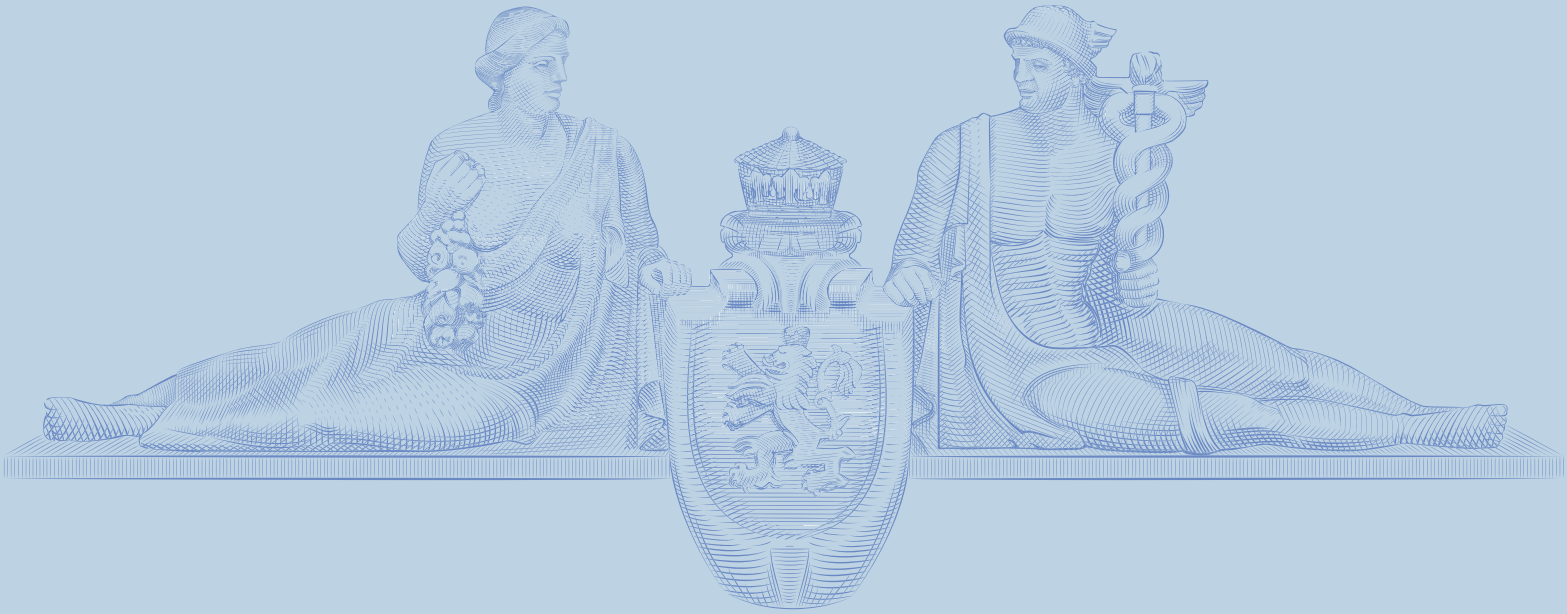

Topical Research and Highlights

Bulgaria's Economic Connectedness with Russia, Ukraine and Belarus and Dependency of the Bulgarian Economy on the Use of Natural Gas

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BULGARIAN NATIONAL BANK

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The war in Ukraine, which started on 24 February 2022, has led to a drastic increase in the uncertainty about the prospects for economic activity and inflation in Bulgaria. The purpose of this topical research is to highlight the degree to which Bulgaria is economically connected in terms of foreign trade and financial flows with the countries participating in the military conflict (Russia, Ukraine and Belarus) and to estimate the degree of dependency of the Bulgarian economy on the use of natural gas, given the suspended gas deliveries from Russia on 27 April 2022.

Foreign trade flows, especially in terms of imported key energy commodities from Russia (crude oil, natural gas and nuclear fuel), appear to be the main channel of an economic exposure of Bulgaria to the military conflict in Ukraine. Concurrently, annual financial flows between Bulgaria and Russia, Ukraine and Belarus, as well as the amount of accumulated financial assets and liabilities were lower than trade in goods and services, constituting primarily past direct investments from Russia to Bulgaria.

In case of failure to replace effectively suspended Russian deliveries of natural gas by imports from other countries or alternative energy sources, significant negative effects on the Bulgarian economy could be expected, and production of heating and electricity and manufacturing sectors will be the most severely affected. The topical research presents also estimates of the price effects on the Bulgarian economy, which would result from replacing of the Russian natural gas by alternative deliveries, but at a higher price than that of the Russian natural gas.

Foreign Trade Relations of Bulgaria with Russia, Ukraine and Belarus

Goods and services imports from Russia, Ukraine and Belarus occupied 8.8 per cent of all Bulgarian imports in 2021 in nominal terms, or 5.7 per cent of GDP. Bulgaria's imports from Russia were significantly higher than those from Ukraine and Belarus, comprising nearly three-quarters of goods and services imports from the three countries. Bulgarian exports of goods and services to Russia, Ukraine and Belarus was 3.3 per cent of all Bulgarian exports in 2021, or 2.1 per cent of GDP, allocated almost equally among Russia and Ukraine.

Russia

The share of Russia in Bulgarian exports and imports of goods and services has followed a downward trend since 2014, and in 2021 it was almost 50 per cent lower compared to 2014 in both items. In 2021 trade flows with Russia occupied 1.7 per cent of Bulgarian exports (1.1 per cent of GDP) and 6.7 per cent of Bulgarian imports of goods and services in nominal terms (4.3 per cent of GDP).

