Republic of Bulgaria

MINISTRY OF ENERGY

PREVENTIVE ACTION PLAN
TO SAFEGUARD THE SECURITY OF
NATURAL GAS SUPPLY

SOFIA 2020

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List of abbreviations and definitions

RB — Republic of Bulgaria
NRA — National risk assessment
RRA — Regional risk assessment
JRC— Joint Research Centre of the European Commission
Dmax — the total daily gas demand (in mcm/d) of the calculated area during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years.
'**Deff**' — the part (in mcm/d) of Dmax that in the case of a disruption of gas supply can be sufficiently and timely covered with market-based demand-side measures in accordance with point (c) of Article 9(1) and Article 5(2).
EU — European Union
EC — European Commission
ERO— Energy Regulatory Office
MS — Member State(s)
ERO President — President of the Energy Regulatory Office
EFTA — European Free Trade Association
ENTSOG — European Network of Transmission System Operators for Gas
RCS for gas/ReCo — the Regional coordination system for gas established by ENTSOG
SGT — System for gas transit
OGP — Oil and gas producers
SSO — Storage system operator
TSO — Transmission system operator
NGTN — National gas transmission network
GTN — Gas transit network
LNG — Liquefied natural gas
UGS — Underground gas storage
AGPRS — Automated gas pressure regulating station
GMS — Gas metering station
GPRS — Gas pressure regulating station
CS — Compressor station
TAP — Trans-Atlantic pipeline
IGB— Interconnector Greece–Bulgaria
IBS — Interconnector Bulgaria–Serbia
IBR — Interconnector Bulgaria–Romania
PCI — Project of common interest
IP — Interconnection point
Regulation (EU) 2017/1938 — Regulation of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010
MSm³/d — million standard cubic metres (conditions — T=20°C and P=1.01325 bar(a)) gas per day (24 hours).

GENERAL INFORMATION

This Preventive Action Plan has been drawn up in accordance with Article 72(1)(1) of Energy Sector Act and the requirements laid down in Articles 8 and 9 of Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 (the Regulation) on the basis of the model set out in Annex VI to the Regulation. It is aligned with Bulgaria's National Risk Assessment (NRA) and the common risk assessment at the level of risk groups conducted in accordance with Article 7 of Regulation (EU) 2017/1938 (the Regulation). Bulgaria's Preventive Action Plan (PAP) has been drawn up by the interinstitutional working group established by Order No E-RD-16-457 of 27 August 2018 of the Minister for Energy.

Member States in the risk group

According to Annex I to the Regulation Bulgaria participates in three risk groups for gas supply. These are the Ukraine and Trans-Balkan (Eastern) risk groups and the Southern Gas Corridor (Southeast) risk group.

The Member States participating in the **Ukraine risk group** are Bulgaria, the Czech Republic, Germany, Greece, Croatia, Italy, Luxembourg, Hungary, Austria, Poland, Romania, Slovenia, Slovakia.

The Member States participating in the **Trans-Balkan risk group** are Bulgaria, Romania and Greece.

The Member States participating in the **Southern Gas Corridor — Caspian risk group** are Bulgaria, Greece, Croatia, Italy, Hungary, Malta, Austria, Romania, Slovenia and Slovakia.

Name of the competent authority responsible for the preparation of the plan

Bulgaria's competent authority responsible for the safety of natural gas supply within the meaning of Article 3(2) of Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 is the Minister for Energy — a special competence body of the central (executive branch of) government under whose authority a separate ministry operates.

The Ministry of Energy is the competent government institution responsible for implementing Bulgaria's energy policy.

MEMBER STATE	COMPETENT AUTHORITY
Republic of Bulgaria	Ministry of Energy Address: 1000 Sofia, 8 Triaditsa Str., Tel: (+359 2) 9263 152 Fax: (+359 2) 980 7630 E-mail: e-energy@me.government.bg; (http://www.me.government.bg)

The Energy and Water Regulation Commission (KEVR) is an independent specialist government body responsible for the regulation of activities in the sectors of

energy, water supply and sewerage. The Commission was established in 1999 under the name State Energy Regulation Commission. The responsibilities of the KEVR in the energy sector include energy market monitoring, price control and licensing of activities relating to the transmission, supply and distribution of electricity, the storage, transmission, supply and distribution of natural gas, trade in electricity, public supply of electricity and natural gas, and electricity and/or heat generation and transmission. (http://www.dker.bg)

1. Description of the system

1.1 Brief consolidated description of the regional gas system for each risk group in which Bulgaria participates

The regional gas system in South-East Europe comprises the transmission systems of the countries participating in the Ukraine and the Eastern Trans-Balkan risk groups.

1.1.1 Ukraine regional risk group

The Ukraine regional risk group for natural gas supply from the East comprises Bulgaria, the Czech Republic, Germany, Greece, Croatia, Italy, Luxembourg, Hungary, Austria, Poland, Romania, Slovenia, Slovakia.

Member States	Competent authority
Austria	Federal Ministry of Sustainable Development and Tourism
Bulgaria	Ministry of Energy
Croatia	Ministry of Environment and Energy
Czech Republic	Ministry of Industry and Trade
Germany	Federal Network Agency
Greece	Regulatory Authority for Energy
Hungary	Energy and Public Utility Regulatory Authority
Italy	Ministry for Economic Development
Luxembourg	Ministry of Economy
Poland	Ministry of Energy
Romania	RPRO Bucharest, Ministry of Energy
Slovenia	Energy Agency
Slovakia	Ministry of Economy

Map of the countries in the Ukraine Eastern risk group

In 2017, total consumption of natural gas in the countries participating in the Ukraine risk group stood at 243.69 bcm (2 673 TWh). Consumption was the highest in Germany (74 bcm, or 802 TWh) and the lowest in Croatia (0.11 bcm, or 1.15 TWh).

Liquefied natural gas (LNG) terminals operate in Greece (1), Poland (1) and Italy (3). In 2017, the total capacity for regasification of the terminals in this group stood at 79.5 mcm/day (872 Gwh/d), with Italy having the highest regasification capacity of 15.9 bcm/year. In the same year, Italy also had the highest rate of utilisation of LNG regasification capacity, which stood at 66 %.

In 2017, total active capacity for underground storage of natural gas in the countries from the Ukraine risk group stood at 59.1 bcm (648 TWh), with Germany having the highest capacity of approximately 24 bcm (263 TWh). In the same risk group, Greece, Luxembourg and Slovenia do not have underground gas storages.

In 2017, the total production of natural gas in the Member States in the Ukraine risk group stood at 33.61 bcm (369 TWh) or approximately 13.8 % of total natural gas consumption in the group. Production volumes were the highest in Romania (11.18 bcm, or 122.67 TWh) and the lowest in Greece (8 bcm, or 87.8 GWh). Out of the Member States in the risk group, Luxembourg is the only country that does not produce natural gas.

Natural gas consumption in the Ukraine risk group is approximately 220 Gsm³ and peak demand in 2018/2019 stood at approximately 1 400 GSm³/d.

The single largest gas infrastructure of common interest for the Ukraine (Eastern) risk group for gas supply is the **interconnection point (IP) Uzhgorod.**

The breakdown of gas import sources per country of origin for the Ukraine risk group is set out in the table below. Most natural gas imports originate from Russia.

Table 1 2018/2019 scenario data [MSm³/d]

Disruption (I_m)	**Capacity**
Uzhgorod	**227.4**
Ukrainian route	**336.5**

Ukraine risk group
Interconnection points (capacity MSm³/d)

	January 2019	**January 2021**
Bulgaria		
Strandzha/Malkoclar	0	5.5
Kyustendil/Zhidilovo	2.53	2.53
Total	**2.53**	**8.85**
Germany		
Bocholtz	45.3	45.3
Bocholtz-Vetschau	1.3	1.3
Bunde	0.0	0.0
Dornum	68.5	68.5
Ellund	2.8	2.8
Elten/Zevenaar	46.6	46.6
Emden EPT	48.9	48.9
Eynatten/Raeren/Lichtenbusch	29.2	29.2
Greifswald NEL	64.1	64.1
Greifswald Opal	101.7	101.7
Haanrade	0.5	0.5
Medelsheim	0.0	0.0
Oude Statenzijl H Gasunie	5.6	5.6
Oude Statenzijl H OGE	6.2	6.2
Oude Statenzijl L	30.2	30.2
RC Basel	0.0	0.0
RC Thayngen-Fallentor	0.0	0.0
Vreden/Winterswijk	20.1	20.1
Total	**471.0**	**471.0**
Greece		
Kipoi (TR) / Kipoi (GR)	4.5	4.5
Kipoi (TAP)	0	31.6
Total	**4.5**	**36.1**

Hungary		
Beregdaróc 1400	71.3	71.3
Beregdaróc 800	0	0
Total	**71.3**	**71.3**
Italy		
Mazara del vallo	110.8	108.4
Gela	49.3	44.5
Total	**160.1**	**152.9**
Luxembourg		
GDLux (BE) / Bras Petange (LU)	4.3	4.3
Total	**4.3**	**4.3**
Poland		
Tieterowka	0.7	0.7
Kondratki	104.7	104.7
Wysokoje	15.8	15.8
Drozdovichi (UA) – Drozdowicze (PL)	16.5	16.5
Total	**137.7**	**137.7**
Slovakia		
(UA) – Velké Kapušany (SK)	227.4	191.7
Budince	23.6	16.7
Total	**250.9**	**208.4**
Romania		
Ungheni	0	0
Isaccea (RO) – Orlovka (UA) I	26.9	26.9
Isaccea (RO) – Orlovka (UA) II	23.4	23.4
Isaccea (RO) – Orlovka (UA) III	18.8	18.8
Mediesul Aurit	34.6	34.6
Total	**103.7**	**103.7**

LNG regasification terminals

MSm³/d	**January 2019-2021**
Greece	13.2
Italy	51.9
Poland	14.4

(a) Describe the role of storage facilities relevant for the region, including cross-border access

The storage capacity (total and working gas) and cross-border access disaggregated by country belonging to the Ukraine risk group are set out in the table below.

2018	Storage capacity (GSm³)			Cross-border access
	Working gas	Reserves	Total	
Austria	5.744	-	5.744	yes
Bulgaria	0.141	0.509	0.650	authorised
Croatia	0.532	-	0.532	yes
Czech Republic	3.121	-	3.121	N/A
Germany	25.339	-	25.339	-
Greece	-	-	-	-
Hungary	4.670	-	4.670	-
Italy	13.065	4.620	17.685	authorised
Luxembourg	3.150	-	3.150	-
Poland	3.075	-	3.075	-
Romania	3.495	-	3.495	no
Slovakia	-	-	-	yes
Slovenia	-	-	-	-
TOTAL	**62.332**	**5.129**	**67.461**	

Maximal daily withdrawal capacity at various filling levels (storages at 100 % and 30 % of the maximum working volume) and gas demand occurring with a statistical probability of once in 20 years.

MSm³/d	2019			2021		
	at 100 % full	at 30 % full	Gas demand	at 100 % full	at 30 % full	Gas demand
Austria	66.4	44.4	55.3	66.4	44.4	55.3
Bulgaria	4.2	2.9	18.2	4.2	2.9	20.3
Croatia	5.8	3.2	16.6	5.8	3.2	16.6
Czech Republic	59.1	41	68.2	59.1	41	68.2
Germany	612.4	479.3	474.8	612.4	479.3	474.8
Greece	-	-	20.1	-	-	21.1
Hungary	78.6	68	77.4	78.6	69.5	89.5
Italy	263.2	171.8	443	291.3	190.8	438
Luxembourg	-	-	4.8	-	-	4.8
Poland	51.5	40.7	86.7	51.5	40.7	97
Romania	29	-	72	29	-	72
Slovakia	52.61	39.5	45.1	52.61	39.5	34.7
Slovenia	-	-	4.9	-	-	6.1
TOTAL	**1 222.81**	**890.80**	**1 387.10**	**1 250.91**	**911.30**	**1 398.40**

(b) Description of the role of domestic production in the Ukraine risk group

Most countries in the Ukraine risk group produce natural gas, although domestic production levels vary from country to country. The total approximate daily capacity of the countries is 90 MSm^3/d, and the average capacity is approximately 32 GSm^3.

