas demand across the EU, an increase in gas consumption, and a decrease in domestic gas production led to a marked deterioration in the security of gas supplies to consumers in Bulgaria and Romania. The nature of the obstacles to the implementation of investments in this area was not only financial, geological, or political (the need to reach an agreement between the countries through which the transmission pipelines were to pass). For example, in Bulgaria, due to public sentiment, shale gas exploration and production was not (and is not) taken into consideration.

Form mid-2021 onward, various consequences of the deterioration in EU-Russia energy relations had an increasingly negative impact on the security of gas supplies to domestic consumers in the analysed countries. This security was further undermined by the mismatch between the transmission infrastructure and the gas import diversification plans in both the short and long term.

The relatively small share of gas in the energy mix of the analysed countries was the reason why the increase in gas prices had less of an impact on the competitiveness of

the Bulgarian and Romanian economies compared to those of the EU's leading gas importers. However, the role of this factor was limited by the increase in the prices of other energy commodities imported by Bulgaria and Romania.

In 2022, in view of the confrontation between Russia and the West, the authorities of both countries faced the challenge of achieving a real, permanent, and radical reduction in their dependence on supplies that came from or through Russia. Bulgarian hopes of meeting the gas needs of Bulgarian consumers by importing Russian gas by land after April 2022 were justified by the country's importance as the intermediary in the supply of gas from Russia to Hungary, Serbia, North Macedonia, and (until 2022) Romania. The different policies of the Russian authorities toward Bulgaria and Romania were to prevent their closer energy cooperation.

The expansion of the gas infrastructure of the two countries during the time of Russia's open aggression against Ukraine to a large extent accelerated the implementation of measures planned before the pandemic. The Bulgarian and Romanian authorities took advantage of the US's and the European Commission's favourable attitudes to these investments. On the other hand, the changing geopolitical situation fostered the European Commission's growing influence on the energy policy of the countries in question in terms of gas supplies to consumers.

Moderate temperatures in autumn and winter, and the scale of supplies sent via Turkey and Greece allowed Bulgaria and Romania to avoid gas rationing in the second half of 2022. This was not conducive to an intensification of Bulgaria's negotiations with Turkey and Greece or the Romanian authorities' financial concessions made to investors.

The agreements with Turkey and Greece on gas supplies to Bulgaria which were reached in January 2023 were closely linked to, among other things, the political consequences of the seasonal increase in gas demand and rivalry on the Bulgarian political scene.

The attitudes of the US and EU authorities, as well as the course of the prolonged armed conflict in the neighbourhood of the two countries, seriously reduces the likelihood that, in the coming years, Russian gas will contribute to satisfying consumer demand either through Turkish and Azeri gas transmission pipelines or Russian LNG.

Given Russia's confrontational attitude toward the EU, basing the security of gas supplies to Romanian (and other) consumers on the production and transmission infrastructure of the Black Sea and its coast (LNG terminals) is very hazardous. Bearing in mind Russia's policy of compromising the safety of gas tanker shipping, there is a need to secure the installations themselves against the risk of cyber-attacks and drone raids. The very high cost of insuring the installations may push back the construction completion date until the EU-Russia confrontation is over, especially as the Neptun Deep deposit is located much further from land than the offshore fields exploited since 2022. In addition,

the current prices and stored quantities of gas are not conducive to investments in the extraction of this commodity.

The high risk of supplying gas by sea directly to places on the Black Sea coast and hybrid attacks on the onshore infrastructure used in the transmission of gas to both countries necessitates concern for preserving the present flow capacity of the infrastructure built years ago.

Considering the level of the economic development of the two analysed countries, major investments (financed mostly from EU funds and by EU institutions) are still needed there. It is necessary to ensure an adequate volume of gas supplies via the onshore infrastructure with Turkey and Greece.

Determining the optimal volume of supplies and infrastructure flow capacity from these countries is complicated by the tense political relations between Turkey and Greece. By contrast, the number and the potential of LNG suppliers in summer 2023 offers good prospects for diversification in this area.

The continued underpricing of gas by the Bulgarian and Romanian authorities is a necessity given the very high levels of energy poverty in these countries compared to the rest of the EU. However, this adversely affects the scale of demand for this resource, especially in Romania.

The authorities of the EU and the analysed countries take into account not only the current unprecedented situation in the energy sector but also the achievement of such objectives as those related to climate. Given the scale of coal use in the economies of both countries and the barriers to RES development, it is likely that there will be a significant, several years long, increase in Bulgaria's and Romania's gas demand after the end of the Russian aggression against Ukraine.

In 2022, faced with the challenges of securing its gas supplies, Romania decided to continue its efforts to exploit deposits under the Black Sea bed. Bulgaria, on the other hand, placed the main emphasis on diversifying its supplies through Greece and Turkey.

Due to the countries' different scales of gas production, diversification of gas supplies for domestic consumers is far more important for Bulgaria than for Romania. In Bulgaria, between 2020 and 2023, this is likely to have affected the scale of the expansion of the gas distribution infrastructure and, as a result, much lower availability of gas for individual households. In 2022, the changes in the volume and consumption of this commodity between various groups of gas consumers in the discussed countries were clearly different.

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