Bulgarian exports to Russia in 2021 consisted of 57.7 per cent goods and 42.3 per cent services. Goods exports were concentrated mainly in chemical products[1] (a share of 39.6 per cent in total goods exports of Bulgaria to Russia in 2021) and machinery and equipment[2] (a share of 37.0 per cent in total goods exports of Bulgaria to Russia in 2021). Services exports to Russia comprised largely transport services (63.3 per cent), with travel services occupying a significantly lower share (22.3 per cent). Net revenue from travel services has decreased since 2014, with the share of Russian citizens' visits in total foreign visits into Bulgaria declining from 7.1 per cent in 2014 to 1.9 per cent in 2021.

In contrast to exports, goods and services imports in Bulgaria from Russia were almost entirely consisted of goods which in 2021 occupied 97 per cent of total imports. Russia was Bulgaria's fourth largest trading partner in terms of goods imports. By commodity group, in 2021 81.1 per

[77] In this topical research, it should read the groups of chemical products, plastics and rubber under the Combined Nomenclature.
[78] It should read the groups of machines, vehicles, appliances, instruments and weapons under the Combined Nomenclature.

cent of goods imports from Russia comprised mineral products and fuels[3], followed by the groups of chemical products and base metals[4] (6.5 per cent and 5.8 per cent, respectively, of total goods imports). The essential share of the group of mineral products and fuels reflected largely crude oil, representing some 64 per cent on average of total imports in this commodity group during 2014–2021 (45.5 per cent in 2021).[5] Crude oil imported from Russia is used in LUKOIL Neftohim Burgas AD refinery. According to the reports of the refinery, imported Russian crude oil[6] in total oil imports of the company declined from 92 per cent in 2013 to 60 per cent in 2020, partially replaced by crude oil imports from the Middle East.[7] Natural gas comprised approximately 25 per cent on average of Bulgarian imports from Russia in the group of mineral products and fuels for 2014–2021, its share rising with the increased price to 44.1 per cent[8] in 2021. In addition, Bulgaria depends on nuclear fuel imports from Russia for Kozloduy nuclear power plant,[9] but data on specific quantities of imports are not publicly disclosed.[10]

Ukraine

Bulgarian exports to Ukraine in 2021 occupied 1.4 per cent of total Bulgarian goods and services exports (0.9 per cent of GDP), comprising 65.4 per cent goods and 34.6 per cent services. Goods exports were mainly in the form of mineral products (32.4 per cent of total goods exports in 2021) and chemical products (30.0 per cent of total goods exports in 2021). Services exports were characterised by a predominant share of travel services (92.8 per cent of total exports of services). The share of Ukrainian citizens in total foreign visitors in Bulgaria increased in the last several years: from 3.6 per cent in 2014 to 6.5 per cent in 2021.

Total Bulgarian imports from Ukraine in 2021 consisted of 93.7 per cent goods, concentrated mainly in the group of base metals, with iron and steel comprising 64.1 per cent of total imports within this group.

Belarus

Trade flows between Bulgaria and Belarus were significantly lower than those with Russia and Ukraine, with exports and imports of goods and services each occupying just 0.1 per cent of GDP in 2021. Trade in goods was significantly higher than that in services. Regarding exports of Bulgarian goods to Belarus, in 2021 chemical products had the largest share, accounting for 33.6 per cent of total goods exports. The group of machines (31.1 per cent of total goods imports from Belarus in 2021) and that of base metals (29.7 per cent of total goods imports from Belarus in 2021), mainly ferrous metals, had the largest shares of Bulgarian goods imports from Belarus.

Financial Flows and International Investment Position

Data on Bulgaria's balance of payments and international investment position show that both financial flows and accumulated financial assets and liabilities of Bulgaria with Russia, Ukraine and Belarus were lower than the annual foreign trade flows with the three countries. In 2021 net direct, portfolio and other investments made in Bulgaria by the three countries occupied 2.8 per cent of GDP.[11] In terms of liabilities, funds attracted by residents in the form of direct investments from Russia,

[79] It should read mineral products and fuels under the Combined Nomenclature.
[80] It should read the base metals and their products group under the Combined Nomenclature.
[81] BNB calculations based on Eurostat's data on the product group 2709: *Petroleum oils and oils obtained from bituminous minerals, crude* under the Combined Nomenclature.
[82] Primarily REBCO, a type of crude oil, but there are also data on Siberian Light crude oil.
[83] No public information on the possibility for the refinery to process entirely non-Russian crude oil is available, given a possible embargo on crude oil imports from Russia, as discussed at a European Union level.
[84] BNB calculations based on foreign trade data under the Combined Nomenclature.
[85] According to data on Bulgaria's energy balance for 2020. Kozloduy nuclear power plant produced 24.3 per cent of (gross) energy consumed in Bulgaria.
[86] Based on public information available in the documentation on Eurobonds issued in 2021 by the Bulgarian Energy Holding EAD, Kozloduy nuclear power plant uses nuclear fuel under a long-term contract with a Russian supplier. Data on imports and exports of nuclear fuel are not publicly disclosed in the NSI foreign trade statistics.
[87] Preliminary data as of 30 March 2022. Data are consistent with the sixth edition of the IMF Balance of Payments and International Investment Position Manual.

amounting to EUR 1979.7 million (2.9 per cent of GDP), had the most significant volume as of December 2021. In addition, EU sanctions against legal entities and natural persons from Russia had no direct effect on the Bulgarian banking sector due to the insignificant share of credit exposures, attracted funds and financial transactions from and to Russia.