MSm³/d	2019	2021
Austria	3.4	3.4

Bulgaria	0.6	1.1
Croatia	3.5	3.5
Czech Republic	0.5	0.4
Germany	26.2	6.2
Greece	-	-
Hungary	4.8	3.6
Italy	15.5	18.9
Luxembourg	-	-
Poland	7.2	7.2
Romania	29.5	25.7
Slovakia	0.2	0.3
Slovenia	-	-
TOTAL	**91.4**	**90.2**

(c) Description of the role of gas in the electricity production, gas-fired generating capacity, percentage of total generating capacity, and electricity cogeneration as a percentage of total generating capacity

In 2016, the total consumption of natural gas in electricity production in the countries participating in the Ukraine risk group stood at 65.65 bcm (720 TWh). Natural gas consumption (utilisation) for gas-fired electricity generation in 2016 was the highest in Italy (27.76 bcm, or 305 TWh) and the lowest in Luxembourg (92 mcm, or 1 009 GWh).

In recent years, the importance of natural gas in the structure of electricity generation has increased, leading to a corresponding increase in the number of gas-fired power plants in the group.

In 2018, total electricity production in the countries from the Ukraine risk group stood at 165.2 TWh, including 9.59 TWh by gas-fired power plants or 5.80 % of the total electricity generated. Electricity production by gas-fired power plants relies primarily on cogeneration. The annual consumption of natural gas by heat and electricity cogeneration plants is 2 557.7 mcm (27.95 TWh).

The total achievable capacity of gas-fired power plants connected to the national electricity grid (NPE) [sic] is 2 123 MW, or approximately 4.56 % of the maximum capacity of all generating plants (sources) connected to the NPE [sic]. Information about gas-fired electricity generation is set out in the table below.

Year	Gross electricity generation [GWh]	Electricity generation from natural gas [GWh]	%
2011	163 153	4 355	2.67 %
2012	159 853	4 485	2.81 %
2013	162 501	3 149	1.94 %
2014	156 567	3 274	2.09 %
2015	161 772	4 193	2.59 %
2016	162 626	5 776	3.55 %
2017	165 852	7 172	4.32 %
2018	165 214	9 590	5.80 %

Source: Head of the ERO (Energy Regulatory Office — European Commission)

Projections indicate an increase in the share of natural gas in the energy mix of some Member States in the coming years. Gas-fired power plants serving as reserve capacity and utilising renewable energy sources are expected to be the main source of increase in consumption.

(d) Description of the role of energy efficiency measures and their effect on annual final natural gas consumption

Legislation has been enacted in all Member States belonging to the Ukraine risk group, which requires all entities to implement energy efficiency projects. The obligation to achieve energy savings applies to all public and private sector entities. More specifically, energy savings are to be achieved through a variety of energy efficiency measures to be implemented by all public sector entities, including through energy performance contracts. Furthermore, applicable legislation provides for energy audits to be conducted by large enterprises every four years.

The mechanisms introduced by law seek to ensure the achievement of a set of energy efficiency targets by 2020 in line with the requirements laid down in national/EU/international standards.

The measures envisaged in applicable law are the basis for energy efficiency improvement and their specific nature means that they have a double effect on final annual natural gas consumption. On the one hand, the refurbishment and upgrade of the gas-fired equipment and installations used in industrial and/or other processes in the energy sector reduce final consumption and improve efficiency. On the other hand, fuel replacement projects (for example the use of gas-fired local cogeneration systems instead of boilers fired by fossil fuels) act as a driver for continued increase in natural gas consumption.

By Decree No 18 of 2 February 2015 the Council of Ministers adopted a National energy efficiency programme, which stipulates the conditions and procedure for granting financial assistance. The programme targets the upgrade of private residential buildings through implementation of the energy efficiency measures envisaged in the programme with a view to lowering energy costs, improving the operational parameters and extending the life-cycle of buildings, thereby creating a living environment that satisfies the criteria for sustainable development.

1.1.2 Eastern Trans-Balkan risk group

The Eastern Trans-Balkan risk group comprises Bulgaria, Greece and Romania. The total length of the gas transmission network of the countries belonging to the group is approximately 17 571 km. The final annual natural gas consumption in the countries in the risk group is 78.9 bcm. Most natural gas is used by industrial consumers (power plants, central heating utilities, various industries and the tertiary sector), and household consumers connected to the gas distribution network. The competent authorities of the three Member States are as follows:

Member State	Competent authority
Bulgaria	Ministry of Energy
Greece	Regulatory Authority for Energy (RAE)
Romania	Ministry of Energy

A map of the countries in the Eastern Trans-Balkan risk group, which shows the entry and exit points for the natural gas supplied to the region, is set out below.

The volume of domestic natural gas production in the countries in the Trans-Balkan risk group is approximately 30.1 MSm^3/day. A breakdown of domestic production volumes per country is set out below.

MSm^3/d	2019	2021
Romania	29.5	25.4
Bulgaria	0.6	1.1
Greece	-	-

The capacity (firm and/or interruptible) of the main interconnectivity points is set out in the table below.

Member State	Cross-border point	Direction	Direction	Minimum transmission pressure
			[M(S)m^3/d]	[bar-g]
Greece	Kulata (BG)/Sidirokastro (EL)	BG -> EL	11.4	47.75
		EL -> BG	4.33*	40.00
	Kipoi	TR -> EL	4.54**	50.00

Romania	Orlovka (UA)/Isaccea I (RO)	UA -> RO	18.76	48.00
	To Romania	UA -> RO	23.6	36.00
	Orlovka (UA)/Isaccea II (RO)	UA -> RO	26.93	50.00
	Orlovka (UA)/Isaccea III (RO)	UA -> RO	23.43	50.00
	Tekovo (UA) – Medieşu Aurit – Isaccea (RO)	UA -> RO	10.98	
	Csanádpalota (HU) – Arad (RO)	HU -> RO	4.8	
		RO - > HU	0.24 (4.80)	
	Ungheni (MO) – Iași (RO)	RO -> MD	0.12	
	Ruse (BG) – Giurgiu (RO)	RO -> BG	0.15	40.00
		BG -> RO	3	40.00
	Negru voda I	RO -> BG	17.44	31.50
	Negru voda II	RO -> BG	26.93	38.00
	Negru voda III	RO -> BG	23.43	38.00
Bulgaria	Negru voda 1(RO)/ Kardam (BG)	RO -> BG	19.92	31.50
	Negru voda 2, 3(RO)/ Kardam (BG)	RO -> BG	57.25	38.00
	Kulata (BG)/Sidirokastro (GR)	BG -> EL	10.882 (0.147)	47.75
		EL -> BG	4.42 (0.59)	40.00
	Strandzha (BG)/Malkoclar (TR)	BG -> TR	44.35	50.00
	Kyustendil (BG)/Zhidilovo (MK)	BG -> MK	2.53	40.00
	Ruse (BG)/ Giurgiu (RO)	RO -> BG	0.15	30.00
		BG -> RO	4.47 (0.732)	30.00
	Transfer point between NGTN and GTNTT ***	BG GTNTT -> BG NGTN	3.93 (1.96)	
		BG NGTN -> BG GTNTT	1.96 (3.93)	

*Equivalent to 4.1 M (N) m³ / d.

**Before January 2019 only 2.27 M (S) m³/day of capacity was considered available.

***Total capacity

1.2 Brief description of the gas system of each Member State

1.2.1 Greece's gas system

The national natural gas system (NNGS) of Greece supplies natural gas to consumers in the continental part of the country from the Bulgarian-Greek and Turkish-Greek borders and from the liquefied natural gas (LNG) terminal.

A diagram of the Greek gas transmission network is set out below.

The Greek gas transmission network has a total length of 1 456 km. It is connected to the transmission systems of Bulgaria and Turkey via interconnection points at Kulata/Sidirokastro and Kipoi, respectively. The network comprises a high-pressure gas pipeline (70 bar) with a length of 512 km and pipe diameter of 36", and several high-pressure branches (70 bar) with a total length of 954 km and pipe diameter of 30", which supply gas to various parts of the country. Liquefied natural gas is also supplied via the Revithoussa terminal, which has a total capacity of 225 000 m³. Greece does not produce natural gas and there are no underground natural gas storages in the country. By the end of 2020, the Greek gas transmission network will be expanded with the completion of the Trans-Atlantic Pipeline (TAP) and in the future new pipelines and LNG terminals are expected to be constructed. In 2017, total natural gas consumption stood at 5 GSm³.

1.2.1 Romania's gas system

A total of nine cross-border pipelines cross Romania's territory – 5 connecting the country's transmission network to that of Ukraine, 3 to Bulgaria's network and 1 to Hungary's network. There are 6 cross-border entry points (EP) and 3 exit points (EXP) to Moldova (Ungheni), Ukraine (Orlovka/Isaccea and Medisul Aurit/Tekovo), Bulgaria (Negru Voda/Kardam and Ruse /Giurgiu), and Hungary (Csanapadlota/Nadlac). The current setup of the system allows natural gas to be exported via the interconnectors at the Romanian-Hungarian, Romanian-Moldovan and Romanian-Bulgarian borders. The Romanian section of the Trans-Balkan pipeline from Ukraine through Romania to Bulgaria, Greece, Turkey and

North Macedonia comprises three gas transit lines with a total capacity of 25.18 bcm/year (Transit Lines 1, 2 and 3, respectively). Transit lines 2 and 3 are technologically linked and operate as a single gas transmission system.

A diagram of the Romanian gas transmission network is set out below.

Romania's gas transmission network has a total length of 13 350 km. It includes an underground gas storage facility with total working gas capacity of 3 130 GSm³.

According to the draft Romanian Energy Strategy in the period 2016-2030 annual domestic natural gas production is expected to remain at the level of 9-10 bcm. In 2016, annual domestic production stood at 9.2 bcm, which is insufficient to cover the country's total annual domestic consumption. A possibility has been envisaged for surplus quantities of gas produced in Romanian territorial waters to be supplied to the Balkan Gas Hub.

In 2017, domestic natural gas production in Romania stood at 10.7 Gsm³ and total natural gas consumption at 70.9 GSm³.

1.2.3 Bulgaria's gas system comprises all activities relating to the production, transmission, storage, distribution and supply of natural gas to satisfy clients' needs. It includes facilities and infrastructure that enable the production, transmission, storage and distribution of natural gas in the country. These operate as a single interconnected gas transportation system. Bulgaria's gas system comprises the gas transmission network with a total length of 2 799 km and the underground gas storage facility in Chiren (UGS Chiren). It is connected to Romania's system via interconnectors at Negru voda/Kardam and Ruse/Giurgiu; to Greece via an interconnector at Kulata/Sidirokastro; to North Macedonia via an interconnector at Kyustendil/Zhidilovo; and to Turkey via an interconnector at Strandzha/Malkoclar. Until 2019, approximately 97 % of domestic demand for natural gas was covered by (Russian) natural gas imports via EP Negru voda. Domestic natural gas is extracted onshore at GMS Dolni Dabnik and offshore at GMS Galata. Both gas fields are connected to transmission system via entry points. Following a switch on 1 January 2020, the main entry point for natural gas supplied to Bulgaria is now at Bulgarian-Turkish border

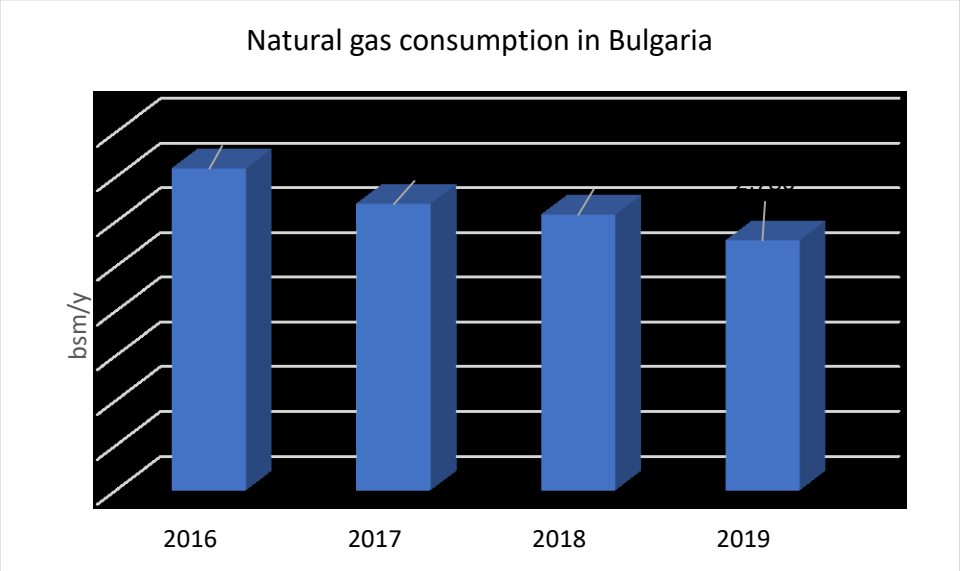
(IP Strandzha-2/Malkoclar), which became operational at the end of 2019. Surplus capacity is traded on the Regional [capacity] booking platform (RBP).