Natural Gas Significance for the Bulgarian Economy and Dependency by Economic Sector

In 2021 Bulgaria's net imports of natural gas amounted to around 1.6 per cent of GDP, with 76.1 per cent of imports from Russia supplied under a long-term contract with OOO Gazprom Export. Unlike the imports of most raw materials, gaseous fuel supplies are closely linked to the specificities of the existing infrastructure for their transportation (availability, capacity and ownership of the gas network; available liquefied gas terminals, *etc*.) which is the reason for a limited opportunity to change the supplier country in the short term.[12] Therefore, the major factors determining the degree of dependency of the Bulgarian economy on the use of natural gas relate to the consumption of gaseous fuels in total energy consumption of Bulgaria, the economic purpose of these fuels in individual sectors and possibilities for their replacement by alternative energy sources. The analysis of natural gas significance for the Bulgarian economy in the topical research employs statistical data on the overall energy balance of Bulgaria and Supply and Use tables.

The overall energy balance provides data on energy resources in the economy, which may be used for transformation into another type of fuel/energy product or supplied to an end user in their original form (so-called final consumption). Energy flows are presented in thousand tonnes of oil equivalent (KTOE). Regarding the processes of transformation, statistics provides a breakdown at the level of transformation in power plants, heat plants, oil refineries, *etc*. Final consumption of energy products is split into non-energy and energy consumption: energy consumption shows quantities of fuels used in their capacity as energy sources/energy carriers, whereas non-energy use is consumption of fuels/energy that have not been combusted but used as raw materials in production due to their chemical properties.[13] Consumed quantities of energy products are classified into three sectors depending on the main economic activity of corporations which use them: industry, transport and other sectors (including trade and public services; households; agriculture and forestry). Energy balance statistics has an advantage to report actually consumed quantities (volumes) of energy products and contains information on the way of technological transformation of individual types of energy.

Supply and Use tables present in detail all flows of goods and services between individual institutional sectors[14] of the economy, not only those related to energy products. These data can lead to a conclusion how total production factors in the economy – raw materials and supplies (of domestic origin and imports), labour and capital – are used in the production process as intermediate consumption and how they are broken down by category of final consumption (private and government consumption, investments, changes in inventories and exports). All flows are shown in nominal terms and in million BGN.[15] The advantage of Supply and Use tables is that they allow to examine the significance of natural gas in terms of the organisation of the overall production process of firms. As result of interconnections contained therein, these tables allow exploring both direct and indirect effects of gas supply disruptions on individual sectors of the economy and final demand components. A disadvantage of the above two statistics is that they are published only annually and with a significant lag, and at the time of writing the present topical research the latest data for Bulgaria's overall energy balance is for 2020 and those for the Supply and Use tables for 2018.

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[88] An additional factor impeding the switching of natural gas supply chains in the short run is the inelastic supply of gaseous fuels due to production constraints.
[89] Non-energy use covers fuels that are used as raw materials in production but not consumed as energy or transformed into another fuel. For example, this includes petroleum products used for production of plastics; bitumen used as road pavement; lubricants and natural gas used as raw material for the chemical and petrochemical industries or for fertiliser production.
[90] These sectors are non-financial corporations, financial corporations, households, NPISHs and the general government.
[91] Primary data are in million US dollars but converted into national currency for the purpose of the topical research. For details, see: https://www.oecd.org/sti/ind/inter-country-input-output-tables.htm.

Based on data from Bulgaria's energy balance for 2020 the total natural gas input in the economy was about 2524 KTOE (see Chart 1), mostly from imports and, to a lesser extent, from draw stock and domestic production. The natural gas input in the economy accounts for 14.2 per cent of total energy used throughout the year. By use, 41.4 per cent (1045 KTOE) of natural gas was input for transformation into other energy sources, mostly heat and electricity. This is done mainly through combined heat and power plants, which are used, for example, by some of the heating companies in Bulgaria. The rest of the natural gas in Bulgaria in 2020 (58.6 cent of the total available amount, or 1479 KTOE) was used for final consumption mainly in the form of energy consumption and, to a lesser extent, as a raw material in the production of industrial companies (non-energy consumption). Industry[16] was the largest consumer of natural gas (998.5 KTOE) across economic sectors in 2020 (total energy and non-energy consumption), followed by transport (122 KTOE), services (99 KTOE) and households (96 KTOE). Within industry, natural gas is mainly used in chemical and petrochemical industry, production of non-metal materials[17], and food and drinks. In the transport sector gaseous fuels were mainly consumed by road transport.

In conclusion, the energy balance statistics shows that a partial or total cut-off of natural gas deliveries would have a negative effect on the productive side of the economy, with heat generation and industry being the most severely affected at sectoral level. At macro level, the effects on economic activity will depend both on the ability of heat generation plants using natural gas to switch to a back-up fuel (*e.g.* black oil) and on the extent to which the heat and electricity they generate is replaced by alternative sources (nuclear, coal, renewable energy).