Bulgaria's gas transmission system is provisionally divided into two segments: the national gas transmission network (NGTN) used to supply natural gas to most household customers and the gas transit network (GTN) used for the transit of natural gas to Turkey, Greece and North Macedonia. The national network comprises 1 835 km of long-distance gas pipelines and high-pressure (54 bar) branches, three gas compressor stations (GCS Kardam-1, GCS Valchi dol and GCS Polski Senovets) with a total installed capacity of 49 MW, pressure regulating stations, metering stations, a system for electro-chemical protection, gas purification plants, a communication and information system, and other ancillary equipment. The gas transit network, which is primarily used for the transmission of natural gas to neighbouring countries, also supplies natural gas to household customers connected to the network. It comprises 964 km of high-pressure (54 bar) pipelines, six gas compressor stations (GCS Kardam-2, GCS Provadia, GCS Lozenets, GCS Strandzha, GCS Ihtiman and GCS Petrich) with a total installed capacity of 270 MW, pressure regulating stations, metering stations, a system for electro-chemical protection, gas purification plants, a communication and information system and other ancillary equipment. Transfer points between the gas transmission networks enable the transmission system operator (TSO) to supply quantities of natural gas to individual consumers. The underground gas storage (UGS) in Chiren is an important component of Bulgaria's gas system. It has a total storage capacity of 1 300 mcm, including 550 mcm for working gas and 750 mcm for buffer gas.

(a) Main figures on natural gas consumption in Bulgaria

The breakdown of annual domestic natural gas consumption per year for the period 2016-2019 is as follows:

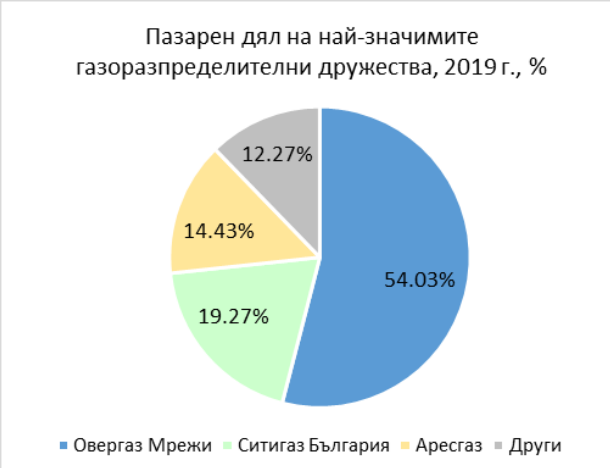
- 2016 — 3.59 bcm;
- 2017 — 3.196 bcm;
- 2018 — 3.073 bcm;
- 2019 — 2.786 bcm.



The major consumers of natural gas in Bulgaria are enterprises operating in the energy sector and the chemical industry, with a total share of more than 60 % (80 % in 2019). The breakdown of natural gas consumption by year is as follows:

- 2016 — 2.024 bcm;
- 2017 — 2.097 bcm;
- 2018 — 1.962 bcm;
- 2019 — 1.883 bcm.

Gas distribution companies in Bulgaria have a relative share of 15 % of total consumption, with an increase in the sales of natural gas registered in recent years, which is driven by the expansion of the gas distribution network. In 2016, gas distribution companies supplied 0.448 bcm of natural gas to their customers and in 2017, 2018 and 2019 the corresponding quantities stood at 0.512 bcm, 0.519 bcm and 0.505 bcm, respectively. The gas distribution companies with the largest market shares are Overgaz Mrezhi AD, Citygaz Bulgaria EAD and Aresgaz AD. Their respective market shares are shown in the charts below.



In terms of structure, a breakdown of sales per category of consumer (client) in 2018 and 2019 is set out in the chart and table below.

The quantities and the number of customers per type in the period 2016–2019 are as follows:

Customers	**2016**	**2017**	**2018**	**2019**	**2016**	**2017**	**2018**	**2019**

	bcm	bcm	bcm	bcm	number	number	number	number
Household	0.074	0.091	0.099	0.101	71 692	80 784	91 784	101 050
Non-household	0.374	0.421	0.420	0.404	5 866	6 321	6 101	6 894

Regardless of the increase in natural gas consumption by household customers, their share remains relatively low at 3 % of total domestic natural gas consumption.

(b) Functioning of the gas system at national level

The functioning of Bulgaria's gas system is directly linked to the operation of the enterprises under the jurisdiction of the Ministry of Energy — Bulgargaz EAD, Bulgartransgaz EAD and the underground gas storage in Chiren (UGS Chiren).

Bulgartransgaz EAD is a sole shareholder joint-stock company established in accordance with the Commercial Act under the jurisdiction of the Bulgarian Energy Holding EAD. By Decision No R-046 of 29 November 2006 of the DKEVR Licence No L-2014-14 of 29 November 2006 was issued to Bulgargaz EAD for the public supply of natural gas in Bulgaria. The licence is valid for a period of 35 years. For the entire effective period of the licence, Bulgargaz EAD is authorised to perform the following activities:

- conclude contracts with producers of and traders in natural gas for the purchase the necessary quantities of natural gas to cover demand from consumers connected to the gas transmission network as well as the agreed quantities necessary for the operation of public suppliers;
- conclude agreements for the sale of natural gas to clients;
- conclude agreements for the transmission of natural gas with the transmission company and distribution companies;
- conclude agreements for the storage of natural gas with storage facility operators;
- perform other necessary activities relating to the public supply of natural gas;
- ensure the uninterrupted and high-quality supply of natural gas;
- conclude contracts for the sale of natural gas with clients who are not directly connected to the gas transmission network or with public suppliers in accordance with the provisions laid down in applicable law. The enterprise may not refuse to conclude the contracts concerned.

Bulgartransgaz EAD is a combined gas operator engaged in the transmission and storage of natural gas. The company implements a policy of transparency and responsibility with a view to ensuring the security and sustainable development of the Bulgarian and regional markets in natural gas in line with the principles of equal treatment and transparency. As part of the trans-European gas network, the company operates in compliance with the requirements of the third energy liberalisation package and those set out in EU and national law. In its capacity as combined transmission system operator (TSO) and gas storage operator (GSO), it enables the development and reliable functioning of natural gas transmission and storage infrastructure in Bulgaria. Bulgartransgaz EAD is the operator of Bulgaria's single gas transmission system, which enables the transmission of natural gas to distribution networks, non-household customers and the neighbouring countries of Romania, Greece and North Macedonia as well as the storage of natural gas at USG Chiren to ensure that sufficient capacity is available at all times to cover seasonal fluctuations in consumption and safeguard the security of supply. The company performs the activities of natural gas transmission and storage under dedicated licences issued on 29 November 2006 by the Energy and Water Regulation Commission, and more specifically Licences Nos L-214-06 and L-214-09 (for natural gas transmission) and L-214-10 (for the storage of natural gas). It develops its network in line with regional and common European

plans and priorities in a manner that ensures free flow of natural gas through Bulgaria and access to different sources.

The activities relating to the distribution and supply of natural gas to clients connected to the distribution networks are performed by regional and local gas distribution companies. These (mostly private) entities operate under the terms of issued licences and the prices they charge are subject to regulation. The two gas producers in Bulgaria and the two principal groups of clients, notably gas distribution companies and non-household clients, are connected to the gas transmission network of Bulgartransgaz EAD.

The Chiren underground gas storage is situated in Chiren village in North East Bulgaria within the perimeter of a depleted gas-condensate deposit. The storage is equipped with the necessary underground and ground equipment for injecting and withdrawing natural gas and preserving the quality of gas in storage. UGS Chiren comprises 24 operational drills and a compressor station with total installed capacity of 10 MW. Its current capacity is sufficient for the storage of 550 mcm of natural gas. The withdrawal and injection capacity is directly dependent on the pressure exerted by injected layers of gas and the total amount of gas in storage. The minimum and maximum withdrawal capacity is 0.5 mcm/day and 3.82 mcm/day, respectively. Where necessary, this capacity can be increased up to 4.7 mcm per day by means of enforced (emergency) withdrawal. However, emergency withdrawal is only possible when the gas storage facility is full and can be maintained for a period of up to 30 days.

(c) Identification of the key infrastructure relevant for the security of gas supply

The key infrastructure relevant for the security of natural gas supply in Bulgaria is described below. It comprises:

- the gas transmission system as a whole, including all long-distance gas pipelines and compressor stations;
- the Chiren underground gas storage, together with all specialist underground and ground equipment necessary for gas injection and withdrawal and for preserving the quality of natural gas in storage, and a compressor station with a total installed capacity of 10 MW;
- the entry and exit point of GMS Chiren, which connects the gas storage to the transmission network;
- the entry and exit point of IP Negru voda 1/Kardam, which connects the transmission network of Bulgartransgaz EAD and the gas transmission system operated by TRANSGAZ S.A. (Romania). This point is situated at the Bulgarian-Romanian border in the area of Negru voda/Kardam;
- the entry and exit point of IP Kulata/Sidirokastro, which connects the transmission network of Bulgartransgaz EAD and the gas transmission system operated by DESFA S.A. (Greece). This point is situated at the Bulgarian-Greek border in the area of Kulata/Promahonas;
- the entry and exit point of the Ruse/Giurgiu reverse-flow interconnector (IP), which connects the transmission network of Bulgartransgaz EAD and the gas transmission system operated by TRANSGAZ S.A. (Romania). The point is situated at the Bulgarian-Romanian border in the area of Ruse/Giurgiu;
- the Strandzha 2/Malkoclar IP entry point, along with the Strandzha gas metering station, which connects the transmission network of Bulgartransgaz EAD and Turkey's network;
- transfer point between the national gas transmission network and the gas transit network, including the gas metering stations (GMS) in Ihtiman and Lozenets — an aggregator connecting the two networks and enabling them to supply natural gas to their respective clients.

(d) [Breakdown of] natural gas import sources

The table below sets out a breakdown of the sources of natural gas imports in 2018 and 2019:

No	Type of supply	Year 2018		Year 2019	
		Quantity, GWh	Relative share	Quantity, GWh	Relative share
1	Imported natural gas, incl.	31 630	99.9 %	30 390	99.8 %
1.1	Russian Federation	31 613	99.8 %	24 802	81.4 %
1.2	Other sources	17	0.1 %	5 588	18.4 %
2	Domestic production	33	0.1 %	75	0.2 %
TOTAL		**31 663**	**100 %**	**30 465**	**100 %**

Bulgaria produces only limited quantities of natural gas. Exploration is under way in the Black Sea economic zone and recently discovered gas deposits are expected to be developed.

(e) Description of the role of storage of natural gas in Bulgaria

On the basis of Licence No L-214-10 of 29 November 2006 issued by the DKEVR Bulgartransgaz EAD provides natural gas storage services through a proprietary underground gas storage in Chiren (UGS Chiren). The quantities of gas in storage are used to cover seasonal fluctuations in natural gas consumption and ensure the security of gas supply. When filled to capacity, UGS Chiren can cover approximately 25 % to 30 % of the daily demand for natural gas during the cold months of winter. The quantities of natural gas injected into/withdrawn from the storage depend on market conditions and on the optimal technical capacity of UGS Chiren, subject to compliance with the rules for operational safety and security.