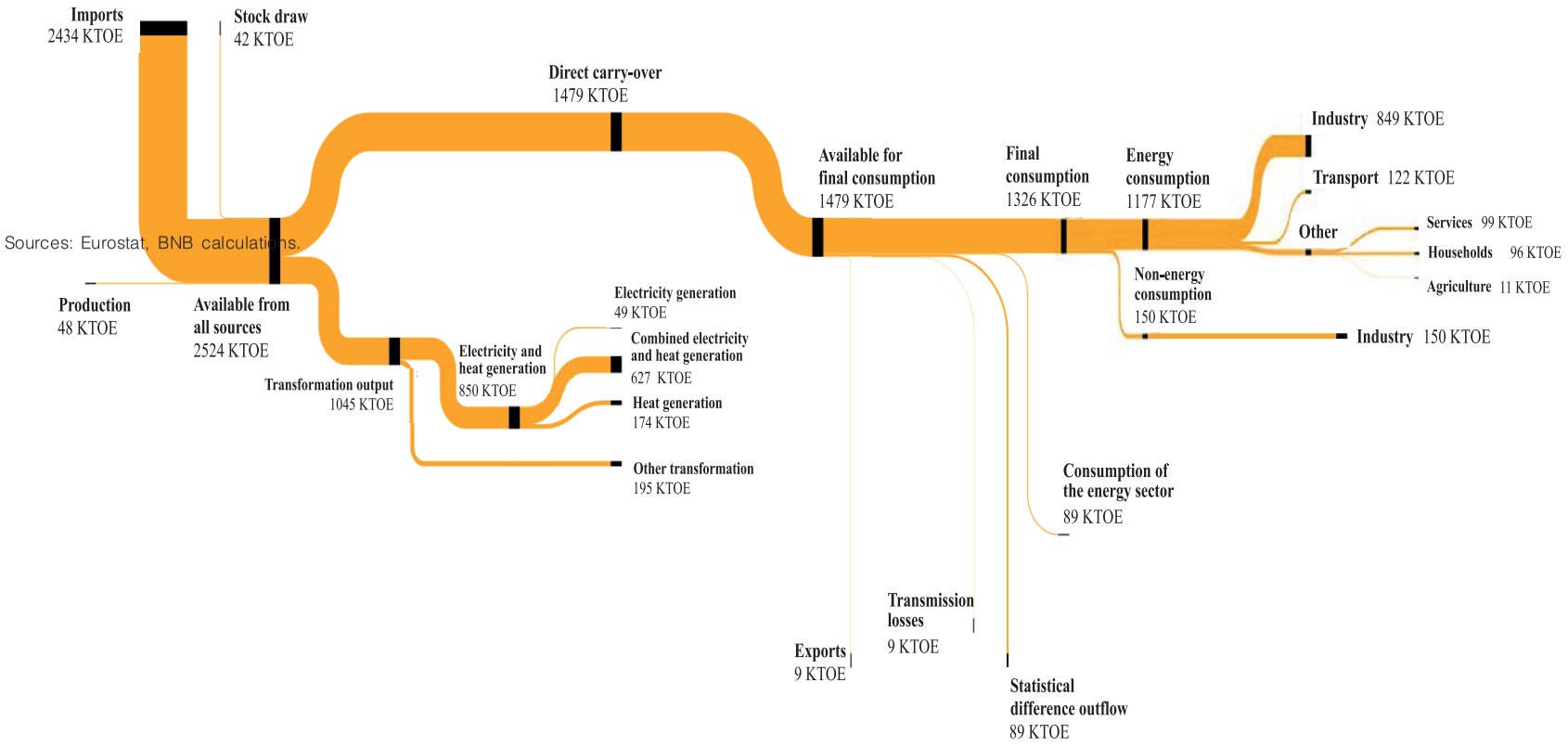
To assess possible macroeconomic effects of the cut-off of natural gas deliveries from Russia on Bulgaria's economy, more detailed information from the supply use tables on the production structure and the interlinkages between individual economic sectors was used.

According to the data from the Supply and Use tables[18] on the structure of the Bulgarian economy in 2018 annual imports of natural gas from Russia amounted to BGN 1725 million[19] and were carried out by sector D35: Production and distribution of electricity, heat and gas. This sector is also the largest consumer of the commodity (amounting to BGN 809.9 million) according to the BNB estimates of the final use of natural gas across economic sectors[20] presented in Table 1[21] below. The rest of the natural gas is consumed directly or indirectly (through products for the production of which natural gas has already been used) by other sub-sectors of industry (BGN 532 million), as well as by the services sector (BGN 365 million) and agriculture (BGN 18 million). Within industry, manufacturing is the largest consumer of natural gas, represented by sectors under the Classification of Economic Activities codes C10 to C33 (BGN 442 million). Natural gas used in the total economy accounted for a small share of firms' intermediate consumption (1.4 per cent). However, there are significant divergences across economic sectors in terms of the share of natural gas in both firms' total spending on raw materials and inputs and in the value added produced. Chart 2 shows the ten sectors with the largest share of natural gas consumed in intermediate production costs. Based on this criterion, the most gas dependent sectors are D35: Production and distribution of electricity, heat and gas; C21: Manufacture of basic pharmaceutical products and pharmaceutical preparations; E36_39: Water collection, treatment and supply[22]; and C20: Manufacture of chemicals and chemical