The companies that supply natural gas to clients with fluctuations in seasonal consumption (including heating utilities and suppliers to end customers) are required to ensure that sufficient quantities of natural gas are available to compensate for any fluctuation in client consumption within a range of 10 % to 20 % of the annual quantities of gas ordered for supply to clients with fluctuating seasonal consumption, including heating utilities and suppliers of end consumers.

Bulgartransgaz EAD is required to ensure that sufficient capacity is available for injecting and storing such additional quantities of natural gas with an indicative total volume of 290 mcm.

The seasonal fluctuation in supply is calculated by using a fluctuation factor (KN) as follows:

KN = Vs / Vw

Vs — the quantities used in the previous year in the period between April and September;

Vs — the quantities used in the previous year in the periods between January and March and October and December, respectively.

When KN is less than 0.6, supply is deemed to fluctuate, and in all other cases – to be even.

In order to verify the information set out in the contracts for supply of natural gas to clients with seasonal fluctuations in consumption, the companies supplying gas to such

clients are required to provide to the competent authority a model contract, in redacted form to edit out any commercially sensitive information of Bulgartransgaz EAD, giving an indication of the storage and injection capacity requested by each company on the basis of the reported information.

The Chiren gas storage is currently regarded as having primarily local importance and is used as an instrument to compensate seasonal fluctuations in consumption and supply of natural gas in Bulgaria. In the long term, it has the potential to evolve into a commercial storage with a major role in bolstering competition and consumer benefits in a natural gas market that is connected to and well integrated into the regional market.

The development of interconnections with neighbouring countries, including the Republic of Serbia and the Hellenic Republic, along with the implementation of several other priority projects, will enhance regional market integration and ensure that UGS Chiren plays an increasingly important role by boosting the flexibility of regional gas transmission systems, enabling better management of network congestion and seasonal optimisation of the use of gas transmission networks. The Alexandroupolis project for an independent natural gas system (Liquefied natural gas terminal in Alexandroupolis, Greece) has been included in the Fourth list of projects of common interest (PCI) of the European Union The infrastructure comprises a floating terminal (Floating, storage and regasification unit, FSRU) for LNG reception, storage and regasification, which will be situated in the coastal area of Alexandroupolis.

(f) Storage capacity (total and working) compared to demand during the heating season

UGS Chiren has a total holding capacity of 1 300 mcm and total working gas storage capacity of 550 mcm. The remaining capacity of 750 mcm is reserved for buffer gas storage. The quantities of natural gas withdrawn and injected and the relevant figures for 2016, 2017, 2018 and 2019 are set out in the tables below.

UGS Chiren	Year 2016	Year 2017	Year 2018	Year 2019
	bcm	bcm	bcm	bcm
Injected quantity	0.320	0.325	0.319	0.410
Withdrawn quantity	0.342	0.325	0.324	0.358
Average daily withdrawal for 1 month	0.0022	0.0021	0.0022	0.0024
Minimum average daily withdrawal for 1 month	0.00072	0.00079	0.00064	0.00107
Maximum average daily withdrawal for 1 month	0.00299	0.00304	0.00315	0.00323

i) **Storage capacity (total and working) compared to demand during the heating season**

Natural gas consumption in Bulgaria

Consumption in Bulgaria during the heating season 2016-2017							
	October 2016	November 2016	December 2016	January 2017	February 2017	March 2017	April 2017
mcm	259.98	312.87	380.49	448.11	343.12	301.33	248.45
GWh	2 747.6	3 283.5	4 002.5	4 745.1	3 663.4	3 196.7	2 643.9

Consumption in Bulgaria during the heating season 2017-2018

	October 2017	November 2017	December 2017	January 2018	February 2018	March 2018	April 2018
mcm	238.26	310.32	346.87	370.29	336.42	332.69	193.67
GWh	2 521.5	3 292.5	3 664.7	3 911.3	3 554.3	3 349.7	2 040.9

Consumption in Bulgaria during the heating season 2018-2019							
	October 2018	**November 2018**	**December 2018**	**January 2019**	**February 2019**	**March 2019**	**April 2019**
mcm	221.4	298.1	386.8	396.5	324.6	282.2	250.4
GWh	2 334.0	3 144.8	4 088.9	4 185.6	3 421.4	2 971.3	2 640.8

Consumption in Bulgaria during the heating season 2019-2020							
	October 2019	**November 2019**	**December 2019**	**January 2020**	**February 2020**	**March 2020**	**April 2020**
mcm	180.7	256.0	330.0	365.1	318.6	300.0	230.2
GWh	1 918.8	2 715.4	3 494.8	3 863.1	3 358.4	3 163.0	2 425.0

(g) Description of the role of storage facilities relevant for the risk group, including cross-border access

The Chiren gas storage is currently regarded as having primarily local importance and is used as an instrument to compensate seasonal fluctuations in consumption and supply of natural gas in Bulgaria. In this context, the companies that supply natural gas to clients with fluctuations in seasonal consumption (including heating utilities and gas suppliers to end customers) are required to ensure that sufficient quantities of natural gas are available to compensate for any fluctuation in client consumption within a range of 10 % to 20 % of the annual quantities ordered. Bulgartransgaz EAD, in its capacity as operator of the Chiren gas storage facility, is required to ensure that sufficient capacity is available for the injection, storage and withdrawal of such additional quantities with an indicative total volume of 290 mcm. In the long term, it has the potential to evolve into a commercial storage facility with a major role in bolstering competition and consumer benefits in a natural gas market that is connected to and well integrated into the regional market.

The main parameters of the Chiren gas storage facility during the period 2018-2019 (winter cycle), including cross-border access, are set out in the table below.

Cross-border access	**Volume (MSm^3)**		**Generating capacity (MSm^3/d)**			
	Reserve *	Available firm commercial capacity	Initial	At the beginning of January or 50 %	At the end of February or 20 %	At the end of March
Authorised and used	392.5	157.5	1.8**	3.1	2.6	1.8

* Capacity to ensure the security of supplies for consumers and maintain balance.
** Production capacity (MSm^3/d) in November 2018

MSm^3/d — million standard cubic metres (conditions - T=20°C и P=1,01325 bar(a)) gas per day (24 hours).

Storage capacity (total and working/active gas)

Total volume of gas at UGS Chiren, incl.	1 300 mcm

Buffer gas	750 mcm
Active gas	550 mcm

The current capacity of the storage facility (active gas volume in energy units) is 5 813 500 MWh at upper limit value for natural gas caloricity of 10.57 MWh/1 000 m^3.

Maximum daily withdrawal capacity at different levels of gas in storage

The daily capacity for gas withdrawal is directly dependent on the current pressure exerted by the layers of gas in the underground gas reservoir and on the amount of gas in storage. Where necessary, this can be increased up to 4.7 mcm per day by means of enforced (emergency) gas withdrawal. However, emergency withdrawal is only possible when the gas storage is full and can be maintained for a period of up to 30 days.

Withdrawal and injection capacity of the Chiren gas storage facility

Capacity	**Injection**	**Injection**	**Withdrawal**	**Withdrawal**
daily	mcm/day	MWh/day	mcm/day	MWh/day
Maximum	3.2	33.824	3.82 /4.7*	40 377 / 49 679*
Minimum	0.5	5 285	0.5	5 285

The gas volume in energy units has been calculated at upper limit value for natural gas caloricity of 10.57 MWh/1000m^3.

* Maximum capacity for withdrawal in enforced (emergency) mode.

The withdrawal and injection capacity is directly dependent on the pressure exerted by the layers of gas already injected and the total amount of gas in storage.

(f) Description of the role of domestic production in Bulgaria

There are two companies engaged in natural gas production in Bulgaria — Petroceltic and Oil and Gas Exploration and Production (*Prouchvane i dobiv na neft i gaz*) AD. During the period 2016–2019 the companies produced the following quantities of natural gas:

Year	**2016**	**2017**	**2018**	**2019**
	bcm	bcm	bcm	bcm
Domestic production – total	0.072	0.056	0.012	0.017

The quantities of natural gas from domestic production are insignificant and insufficient to cover domestic demand, meaning that most natural gas necessary to cover the needs of domestic consumers is imported.

(g) The role of gas in the electricity production in Bulgaria (capacity for gas-fired electricity production (total in MWh) and as a percentage of total production capacity and electricity cogeneration (total in MW)).

In Bulgaria, natural gas is predominantly used for electricity production by combined heat and electricity (cogeneration) plants. The largest cogeneration plants are:

- Toplofikatsiya Sofia EAD – TPP Sofia and TPP Sofia Iztok – 239 MWe (3437.9 MWt) in total installed capacity;
- EVN Bulgaria Toplofikatsiya EAD – 80 MWe (445 MWt) in total installed capacity;
- Veolia Energy Varna EAD – 11.22 MWe (55.43 MWt) in total installed capacity;

- Toplofikatsiya Burgas EAD – 17.82 MWe (74.45 MWt) in total installed capacity;
- Toplofikatsiya Pleven EAD – 68 MWe (466 MWt) in total installed capacity;
- Toplofikatsiya Vratsa EAD – 8.24 MWe (72 MWt) in total installed capacity;
- Toplofikatsiya Razgrad EAD – 3.014 MWe (29 MWt) in total installed capacity;
- Toplofikatsiya Veliko Tarnovo EAD – 2.81 MWe (173 MWt) in total installed capacity.

The above cogeneration plants produce heat and electricity using exclusively natural gas.

- Toplofikatsiya Pernik AD has two coal-fired steam generators and a gas-fired steam generator. When natural gas is used, the unit capacity can reach up to 15 MWe;
- Biovet AD Peshtera — 18.5 MWe (99 MWt) in total installed capacity.

Gas-fired electricity generation also takes place at the Varna Thermal Power Plant (TPP), a condensation plant with an installed capacity of 630 MWe. Until June 2020, TPP Varna was used as a cold reserve facility.

The total quantities of natural gas in electricity and heat production in Bulgaria in the period 2016–2019, in bcm/year, are set out in the table below:

Type production	**2016**	**2017**	**2018**	**2019**
	bcm/y	bcm/y	bcm/y	bcm/y
Natural gas for electricity generation	0.345	0.331	0.345	0.362
Natural gas for heat generation	0.768	0.774	0.772	0.721
Total:	**1.113**	**1.105**	**1.117**	**1.083**

The generating capacity of gas-fired electricity plants in Bulgaria as compared to total generating capacity in the electricity sector is small but essential for the national energy balance. The consequences of a disruption in natural gas supply in the electricity sector are unlikely to have a significant impact on the domestic electricity market on account of the low share of gas-fired electricity plants in total generating capacity. However, a disruption in the supply of heat by district heating utilities would cause the population to switch to electricity for heating, which could overload the electricity system.

(h) Role of energy efficiency measures and their effect on annual final gas consumption in Bulgaria

By Decree No 18 of 2 February 2015 the Council of Ministers adopted a National energy efficiency programme for multi-unit residential buildings (the Programme), the conditions and procedure for granting financial assistance under the programme and for the designation of bodies responsible for its implementation. The programme provides assistance for the renovation of multi-unit residential buildings with a view to improving living conditions for citizens in multi-unit residential buildings, ensuing heat comfort and a better living environment, and lowering heating costs through the implementation of energy efficiency measures.

The latter lower the electricity consumption of households and have a cost-saving effect. Grant financing is available under the programme for the most effective package of energy efficiency measures necessary to upgrade the building to energy class C in accordance with Regulation No 7/2004 on energy efficiency, heat retention and energy savings in buildings. The district heating utilities supplying heat to consumers in the largest cities in Bulgaria operate as gas-fired thermal power plants. Energy efficiency measures

thus lower gas consumption and have a direct impact on the stability and functioning of the national electricity and gas transmission system. Their implementation thus seeks to achieve a significant reduction in the specific final consumption of electricity of households. To date, Bulgaria has not achieved the full impact of energy efficiency measures and will therefore continue to implement the programme in the future.

2. Risk assessment summary

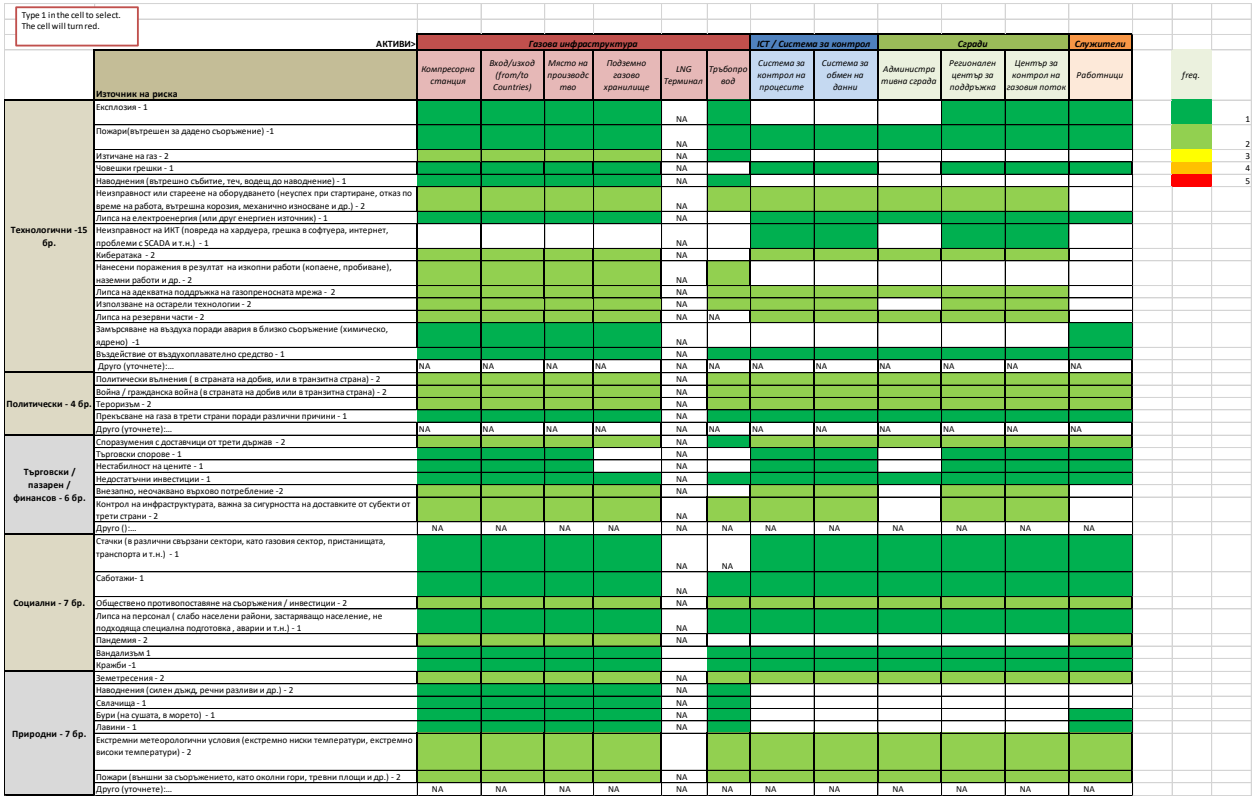
The conducted national risk assessment (NRA) covers 5 main groups of risk factors, depending on their source (political, technological, social, commercial/market/financial and natural). Threats can arise from acts, omissions or natural phenomena. A total of **39 types** of specific risks at group level which may affect the security of natural gas supply were identified during the course of the assessment. Some of them present a threat to the functioning of all elements of gas infrastructure while the impact of others is local or limited to individual components of the system. The most vulnerable gas transmission system elements are compressor stations, interconnector entry and/or exit points, underground gas storages, pipelines, the gas flow control centre, etc. Although most risks have a very low to low (1-2) probability of materialising, they have the potential to affect various elements of gas infrastructure. While a single risk does not present a major threat in itself, several different risks materialising at the same time may cause the situation to rapidly deteriorate and lead to disruptions in supply.

The risk assessment clearly shows that **20 risk factors** pose a very low level of threat and that the probability of their occurrence is correspondingly very low (1). The impact of this group of risks is mostly local and does not present a long-lasting threat to the security of supply. The consequences of such risks can usually be overcome by the relevant system operators at national level.

The risk assessment further shows that **19 risk factors** pose a low level of threat and have a correspondingly low probability of occurring (2). In most cases, when these risk factors occur independently, they do have the potential to affect gas infrastructure but their adverse consequences are not expected to lead to long-lasting disruptions in supply. However, complications may arise in a situation of such risks getting out of control, particularly in combination with other adverse circumstances.

Some of the risks have the potential to escalate to a higher level of threat and cause a cascade effect throughout the system, leading to unacceptable consequences. The combined impact of one or several risks being felt by a country at the same time may have serious consequences for gas infrastructure and cause disruptions in gas supply to the affected country and other countries in the risk group, lasting between one and several weeks. Such an eventuality will also affect protected customers and may partly affect the interruptible market, export, electricity cogeneration, [and] industrial demand. In such a scenario, non-market-based measures will be required in order to safeguard protected customers. Such measures will have to be continually monitored by teams on duty in order to prevent abrupt escalation of risk situations and difficulties in addressing their consequences.

The criteria used to determine whether a system is exposed to a high/unacceptable risk are set out in the Risk Severity Table proposed by the Joint Research Centre (JRC) of the European Commission. The table defines five levels of risk probability. The risks in the green section of the table have the lowest probability of occurring and those in the red section are the unacceptable risks that may trigger a crisis and must therefore be prevented. Each risk factor has been assessed on the basis of criteria that are specific to the risk concerned. For this reason, the overall picture regarding the impact of each factor is exceedingly complex and dynamic. Nevertheless, having it in place may help gas supply security experts gain better understanding of the preventive measures that need to be taken.



(a) A list of the relevant risk scenarios according to the risk factors and their probability is set out in the table of the Joint Research Centre of the European Commission. The scenarios have been selected depending on their probability and the impact they are expected to have on supplies to Bulgaria.

Scenario	Variant	Name	Description	Duration of event (days)	Time frame	Demand	UGS level	LNG availability	Imports from Norway	Imports from Russia	fr
S.01	a	Failure of the Ukrainian Corridor	N-1 case: failure of the cross-border point of Uzhgorod (UA) - Velké Kapušany (SK)	7	Beginning of February	1-in-20 7-day peak demand	Beginning of February	send-out capacity 100% for 4 days and at 75 % for 3 days	✓	✓	
	b		Failure of all cross-border points with Ukraine	14	Beginning of February	1-in-20 14-day peak demand	Beginning of February	send-out capacity 100 % for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✓	
	c		Failure of all cross-border points with Ukraine	30	Beginning of February	1-in-20 30-day peak demand	Beginning of February	send-out capacity 100% for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✓	
S.02	a	Failure of the Ukrainian Corridor during a cold spell event	N-1 case: failure of the cross-border point of Uzhgorod (UA) - Velké Kapušany (SK)	7	Second week of March	7-day peak demand	Second week of March	send-out capacity 100 % for 4 days and at 75 % for 3 days	✓	✓	
	b		Failure of all cross-border points with Ukraine	14	Second week of March	14-day peak demand	Second week of March	send-out capacity 100% for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✓	
S.03	a	Failure of Russian Exports to EU	Stop of flow from all Russian related supply corridors	14	Beginning of February	1-in-20 14-day peak demand	Beginning of February	send-out capacity 100% for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✗	
	b			30	Beginning of February	30-day peak demand	Beginning of February	send-out capacity 100% for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✗	
S.04		Failure of Baumgarten	stop of the flow in the station	7	Beginning of February	7-day peak demand	Beginning of February	send-out capacity 100 % for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✓	
S.05		Failure of Lanžhot	stop of the flow in the station	7	Beginning of February	7-day peak demand	Beginning of February	send-out capacity 100% for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✓	
S.06		Failure of Oberkappel	stop of the flow in the station	7	Beginning of February	7-day peak demand	Beginning of February	send-out capacity 100% for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✓	
S.07		Failure of Isaccea (RO) - Orlovka (UA)	stop of the flow in the station	7	Beginning of February	7-day peak demand	Beginning of February	send-out capacity 100% for 4 days and at 75 % for 3 days, timing for next ship to be defined	✓	✓	
S.08		Supply failure from Algeria	Stop of supply sources of Algerian origin (pipeline and LNG)	30	Beginning of February	1-in-20 30-day peak demand	Beginning of February	BAU average of past 3 years	✓	✓	

Legend

- ✗ Not available
- ! With limitations
- ✓ Always available

Out of the 8 main risk scenarios for gas proposed by ENTSOG (including the 7-day, 14-day and 30-day time scale sub-scenarios, or a total of 12 scenarios), six have been taken into consideration on account of the expected curtailment or disruption of natural gas supply, coupled with the potential harm to the interests of protected customers and the subsequent social and economic impact on heating utilities, electricity generation, etc.

The worst case scenario is **S.03 (a,b)** — disruption of supplies from Russia to the European Union, with halted gas flow along all corridors connected to Russia for 14 days and 30 days.

Other risk scenarios have also been taken into consideration, such as **S.01 (b,c)** involving halted gas flow along the Ukrainian corridor for 14 days and 30 days, **S.02 (b)** involving disruption along the Ukrainian corridor lasting from 7 days up to 14 days due exceptionally cold weather, and **S. 07** involving disruption along the Ukrainian corridor at IP Isaccea (RO)/Orlovka (UA) for 7 days.

(b) Main conclusions of the risk assessment

The final result of the overall risk assessment for natural gas supply to Bulgaria demonstrates that, in terms of severity, no risks leading to major, severe or catastrophic consequences in Bulgaria have been identified, but that there is a possibility for such risks to materialise. None of the risks identified is unacceptably high and therefore requiring immediate action in order to be eliminated. Most identified risks have a low probability of materialising and a low potential for destruction. Their impact remains limited to individual components of gas infrastructure. The risks will not have a major impact on supplies to other countries in the risk group and to protected customers. In order to be addressed, they must be included in the Emergency Action Plan.

The highest constant risks for gas supplies to the countries in the group are **political risks and the risk of a global pandemic taking hold.** As risks are not limited to a single geographical area, they may lead to disruptions in gas supply to third countries for a number of reasons. This group includes approximately one-fourth of all risks assessed and, in the event of any of them materialising, their estimated **impact rating is 2**. In the event of any of the identified risks materialising, supplies may be disrupted for more than a week, which will create difficulties for basic service providers and protected customers alike. In combination with the commercial, market and financial risks associated with the fluctuating prices of natural gas, these may cause supply to collapse.

Analyses show that existing standard infrastructure and supply conform to requirements to a sufficient degree. The use of the N – 1 formula at regional level conclusively demonstrates that the technical capacity of gas infrastructures is sufficient to cover the total gas demand of the countries belonging to the risk group in the event of disruption of the single largest gas infrastructure.

3. Infrastructure and supply standard (Article 5)

3.1. Calculation of the N – 1 formula (for the Ukraine Eastern risk group)

As envisaged in Article 5 of the Regulation, the competent authorities of the respective Member States may agree to provide the calculation of the N – 1 formula at regional level in the common risk assessment (Article 7) with due respect to point 5 of Annex II.

The N – 1 formula describes the ability of the technical capacity of the gas infrastructure to satisfy total gas demand in the calculated area in the event of disruption of the largest gas infrastructure during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years (Dmax). N – 1 formula [sic]

For the Ukraine risk group, the Member States have provided the following national Dmax values:

[MSm³/d]	D_{max} 2018/2019	D_{max} 2020/2021
Austria	55.3	55.3
Bulgaria	18.2	20.3
Croatia	16.6	16.6
Czech Republic	68.2	68.2
Germany	474.8	474.8
Greece	20.1	21.1
Hungary	77.4	77.4
Italy	443.0	438.0
Luxembourg	4.8	4.8
Poland	86.7	97
Romania	72	72
Slovakia	45.1	34.7
Slovenia	4.9	6.1

As envisaged in Annex II to the Regulation, the N – 1 formula at regional level has been calculated using the single largest gas infrastructure of common interest. The largest gas infrastructure of common interest for the Ukraine Eastern risk group is IP Uzhgorod.