[16] Energy consumption of the industry amounts to 849 KTOE, while non-energy consumption amounts to 150 KTOE.
[17] This includes production of glass and glass products; production of refractories; production of porcelain and ceramic products; production of concrete, cement, lime, gypsum and their products.
[18] The source of the data is the Organisation for Economic Cooperation and Development (OECD).
[19] Since the Supply and Use tables are compiled by economic sector, for the purpose of the analysis it is assumed that the amount of natural gas imported from the Russian Federation corresponds to the flows from sector B05_06: Mining and quarrying, production of energy products of the Russian economy to sector D35: Production and distribution of electricity, heat and gas of the Bulgarian economy. The value of these flows amounts to USD 1041 million or BGN 1725 million. Concurrently, Bulgaria's foreign trade statistics, containing detailed data at product group level, suggests that natural gas imported from Russia amounted to BGN 1246 million in 2018. Discrepancies between the two statistics reflect differences in the scope of data, valuation adjustments and other methodological differences.
[20] Sector names are according to the classification of economic activities (NACE).
[21] Data in the Supply and Use tables for Bulgaria encompass 45 sectors, but for the purpose of the analysis they have been grouped into 24 sectors for a more systematic presentation.
[22] This sector is characterised by a high consumption of electricity and therefore it consumes natural gas mainly indirectly through the generated electricity.

Chart 1. Bulgaria's Energy Balance Flow in Terms of Natural Gas for 2020

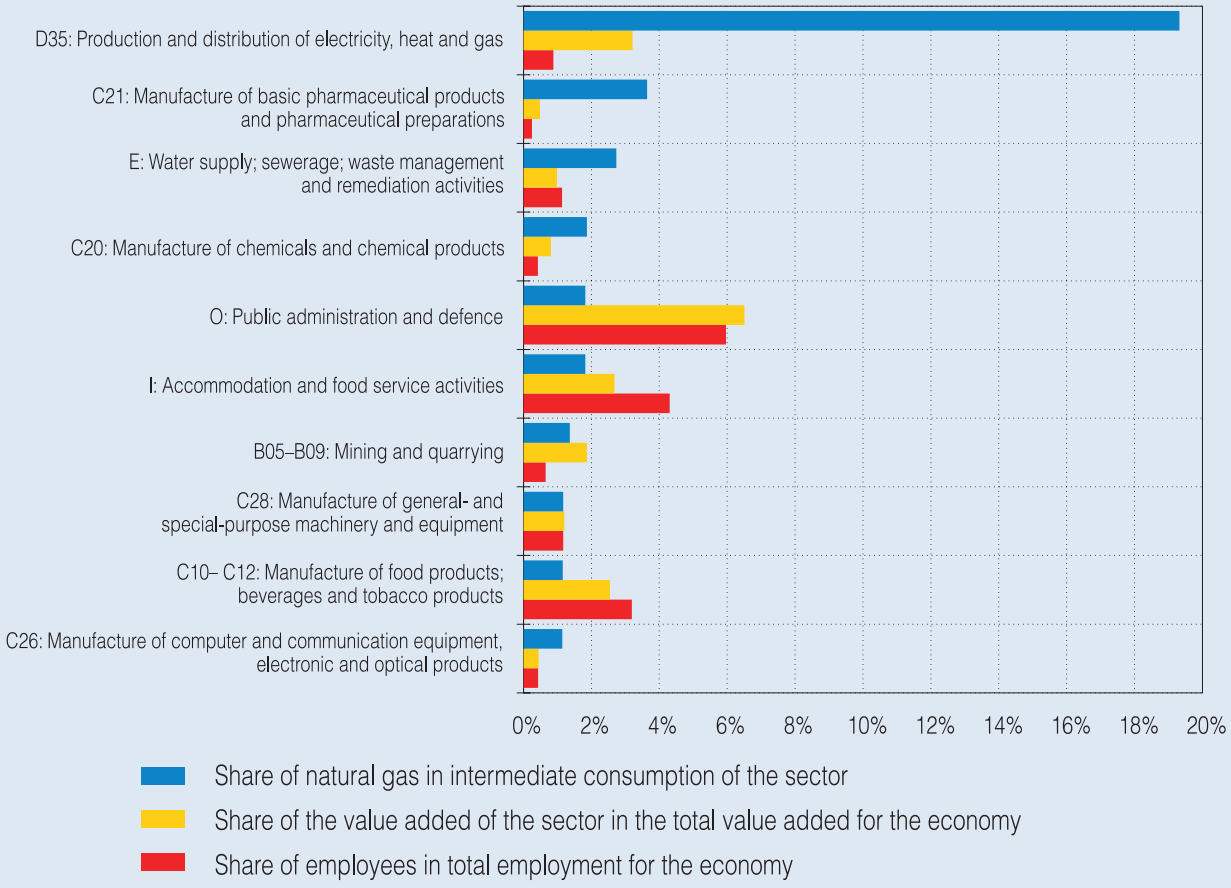
(in thousand tonnes of oil equivalent)



Sources: Eurostat, BNB calculations.

products. These sectors accounted for 5.5 per cent of value added in the economy and directly employed 2.7 per cent of all workers in 2018.

Chart 2. Sectors with the Largest Shares of Natural Gas Consumption in the Input Costs (Intermediate Consumption) in 2018



Notes: Natural gas consumption in the table is based on BNB estimates and shows both direct and indirect consumption of the raw material by the respective sectors. Indirect consumption takes into account the use of products for the production of which natural gas has already been used.

Sources: OECD, BNB calculations.

In terms of final demand, the bulk of natural gas imported from Russia is used in production of goods and services for household consumption and also for export goods (see Table 2). As household consumption of natural gas is mainly for heat production, the cut-off of natural gas deliveries is likely to be partially offset by a switch to alternative energy sources. Concurrently, natural gas consumption in industry is closely tied to production technology, which is generally fixed in the short term. As a result, the cut-off of natural gas deliveries is likely to have a negative effect on Bulgaria's production and export potential.