The calculation of the N – 1 formula at regional level conforms to point 4 of Annex II *Calculation of the N – 1 formula using demand-side measures*:

$$N-1[\%]=\frac{EP_m+P_m+S_m+LNG_m-I_m}{D_{\max}-D_{eff}}\times 100, N-1\geq 100\%$$

The values used in the formula are calculated as follows:

EP_m	technical capacity of entry points (in mcm/d), other than production, LNG and storage facilities covered by Pm, LNGm, and Sm means the sum of the technical capacity of all border entry points capable of supplying gas to the calculated area.
P_m	Maximal technical production capability
S_m	Maximal technical storage deliverability (in mcm/d) means the sum of the maximal technical daily withdrawal capacity of all storage facilities which can be delivered to the entry points of the calculated area, taking into account their respective physical characteristics. As noted in the Regulation, the maximal [technical production] capacity used in the calculation of the formula is the level of all gas storages at 30 % and 100 % of the maximum working volume.
LNG_m	means the maximal technical LNG facility capacity (in mcm/d). i.e. the sum of the maximal technical daily send-out capacities at all LNG facilities in the calculated area, taking into account critical elements like offloading, ancillary services, temporary storage and re-gasification of LNG as well as technical send-out capacity to the system.
I_m	maximal technical capacity of the main entry point.
D_{max}	means the maximum daily gas consumption (demand) in the entire group, calculated on the basis of projected market consumption in exceptional weather conditions occurring with a statistical probability of once in 20 years.
D_{eff}	'Deff' means the part (in mcm/d) of Dmax that in the case of a disruption of gas supply can be sufficiently and timely covered with market-based demand-side measures in accordance with point (c) of Article 9(1)(c) and Article 5(2).

The following disruptions have been taken into account in the calculations:

• Uzhgorod as the single largest infrastructure (Im), as required by the Regulation on security of supply;

• Full disruption of the Ukrainian route. Even when this is not required by the Regulation, [such disruption] may be used as a suitable scenario for assessment in order to conduct a sensitivity analysis for an event such as the one experienced during the gas crisis involving Russia and Ukraine in 2009.

As envisaged in the Regulation, the calculation of the N – 1 formula takes into account the level of gas in storages at 30 % and 100 % of the maximum working volume. The index has been calculated, considering the scenarios for 2018/2019 and 2020/2021.

In any case, the value of the index exceeds 100 %, which means that regional gas infrastructures are correctly sized to cover peak demand in the participating Member States.

However, the N – 1 calculation does not take into account potential domestic difficulties or problems due to malfunction of domestic connection points or the lack of available capacity to attract gas. These risks are assessed in the risk analysis set out below.

A summary of the data used to calculate the N – 1 formula is set out in the tables below.

2018/2019 scenario data [MSm³/d]

Disruption (I_m)	Capacity
Uzhgorod	**227.4**
Ukrainian route	**336.5**

Member States	Ep_m	LNG_m	S 100 %	S 30 %	P_m	D_{max}
Austria	-	-	66.4	44.4	3.4	55.3
Bulgaria	-	-	4.2	2.9	0.6	18.2
Croatia	-	-	5.8	3.2	3.5	16.6
Czech Republic	-	-	59.1	41.0	0.5	68.2
Germany	471.0	-	612.4	479.3	26.2	474.8
Greece	4.5	20.2	-	-	-	20.1
Hungary	82.9	-	78.6	68	5.5	77.4
Italy	133.6	51.9	263.2	171.8	15.5	443.0
Luxembourg	4.3	-	-	-	-	4.8
Poland	137.7	14.4	51.5	40.7	7.2	86.7
Romania	103.7	-	29.0	-	26.0	72.0
Slovakia	250.9	-	52.61	39.5	0.2	45.1
Slovenia	-	-	-	-	-	4.9
Total	**1 188.6**	**86.5**	**1 170.2**	**890.8**	**88.6**	**1 387.1**

2020/2021 scenario data [MSm³/d]

Disruption (I_m)	Capacity
Uzhgorod	**191.7**
Ukrainian route	**294.0**

Member States	Ep_m	LNG_m	S 100 %	S 30%	P_m	D_{max}
Austria	-	-	66.4	44.4	3.4	55.3
Bulgaria	14.6	-	4.2	2.9	1.1	20.3
Croatia	-	-	5.8	3.2	3.5	16.6
Czech Republic	-	-	59.1	41.0	0.4	68.2
Germany	471.0	-	612.4	479.3	26.2	474.8
Greece	36.1	20.2	-	-	-	21.1
Hungary	71.3	-	78.6	69.5	3.6	89.5
Italy	152.9	51.9	291.3	190.8	18.9	438.0
Luxembourg	4.3	-	-	-	-	4.8
Poland	137.7	14.4	51.5	40.7	7.2	97
Romania	103.7	-	29.0	-	26.5	72.0
Slovakia	204.3	-	52.61	39.5	0.3	34.7
Slovenia	-	-	-	-	-	6.1
Total	**1 200.0**	**86.5**	**1 198.3**	**911.3**	**91.3**	**1 386.3**

N-1 calculation

		2018/2019	2020/2021
Uzhgorod	UGS 100 %	166 %	172 %
	UGS 30 %	146 %	151 %
Ukrainian route	UGS 100 %	158 %	165 %
	UGS 30 %	138 %	144 %

The analysis and calculation of the N – 1 formula for the Ukraine Eastern risk group are based on the Regional risk assessment for the group.

3.2 National level

(a) N – 1 formula (variant before the commissioning of IP Strandzha-2/Malkoclar)

(b) Identification of the single largest gas infrastructure

Until 1 January 2020, the single largest gas infrastructure supplying gas to cover domestic demand in Bulgaria was the pipeline with entry point at IP Negru voda 1/Kardam with maximum permanent transmission capacity of 20.27 mcm/day on the Bulgarian side.

For the purpose of the calculations for Bulgaria, the single largest gas infrastructure is IP Negru voda 1/Kardam, connecting the T1 pipeline in Romania (the pipeline in the section IP Isaccea 1, UA>RO — IP Negru voda 1/Kardam, RO>BG) to the Bulgarian gas transmission system, meaning that until the end of 2019 it was also the single largest gas infrastructure for the risk group.

(c) Calculation of the N - 1 formula at national level

Calculation of the N – 1 formula for the period 2019-2023 in accordance with Article 5 of Regulation (EU) No 2017/1938 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010.

The N – 1 formula describes the ability of the technical capacity of the gas infrastructure to satisfy total gas demand in the calculated area in the event of disruption of the single largest gas infrastructure during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years.

In the event of disruption of the single largest gas infrastructure, the technical capacity of the remaining infrastructure must be able to satisfy total gas demand of the calculated area during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years, i.e. N-1 > 100 %.

The formula used to calculate the infrastructure standard for the purpose of this Plan is as follows:

$$N-1(\%) = \frac{\sum_{m=1}^{6} EPm + S\max + P\max - I\max}{D\max} x100,$$

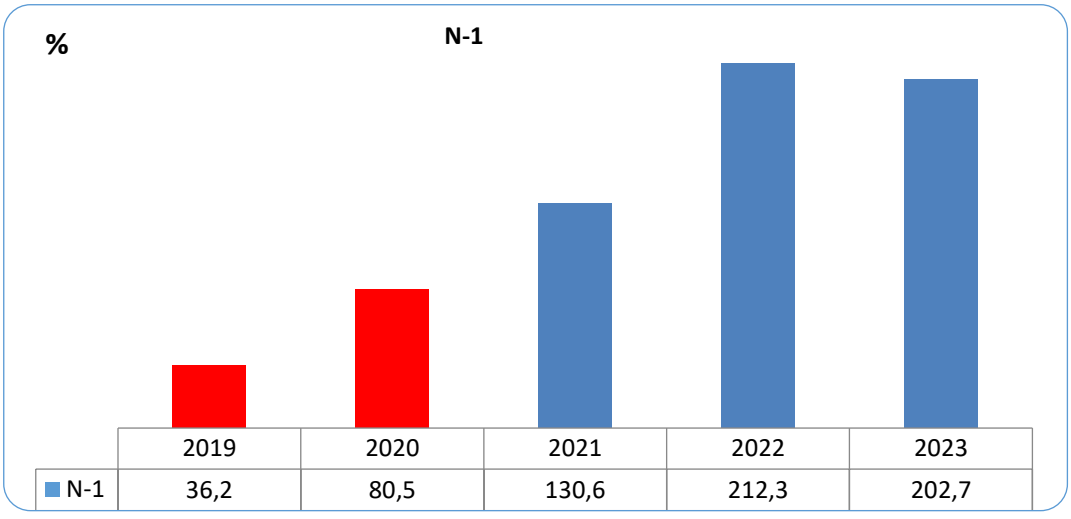
N-1≥100 % , where:

EP_1	Technical capacity of GMS Negru voda 1, mcm/day

EP_2mcm/day	Technical capacity for gas import via the Bulgaria–Serbia interconnector, mcm/day
EP_3mcm/day	Technical capacity for transfer via a transfer point, including from IP Kulata/Sidirokastro, mcm/day
EP_4	Technical capacity for gas import via the Turkey–Bulgaria interconnector, mcm/day
EP_5	Technical capacity for gas import via the Bulgaria–Romania interconnector, mcm/day
EP6	Technical capacity for gas import via the Greece–Bulgaria interconnector (IGB), mcm/day
Smax	Withdrawal from the Chiren UGS facility — maximum, mcm/day
Pmax	Domestic natural gas production — maximum, mcm/day
Dmax	Domestic consumption — consumption at peak times, mcm/day
Imax= EP_1	Single largest gas infrastructure facility — GMS Nergu voda 1, mcm/day

The results of the N – 1 formula calculation for the next 5 years are as follows (capacity figures in the N – 1 formula are expressed in mcm/day as required by the Regulation):

Year	Pmax	S,axsmax	EP2	EP3	EP4	EP5	EP6	Dmax	EP1 = Imax	N-1
	mcm/d									
2019	0.16	4.7	0.0	1.00	0.0	0.15	0.0	16.6	20.27	36.2
2020	0.55	4.7	0.0	4.41	0.0	4.1	0.0	17.2	20.27	80.5
2021	1.10	4.7	0.0	4.41	0.0	4.1	9.1	18.0	20.27	130.6
2022	1.64	4.7	5.5	4.41	9.1	4.1	9.1	18.2	20.27	212.3
2023	1.92	4.7	5.5	4.41	9.1	4.1	9.1	19.2	20.27	202.7



The N – 1 formula calculation for the infrastructure standard shows that, in the event of disruption of the single largest gas infrastructure (from Russia via Ukraine), the capacity of remaining infrastructure in the period 2019-2020 would not be able to cover total domestic gas demand in Bulgaria during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years. At the same time, the implementation of

the projects for the construction of new gas infrastructure currently under way will ensure that in 2021 Bulgaria will be able to meet the infrastructure standard.

In order to ensure that Bulgaria meets the infrastructure standard, several main projects are currently under way, and more specifically a project for the modernisation, rehabilitation and expansion of existing gas transmission infrastructure (including the upgrade of compressor stations), projects for the construction of additional gas interconnectors between Bulgaria's gas system and those of neighbouring countries, a project for the expansion of UGS Chiren and/or the construction of a new gas storage, new projects to increase entry point capacity, etc.

(a1) N – 1 formula (variant after the commissioning of IP Strandzha-2/Malkoclar)

(b1) Identification of the single largest gas infrastructure

Until 1 January 2020, the single largest gas infrastructure supplying gas to cover domestic demand in Bulgaria was the pipeline with entry point IP Strandzha -2/Malkoclar with maximum permanent transmission capacity of 31 mcm/day on the Bulgarian side.

For the purpose of the calculations for Bulgaria, the single largest infrastructure is IP Strandzha-2/Malkoclar, which connects Bulgaria's gas transmission system to that of Turkey.

(c1) Calculation of the N - 1 formula at national level

The N – 1 formula for the period 2020-2024 has been calculated in accordance with Article 5 of Regulation (EU) No 2017/1938 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010.

The N – 1 formula describes the ability of the technical capacity of the gas infrastructure to satisfy total gas demand in the calculated area in the event of disruption of the single largest gas infrastructure during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years.

In the event of a disruption of the single largest gas infrastructure, the technical capacity of the remaining infrastructure must be able to satisfy total gas demand of the calculated area, i.e. N-1 > 100 %.