Given the interconnectedness of individual economic sectors, the Supply and Use tables allow to identify three channels through which the shutdown of natural gas supplies from Russia will affect economic activity in Bulgaria. The first one is the direct effect of the shutdown of deliveries on the activity of sector D35: Production and distribution of electricity, heat and gas. The second channel is related to lower demand for this sector's products by other economic sectors. The third channel reflects the reduced supply of natural gas, heat and electricity to other sectors of the economy, which are essential for their production.

According to the detailed statistics on Bulgaria's foreign trade in goods over 2021, natural gas deliveries from Russia accounted for 76.1 per cent of total natural gas imports throughout the year (against 100 per cent in 2018). Consequently, under the worst scenario, involving a complete shutdown of natural gas deliveries from Russia, the lack of alternative options for purchasing natural

Table 1. Natural Gas Consumption, Gross Output, Intermediate Consumption, Gross Value Added and Employment by Economic Sector in 2018

No	Name of the economic sector	Type of the sector	(NACE 2008)	Natural gas consumption, (BGN million)	Gross output (BGN million)	Intermediate consumption (BGN million)	Gross value added (BGN million)	Employment (thousand)
1	Production and distribution of electricity, heat and gas	Industry	D35	809.90	7,195	4,192	3,003	31
2	Agriculture, forestry and fisheries	Agricultural Sector	A	18	9,032	5,397	3,636	623
3	Mining and Quarrying	Industry	B05-B09	21	3,287	1,542	1,745	23
4	Manufacture of food products; beverages and tobacco products	Industry	C10-C12	98	10,827	8,448	2,379	112
5	Manufacture of textiles; manufacture of wearing apparel; manufacture of leather and related products	Industry	C13-C15	17	3,952	2,561	1,390	134
6	Manufacture of wood, paper, paperboard and their products (except furniture); printing	Industry	C16-C18	16	3,071	2,217	855	43
7	Manufacture of coke and refined petroleum products	Industry	C19	17	6,197	5,988	209	2
8	Manufacture of chemical products	Industry	C20	39	2,855	2,101	754	15
9	Manufacture of basic pharmaceutical products and pharmaceutical preparations	Industry	C21	27	1,210	754	456	9
10	Manufacture of rubber, plastic products and other non-metal mineral products	Industry	C22-C23	30	6,123	4,490	1,633	57
11	Manufacture of basic metals and fabricated metal products, except machinery and equipment	Industry	C24-C25	122	14,323	11,896	2,427	74
12	Manufacture of computer and communication equipment, electronic and optical products	Industry	C26	10	1,285	872	413	15
13	Manufacture of electrical equipment	Industry	C27	18	3,545	2,715	831	28
14	Manufacture of general- and special-purpose machinery and equipment	Industry	C28	28	3,563	2,437	1,127	41
15	Manufacture of motor vehicles	Industry	C29-C30	10	2,972	2,319	653	30
16	Manufacture of furniture; manufacture n.e.c.; repair and installation of machinery and equipment	Industry	C31-33	10	3,508	2,104	1,404	57
17	Water supply; sewerage; waste management and remediation activities	Industry	E	24	1,793	869	923	40
18	Construction	Industry	F	45	16,262	12,356	3,906	184
19	Trade; repair of motor vehicles and motorcycles	Services	G	74	25,196	11,187	14,009	539
20	Transporting and storage	Services	H	63	17,338	12,212	5,125	216
21	Accommodation and food service activities	Services	I	43	4,856	2,349	2,507	152
22	Business services (IT services, communication; financial activities; professional, scientific and technical activities; administrative activities)	Services	J-N	98	46,504	17,978	28,526	437
23	Public administration and defence	Services	O	41	8,318	2,230	6,088	210
24	Social and personal services (education; human health and social work activities; arts, entertainment and recreation)	Services	P-T	47	16,903	7,390	9,513	450
	Total			**1,725**	**220,116**	**126,603**	**93,513**	**3,522**

Note: Natural gas consumption in the table is based on BNB estimates and shows both direct and indirect consumption of the commodity by the respective sectors. Indirect consumption takes into account the use of products for the production of which natural gas has already been used.

Sources: OECD, BNB calculations.

gas from another country and the inability to substitute it in the short run with other production factors, it can be expected that the gross output and value added of sector D35: Production and distribution of electricity, heat and gas will fall by 76.1 per cent. As a result, gross output and value added in the overall economy will fall by 2.5 per cent and 2.4 per cent respectively. These figures should be interpreted as direct effects on the economy caused by the shutdown of natural gas supplies from Russia. However, these direct effects trigger indirect effects for the other sectors of the economy, which are positioned ahead and behind sector D35: Production and distribution of electricity, heat and gas in the supply/production chain. Sectors involved in earlier production stages reported lower demand for their products than the sector directly affected by the natural gas supply disruption. Concurrently, sectors whose production is closer to the end user and require natural gas, electricity and/or heat are affected by the disrupted supply (resource supply). Estimates of the magnitude of indirect effects[23] are presented in Table 3 in the form of percentage deviation of gross output and value added from their levels in the scenario in which natural gas supplies from Russia are not interrupted. In terms of demand, the disruption of deliveries is expected to prompt a further decline in the economy's gross output by 0.57 per cent and in value added by 0.60 per cent. Overall, the direct and demand effects are a precondition for a 3.1 per cent decline in gross output and 3.0 per cent decline in value added compared to pre-shutdown levels. The limited supply of energy resources to other sectors is expected to further exacerbate the negative effects on the economy, resulting in a 5.0 per cent decline in Bulgaria's aggregate gross output and a 4.8 per cent decline in value added.[24]