The formula used to calculate the infrastructure standard to be met is as follows:

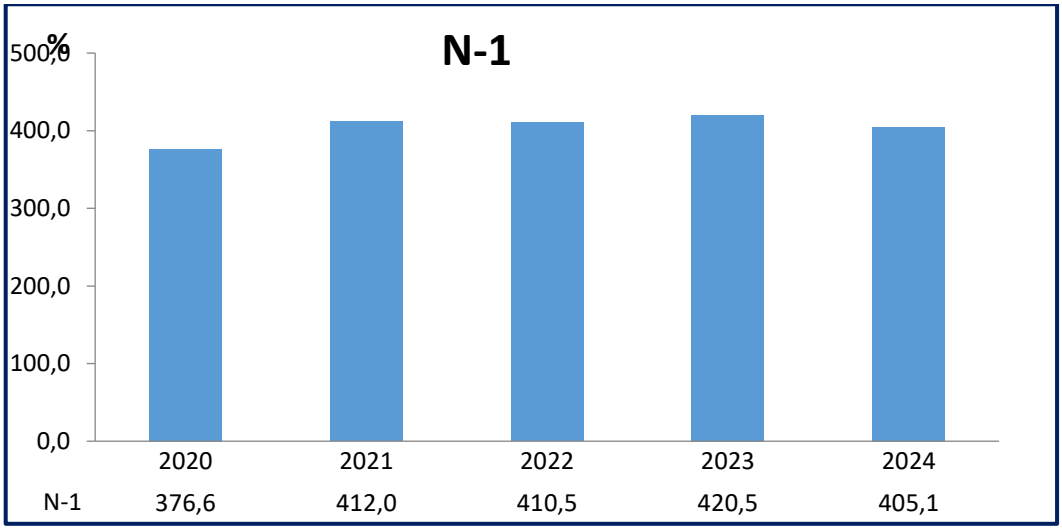
$$N-1(\%) = \frac{\sum_{m=1}^{7} EPm + S\,max + P\,max - I\max}{Dmax}$$, where:

EP_1	Technical capacity of IP Strandzha 2/Malkoclar, constrained by the capacity of the transfer point, mcm/day, taking into account consumption in southwest Bulgaria
EP_2	Technical capacity of IP Negru voda 2, 3/Kardam, constrained by the capacity of the transfer point, mcm/day, taking into account consumption in the southwest of Bulgaria
EP_3	Technical capacity of Negru voda 1/Kardam, mcm/day
EP_4	Technical capacity of the Bulgaria–Serbia interconnector, mcm/day
EP_5	Technical capacity of IP Kulata/Sidirokastro, mcm/day
EP_6	Technical capacity of IP Ruse/Giurgiu (IBR), mcm/day
EP_7	Technical capacity of the Greece–Bulgaria interconnector (IGB), mcm/day
Smax	Withdrawal from UGS Chiren — maximum, mcm/day
Pmax	Domestic natural gas production — maximum, mcm/day

Dmax	Domestic consumption — consumption at peak times, mcm/day on an exceptionally cold day, occurring with a statistical probability of once in 20 years
Imax= EP_1	Single largest gas infrastructure facility — IP Strandzha 2/ Malkoclar, mcm/day

The N – 1 formula calculation for the next 5 years is as follows (capacity figures in the N – 1 formula are expressed in mcm/day as required by the Regulation):

Year	Pmax	Smax	EP2	EP3	EP4	EP5	EP6	EP7	Dmax	EP1 = Imax	N-1
	mcm/d										%
2020	0.16	4.70	31.00	20.25	0.00	6.12	2.54	0.00	17.20	31.00	**376.6**
2.021	0.55	4.70	31.00	20.25	0.00	6.12	2.54	9.00	18.00	31.00	**412.0**
2.022	1.10	4.70	31.00	20.25	0.00	6.12	2.54	9.00	18.20	31.00	**410.5**
2.023	1.64	4.70	31.00	20.25	5.48	6.12	2.54	9.00	19.20	31.00	**420.5**
2.024	1.92	4.70	31.00	20.25	5.48	6.12	2.54	9.00	20.00	31.00	**405.1**



The calculations of the N – 1 formula for the infrastructure standard show that in the event of disruption of the single largest gas infrastructure, the capacity of remaining infrastructure will be able to satisfy total domestic gas demand in Bulgaria during a day of exceptionally high gas demand.

In recent years, Bulgartransgaz EAD has made significant progress in its efforts to ensure that the national gas transmission system is interconnected with the systems of neighbouring countries and to increase transmission capacity and diversify the routes natural gas supply to Bulgaria. The company relies on alternative, independent gas supply routes, which ensure that it can fully cover domestic demand.

(f) bi-directional capacity

(i) The interconnection points with bi-directional capacity and the maximal capacity of bi-directional flows

GMS Kulata/Sidirokastro

BG-GR 117 568 MWh/D firm capacity;

GR-BG 64 695 MWh/D firm capacity;

GMS Ruse/Giurgiu
BG-RO 26 373 MWh/D firm capacity;
RO-BG 26 822 MWh/D firm capacity;

GMS Negru voda 1/Kardam
BG-RO 121 558 MWh/D firm capacity;
RO-BG 214 050 MWh/D firm capacity;
(*) Figures as of January 2020.

ii) Use of reverse flow capacity

The use of bi-directional capacity is governed by the rules set out in the interconnection agreements concluded between Bulgartransgaz EAD and the operators of the neighbouring countries Transgaz SA Romania and DESFA SA Greece. Available capacity is traded on the Regional Capacity Booking Platform (RBP) by the three operators.

iii) The interconnector points for which an exemption has been granted in accordance with Article 5(4), the exemption period and the grounds for granting the exemption.

The Bulgarian side (Bulgartransgaz EAD) has ensured that technical capability is available for continuous physical reverse flow at the IP Negru voda 1/Kardam.

4. Compliance with the supply standard

The competent authorities ensure that conditions for supplies to protected customers are established without prejudice to the proper functioning of the internal energy market and at a price respecting the market value of the supplies. In the scenarios, Bulgaria, Greece and Romania are singled out as the most potentially vulnerable countries in the event of disruption of transit via Ukraine. The potential shortfall in gas supplies relative to consumption would be the greatest in Bulgaria, ranging between 56 % and 58 %. Keeping in mind that protected clients have a share of approximately 40 % of total consumption, they will be seriously affected even in the most conservative simulations. The measures are designed to ensure uninterrupted supply, under very demanding conditions, to protected customers, and the implementation of measures to mitigate the impact of an emergency.

(a) Protected clients in Bulgaria

Protected clients in Bulgaria are those described in Regulation (EU) 2017/1938, notably household customers who are connected to a gas distribution network; small or medium-sized enterprises; each district heating installation insofar as it delivers heating to household customers, provided that the installation is not able to switch to fuels other than gas (for example electricity cogeneration plants using gas turbines and/or piston engines); all essential social services, including hospitals, homes for the elderly, prisons, schools and other public infrastructures, public and private, providing accredited nursing services and activities, and civil and non-civil sector clients with consumption that does not exceed 0.05 mcm/year.

In accordance with Regulation (EU) 2017/1938 **solidarity protected customers in Bulgaria** include households (household customers) connected to the gas distribution network, essential social services, emergency response services, security services and district heating installations, insofar as they supply heat to household customers, on the condition that there is no possibility for the installations concerned to switch to fuels other than gas (for example, electricity and heat cogeneration plants using gas turbines and/or piston engines).

(b) Assessment of the total consumption of protected clients is shown in the table below

Customers	2016 mcm	2017 mcm	Number of clients for 2017
Households	74 081	91 105	80 784
Non-household protected clients *	374 007	420 475	6 321
Total protected clients	448 088	511 580	87 105
Total annual gas consumption in Bulgaria	3 059	3 195	
Protected clients ratio	1.465 %	1.602 %	

* consumption related to the activities referred to in Article 2(5)(a), (b) and (c) of Regulation (EU) 2017/1938.

In keeping with the approach adopted by Bulgaria, heating utilities using natural gas as the main fuel, but comprising components not able to switch to an alternative fuel, are excluded from the definition of protected customers. Minimum quantities of natural gas sufficient to ensure the safe and reliable operation of heat generation and transmission installations of such facilities are envisaged in the Preventive Action Plan. The minimum quantities of natural gas envisaged for heating utilities using alternative fuels account for only 8 % of total domestic consumption of natural gas in normal operating mode. These are necessary for technological reasons, and more specifically because the alternative fuel used by heating utilities in Bulgaria is (heavy) fuel oil.

The technological process of switching to and operating plants relying on this type of fuel requires the use of certain minimum quantities of natural gas necessary to ignite the alternative fuel and stabilise the combustion process to ensure full alternative fuel combustion. The use of certain minimum quantities of natural gas improves the efficiency of this process. It significantly reduces the release of harmful emissions into the air and thus contributes to the protection of the environment and of the life and health of the population.

In accordance with environmental legislation (Directive 2004/35/EC of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damages, respectively the Bulgarian Environmental Protection Act), most large combustion installations with an installed capacity of more than 50 MW, i.e. most heating utilities in Bulgaria, are subject to limitations in terms of the time they are allowed to operate using fuel oil (this period may not exceed 10 calendar days within any 12-month period).

In addition, there are district (local) heating installations in Bulgaria, which generate and supply heat to mostly to household customers. The technological map of the plants concerned includes steam generators (boilers), supplying the steam necessary to warm up the fuel oil used as a reserve fuel. For this reason, minimum quantities of natural gas have also been envisaged for these installations. Halting the gas supply required for these installations to remain in operation will inevitably cause disruptions in production and lead to suspension of the supply of heat to household customers.

Heat installations, including cogeneration plants, have strategic importance for Bulgaria's energy security and a scenario in which their operation is disrupted could trigger a domestic energy crisis. A total suspension of gas supply to these plants will force them to

shut down their operations, leaving their clients (mostly households) no option but to switch to an alternative source of heating, which for practical reasons is likely to be electricity. This is corroborated by the fact that most precast reinforced concrete residential buildings (such as those built in the largest cities in Bulgaria) were designed to be heated by district heating utilities, which is why some rooms in the apartment units do not have chimney openings. A sharp rise in electricity consumption will jeopardise the balance of the electricity system and may trigger its collapse.

This is the reason why Bulgaria's Emergency Plan envisages that heating utilities switch to an alternative fuel and further states that any limitations to gas supply must not jeopardise the safe and reliable operation of heat generation and transmission facilities to ensure that heat continues to be supplied to protected household customers, including childcare facilities, hospitals and educational institutions. Furthermore, the Plan envisages the introduction of a requirement for all heating utilities to declare the time they need to switch to an alternative fuel and the minimum quantities of natural gas needed to ensure the safe and reliable operation of their installations.

The conducted analysis of various scenarios of disruption in natural gas transmission via Ukraine examines options with maximum capacity utilisation of the alternative entry points mentioned above. Statistical data (for a 20-year period) indicates that peak consumption of natural gas on exceedingly cold days is approximately 170 GWh/d.

In recent years, Bulgartransgaz EAD has made significant progress in its efforts to ensure that the national gas transmission system is interconnected with the systems of neighbouring countries and to increase transmission capacity and diversify the routes for the supply of natural gas to Bulgaria. The company relies on alternative, independent gas supply routes, which ensure that it can cover domestic demand. According to the draft modification of the general method for capacity calculation and optimisation the Bulgaria–Romania interconnector (IBR) has a capacity of 22.4 Gwh/d on the Bulgarian side. As from 1 January 2020, a total of 64.7 Gwh/d in capacity for natural gas transmission to Bulgaria will be available via IP Kulata/Sidirokastro. The new IP Strandzha-2 Malkoclar, which became operational at the end of 2019, has a capacity of 567 Gwh/d, and the first section of the extension of the gas transmission network from the Bulgarian-Turkish border to the Bulgarian-Serbian border has also been put into operation. The withdrawal capacity of UGS Chiren is approximately 40 GWh/d, with a potential to increase it up to 49 GWh/d in emergencies. The total capacity of all entry and exit points is sufficient to cover the total natural gas demand of 170 GWh/d of all protected customers for a 7-day period of peak demand occurring with a statistical probability of once in 20 years for each period of 30 days of exceedingly high gas demand, as well as in the event of disruption of the single largest gas infrastructure in average winter conditions occurring with a statistical probability of once in 20 years, for a period of 30 days of exceedingly high gas demand. Where necessary, transmission of natural gas to neighbouring countries in the group can be ensured. Thus, compliance has been ensured with the requirements laid down in Article 6(1) of the Regulation.