Given the described specificity of the analyses based on data from the Supply and Use tables, the presented estimates should be considered as the most negative scenario for the economy as a result of the cut-off of natural gas deliveries from Russia and the assumption of a lack of other alternatives. Real effects are likely to be weaker, but this will depend on the extent to which corporations and households substitute natural gas with alternative energy sources, the opportunities for substitution of natural gas supply sources, and the amount of own sources (mostly in the form of inventories and domestic production)[25]. Other factors that will determine the actual magnitude of the effects of the economic shock are the duration of the gas supplies cut-off and the part of the year during which it takes place, considering that the consumption of natural gas in Bulgaria is characterised by a high seasonality. NSI data for 2021 indicate that 77.2 per cent of annual gas consumption is in the months from October to April[26].

The cut-off of natural gas supplies from Russia represents a negative shock to the economy, both in terms of real activity and price developments. In case the economy switches to alternative supplies of liquefied natural gas (LNG) through Greece at a price higher than that of the Russian pipeline gas, this would have a negative impact on companies' production costs. Data from the Supply and Use tables allow to estimate the possible pass-through of higher gas prices and products produced therewith to the prices of locally produced final goods and services. Chart 3 shows the effects on the Bulgarian economy under a hypothetical scenario in which imported natural gas from Russia is replaced by imports of natural gas from another supplier at a 10 per cent higher price than that of Russian gas. It is assumed that the resulting higher production costs for firms will be fully passed through the supply chain to final prices. The overall effect on the economy is an increase of 0.12 per cent on average in locally produced goods and services. Goods and services intended for final consumption by households (0.18 per cent) and exports (0.12 per cent) are relatively hardest hit. As regards government consumption and investment products, prices increased relatively less (0.05 per cent). The estimates in Chart 3 are based on interlinkages in the Supply and Use tables, which are

[23] Quantitative assessments of these effects were made in accordance with the methodology in the article: *Kim, Dongseok (2021): Measuring the Impact of a Trade Dispute with a Supply-side Shock Using a Supply-driven Input-Output Analysis: Korea-Japan Dispute Case, KDI Journal of Economic Policy, ISSN 2586-4130, Korea Development Institute (KDI), Sejong, Vol. 43, Iss. 1, pp. 29–52.*

[24] The methodology used in the analysis allows to assess the state of the economy before and after the cut-off of natural gas supplies from Russia, but not the period of time necessary for the materialisation of adverse effects. It may be assumed that the effects resulting from the existing shortage of key raw materials will spread relatively quickly in the economy.

[25] The estimates are linear and additive in nature, which means that in the event of a twofold decrease in gross output of sector D35: Production and distribution of electricity, heat and gas compared with the analysis and Table 3, a twofold decrease in value added and GDP, respectively, can be expected.

[26] According to Bulgargas EAD Annual Report for 2019 data, the reported sales of natural gas during the winter months was 70.4 per cent of the total sales during the year.

linear and additive in nature. This means that in the event of a double increase in the prices of gas supplies replacing Russian gas, a double increase in final prices can be expected.

The estimated reaction of consumer prices (0.18 per cent) refers only to the prices of locally produced goods and services. In order to construct an assessment of the effect of rising gas prices on HICP inflation, it should be taken into account that household consumption includes both locally produced and imported goods and services. According to data from the Supply and Use tables, direct consumption of imported finished consumer goods accounts for around 26 per cent of households' final consumption expenditure. Assuming that the increase in the price of natural gas will only be observed in Bulgaria, it will be passed through to final prices within the year and will not affect the prices of imported consumer goods, annual HICP inflation can be expected to be around 0.13 percentage points higher than under a scenario involving no increase in the price of natural gas.

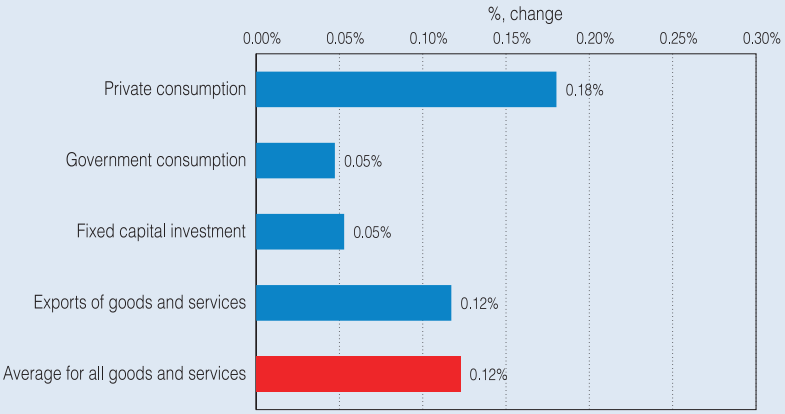
Table 2. Consumption of Natural Gas Imported from Russia, by Final Demand Elements in 2018

Final demand	natural gas, BGN million
Household consumption	791.9
Government consumption	77.4
Investments	72.0
Change in inventories	18.7
Exports (goods and services)	765.4
Total	1,725.4

Sources: OECD, BNB calculations.

In conclusion, the quantitative assessments indicate that the cut-off of natural gas supplies from Russia to Bulgaria is likely to have a significant negative effect on the production side of the economy and to result in an increase in the average price level in the country. The most gas dependent sectors are those of the manufacturing, as well as activities related to the production and distribution of electricity and heat. In the event of a permanent suspension of natural gas supplies from Russia, without replacing them with alternative energy sources, a decline in value added in the economy of a total of 4.8 per cent can be expected. In case of replacement of natural gas supplies from Russia with more expensive alternatives, an increase in the overall price level in Bulgaria can be expected. Estimates based on the Supply and Use tables suggest that a hypothetical scenario of a 10 per cent higher price of alternative supplies will result in an increase of 0.12 per cent on average in the prices of locally produced goods. This would put further inflationary pressures in the economy. Goods and services for household consumption (0.18 per cent) and/or for exports (0.12 per cent) are anticipated to experience the highest price increase. As regards consumer prices, the estimated effect is that a 10 per cent increase in the price of natural gas would lead to an acceleration in annual HICP inflation of 0.13 percentage points.

Chart 3. Effects on Final Prices of Locally Produced Goods and Services in Bulgaria under a Hypothetical Scenarios, Involving the Replacement of Russian Natural Gas Supplies with Imports from Another Supplier at a 10 per cent Higher Price



Note: The estimates are based on the structure of the economy in 2018.
Sources: OECD, BNB calculations.

Table 3. Effects of Lower Gross Output by 76.1 Per Cent in Sector D35: Production and Distribution of Electricity, Heat and Gas

No	Name of the economic sector	(NACE 2008)	Gross output, change in per cent			Gross value added, change in per cent		
			Direct and indirect demand effects	Indirect supply effects	Total	Direct and indirect demand effects	Indirect supply effects	Total
1	Production and distribution of electricity, heat and gas	D35	-76.1		-76.1	-76.1		-76.1
2	Agriculture, forestry and fishing	A	-0.1	-0.8	-0.9	-0.1	-0.8	-0.9
3	Mining and quarrying	B05-B09	-2.3	-6.4	-8.8	-2.7	-6.8	-9.5
4	Manufacture of food products; beverages and tobacco products	C10-C12	-0.2	-3.4	-3.6	-0.2	-3.4	-3.6
5	Manufacture of textiles; manufacture of wearing apparel; manufacture of leather and related products	C13-C15	-0.1	-1.6	-1.7	-0.1	-1.6	-1.7
6	Manufacture of wood, paper, paperboard and their products (except furniture); printing	C16-C18	-0.4	-3.2	-3.6	-0.4	-3.2	-3.6
7	Manufacture of coke and refined petroleum products	C19	-0.4	-1.1	-1.5	-0.4	-1.1	-1.5
8	Manufacture of chemical products	C20	-0.2	-5.1	-5.3	-0.2	-5.1	-5.3
9	Manufacture of basic pharmaceutical products and pharmaceutical preparations	C21	-0.1	-7.3	-7.4	-0.1	-7.3	-7.4
10	Manufacture of rubber, plastic products and other non-metalic mineral products	C22-C23	-0.3	-2.7	-3.0	-0.3	-2.8	-3.1
11	Manufacture of basic metals and fabricated metal products, except machinery and equipment	C24-C25	-0.2	-4.2	-4.4	-0.3	-3.5	-3.8
12	Manufacture of computer and communication equipment, electronic and optical products	C26	-0.1	-2.7	-2.8	-0.1	-2.7	-2.8
13	Manufacture of electrical equipment	C27	-0.4	-1.9	-2.3	-0.4	-1.9	-2.3
14	Manufacture of general- and special-purpose machinery and equipment	C28	-0.1	-2.7	-2.8	-0.1	-2.7	-2.8
15	Manufacture of motor vehicles	C29-C30	-0.2	-1.3	-1.6	-0.2	-1.3	-1.6
16	Manufacture of furniture; manufacture n.e.c.; repair and installation of machinery and equipment	C31-33	-0.9	-1.4	-2.3	-0.9	-1.4	-2.3
17	Water supply; sewerage; waste management and remediation activities	E	-1.0	-7.8	-8.8	-1.0	-7.8	-8.8
18	Construction	F	-0.5	-1.4	-1.9	-0.5	-1.4	-1.9
19	Trade; repair of motor vehicles and motorcycles	G	-1.0	-1.6	-2.6	-1.0	-1.6	-2.6
20	Transporting and storage	H	-1.5	-1.9	-3.4	-1.5	-2.0	-3.5
21	Accommodation and food service activities	I	-0.2	-3.0	-3.2	-0.2	-3.0	-3.2
22	Business services (IT services, communication; financial activities; professional, scientific and technical activities; administrative activities)	J-N	-0.7	-1.1	-1.8	-0.7	-1.1	-1.8
23	Public administration and defence	O	-0.1	-1.6	-1.7	-0.1	-1.6	-1.7
24	Social and personal services (education; human health and social work activities; arts, entertainment and recreation)	P-T	-0.2	-1.2	-1.3	-0.1	-1.0	-1.2
	Total		**-3.1**	**-1.9**	**-5.0**	**-3.0**	**-1.7**	**-4.8**

Note: The estimates are based on the structure of the economy in 2018. The reported estimates should be considered as the most negative scenario for the economy after the cut-off of natural gas supplies from Russia.

Sources: OECD, BNB calculations.

The sculptural composition by Kiril Shivarov depicting Hermes and Demeter on the southern façade of the Bulgarian National Bank building is used in cover design.