Gas type	**Quantity of gas necessary to ensure compliance with the standard**		
	Standard: extreme temperatures 7-day peak gas demand	Standard: 30 days of exceedingly high demand for gas	Standard: 30-day disruption of the single largest gas infrastructure
	Statistical probability of occurring once in 20 years [GWh]	Statistical probability of occurring once in 20 years [GWh]	Average winter conditions [GWh]
E	**170.0**	**340.0**	**560**

5. Preventive measures

In developing the preventive action plan and the emergency plan, the Ministry of Energy considers the contribution of the following indicative and non-exhaustive list of measures only in the event of an emergency:

(a) Maintenance of well-functioning and reliable infrastructure

In its capacity as operator of the Bulgarian gas transmission system, Bulgartransgaz EAD operates, maintains and develops the national gas transmission infrastructure. In line with the statutory requirements for the activities concerned, the transmission system operator is required to develop the network in keeping with long-term forecasts and plans for the development of gas supply, going beyond these when this is economically justified.

- Measures relating to the good technical condition of the gas transmission system

The maintenance of basic and ancillary gas infrastructure in good repair to ensure its reliability and efficiency is a guarantee for the safety of gas transmission and storage, ensuring service delivery that conforms to a high quality standard. In connection with this, the following activities are performed on a regular basis:

- planned checks, preventive checks and routine maintenance of the technological equipment and facilities in accordance with the requirements laid down in the Regulation on the structure and safe operation of transmission and distribution pipelines, gas equipment, installations and devices and the manufacturers' instructions for the equipment;
- inspections, repairs and diagnostic procedures performed on the technological equipment and components of compressor stations on an ongoing basis;
- internal pipeline inspections and running repairs to pipelines;
- repeated strength and density tests along sections of pipelines and ancillary equipment;
- perimeter checks along the route of pipelines for signs of erosion, landslides, gas leakages, unauthorised construction, other activities affecting the rights of way within pipeline perimeter and risk zone monitoring;
- anti-erosion and hydrological activities;
- monitoring cathodic protection;
- checks and tests on measuring centrelines, gas distribution stations and automated gas distribution stations;
- maintaining an emergency pipe reserve and supply of spare parts for the technological equipment – gas turbine compressor aggregates, control systems, control and measuring devices and automation, etc.

The implementation of the above measures helps prevent or reduce the impact of some of the main technological risk factors depending on their origin — technological, social, natural, political, commercial, and threats caused by human acts or omissions. The measures are designed to counter most of the risks identified in the National Risk Assessment (NRA), and more specifically 39 specific risks which may affect the security of natural gas supply. Some of them present a threat to the functioning of all elements of gas infrastructure while the impact of others is local or limited to individual system components.

According to the NRA the elements of the gas transmission system at the highest risk, which have the potential to affect both clients and regional gas supplies to countries in

the risk group, are compressor stations, interconnector entry and/or exit points, underground gas storage, pipelines, the gas flow control centre, etc. Although most risks have a very low to low probability of occurring (1-2), they may have an impact on various elements of the gas infrastructure. While a single risk does not present a major threat in itself, several different risks materialising at the same time may cause the situation to rapidly deteriorate and lead to disruptions in supply. The implementation of the planned measures seeks to ensure that the risks from this group present a relatively low level of threat. The implemented preventive measures have a primarily national dimension. Bulgaria's efforts to ensure the safe operation of the national gas transmission network also reinforce its positive role at regional level. The measures ensure stability of natural gas supply to all clients and thus have a positive impact on the national and regional economy alike. The reliable functioning of the system enables the efficient and effective use of domestic energy resources and prevent any harmful consequences for workers and employees in the energy industry and for clients reliant on sustainable natural gas supplies.

- Measures relating to critical infrastructure in accordance with Directive 2008/114/EC

The sites, pipelines and pump stations of Bulgaria's gas transmission network are designated as European critical infrastructures in accordance with Council Directive 2008/114/EC on the identification and designation of European critical infrastructures (ECI) and the assessment of the need to improve their protection. These are sites of strategic importance for national security, which have also been designated as European critical infrastructures as most connect the energy infrastructures of more than one EU Member State. Each owner/operator of designated ECI draws up an operator security plan (OSP), which identifies the critical infrastructure assets of the ECI and the security solutions to be implemented for their protection. These include permanent security measures, which identify indispensable security investments and means to be employed at all times. The measures generally fall into several groups: technical measures, including installation of detection, access control, protection and prevention means; organisational measures, including procedures for alerts and crisis management; control and verification measures; communication measures; measures to raise awareness and provide training; measures relating to the security of information systems and graduated security measures, which can be activated according to varying risk and threat levels. Arrangements for physical protection, video surveillance, installation of intrusion detection systems and measures to restrict physical access to the sites are made to ensure the security of the most important sites.

- Measures to enhance interconnections between neighbouring Member States

A Memorandum of Understanding on the implementation of the Vertical Gas Corridor has been signed by representatives of the gas companies Bulgartransgaz EAD (Bulgaria), ICGB AD (Bulgaria), DESFA S.A. (Greece), FGSZ LTD (Hungary) and SNTGN TRANSGAZ S.A. (Romania). The document aims to establish a framework for cooperation between the gas companies for the implementation of a project for a bi-directional natural gas transmission corridor connecting the transmission networks of Bulgaria, Greece, Romania and Hungary. One of the aims of the Memorandum of Understanding on the construction of a vertical gas corridor is to promote projects of common interest and other necessary projects both individually and jointly. Taking into account the strategic importance of the gas interconnector between Greece and Bulgaria for the vertical gas corridor, the project company ICGB AD has been included in the initiative. The memorandum will serve as a basis for strengthening future cooperation with a view to conducting an analysis of the

possibility to construct the necessary gas transmission system so as to enable the transmission of natural gas to the EU market from Greece via Bulgaria, Romania, Hungary and in the opposite direction.

In August 2018, Bulgartransgaz EAD put into operation the newly constructed Lozenets–Nedyalsko pipeline loop in proximity to the Lozenets compressor station. The looped section has a length of 20 km, which increases the capacity of the existing interconnector between Turkey and Bulgaria — a technical requirement for the bi-directional natural gas transmission, which further enhances the security of supply. The activities relating to the construction of the section are part of a project for the rehabilitation, modernisation and expansion of the gas transmission system designated as project of common interest (PCI) 6.8.2 by the European Commission. The completion of the project has increased the capacity for natural gas transmission from Bulgaria to Turkey from 14 bcm to 15.7 bcm per year.

On 21 October 2019, the new IP Strandzha 2/Malkoclar (entry point), EIC 58Z-00000015-S2M, with a transmission capacity of 15.7 bcm/y became operational. The available capacity of the interconnector point has been traded on the Regional capacity booking platform (RBP) since 1 January 2020.

- Measures to expand the sources and routed for natural gas supply

In 2018 and 2019, Bulgaria's energy dependence in terms of natural gas supply was exceedingly high, having reached 99 % on account of very low domestic production. Although Bulgaria has awarded a number of concession contracts for natural gas production, the total quantities of domestic natural gas are small and cover an insignificant share of annual domestic consumption. To date, the only reliable source of domestic production is the Kavarna-Iztok deposit in the Galata Block, with proven extractable deposits of natural gas [equivalent to] approximately 3 724 Gwh up to 4 255 GWh.

In connection with this, Bulgaria's Ministry of Energy has granted oil and natural gas prospecting and exploration authorisations, expecting these to ultimately lead to an increase in the share of domestic production and lower dependence on natural gas imports. The authorisations have been issued in respect of both onshore and offshore prospecting and exploration, the latter including the shelf and deepwater area of the Black Sea. Since July 2012, the company Total, in partnership with Repsol and OMV, has conducted prospecting and exploration under an issued authorisation in Block 1-21 Han Asparuh in the deepwater area of the Black Sea. In February 2016, a contract was concluded with Shell for oil and gas prospecting and exploration for a period of 5 years in Block 1-14 Silistar/Han Kubrat.

In March 2020, the binding phase of the market test for the construction of an offshore floating LNG reception, storage and regasification unit (FSRU) at Alexandroupolis was completed. The Bulgarian side has accepted to participate in the international project company set up for the purpose of developing the terminal as a minority shareholder. The terminal has a design annual capacity of 6.1 bcm of natural gas and a storage capacity of 0.170 bcm of liquefied natural gas. These quantities of natural gas will enable [Greece] to balance its domestic market and ensure that Bulgaria, Ukraine, Romania, Serbia, Hungary and North Macedonia are also able to do so. The potential sources of gas supply include LNG producers from Algeria, Qatar and the USA among others (the export capacity of US exporters such as Cheniere LNG and Tellurian LNG is being considered). Furthermore, the possibility for LNG supplies from Cyprus and Israel, using the two Egyptian export terminals expected to start operating at full capacity in 2020 and 2021, is also under consideration.

The final stage of the project for the construction of an interconnector between Greece and Bulgaria is currently under way. The pipeline is under construction and will become operational in 2021.

(b) Other measures adopted for reasons other than the risk assessment but with a positive impact for the security of natural gas supply to Bulgaria and the two risk groups

A project for the rehabilitation, modernisation and expansion of Bulgaria's existing gas transmission infrastructure is currently being implemented. The project covers a number of activities and sites of the gas transmission system and is implemented in several stages. The main activities are the modernisation and rehabilitation of compressor stations, inspections of the condition of pipelines, repair and replacement of sections of the pipelines following inspection, extension and modernisation of the existing network, and installing systems to optimise the management of the technical condition of the network.

The implementation of this large-scale project will contribute to ensuring the security and reliability of natural gas transmission, improving the efficiency, reliability and flexibility of the transmission system and ensuring the necessary capacity and pressure. The implementation of the activities planned will further ensure that technical capacity is available for the transmission of additional quantities of natural gas via the existing and new entry and exit points in Bulgaria, as well as a possibility to diversify the direction of transmission, depending on market interest, thereby optimising gas flow management.

(c) Application of non-market-based measures

'Non-market-based measure' means any supply- or demand-side measure that deviates from market rules or commercial agreements, the purpose of which is to mitigate an electricity crisis. Non-market-based measures are activated in a natural gas supply crisis only as a last resort if all other options provided by the market have been exhausted or where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the natural gas supply situation. These measures must be necessary, proportionate, non-discriminatory and time-bound (temporary) and the competent authority must notify their implementation to the relevant stakeholders in Bulgaria.

One of the non-market-based measures set out in Annex VIII to Regulation 2017/1938 is the use of strategic gas storage. According to the Energy Act strategic gas storage is to be maintained by energy companies engaged in economic activities in the area of international trade in natural gas and by natural gas importers. Strategic gas storage is considered an asset of the abovementioned undertakings, unless it constitutes an asset of the undertaking which has accepted the order for strategic gas storage under the terms of a concluded agreement.

On the basis of Licence No L-214-10 of 29 November 2006 issued by the DKEVR Bulgartransgaz EAD provides natural gas storage services through a proprietary underground gas storage facility (UGS) situated in Chiren. The gas in storage at UGS Chiren is primarily used to compensate for seasonal variations in domestic consumption and in the event of modifications in agreed natural gas supply orders. When filled to capacity, UGS Chiren can cover approximately 25 % to 30 % of the daily demand for natural gas during the cold months of winter. The quantities of natural gas injected into/withdrawn from the storage depend on market conditions and on the optimal technical capacity of UGS Chiren, subject to compliance with the rules for operational safety.

The undertakings supplying natural gas to clients with fluctuations in seasonal consumption (including heating utilities and gas suppliers to end customers) are required to ensure that sufficient quantities of natural gas are available to compensate for any fluctuation in the consumption of clients within a range of 10 % to 20 % of the annual quantities ordered for supply to customers with fluctuating seasonal consumption, including heating utilities and suppliers of gas to end consumers. For this reason, the undertakings concerned ensure that at the beginning of winter natural gas with an indicative volume of a total of 290 mcm is maintained at the Chiren underground storage.

Bulgartransgaz EAD is required to ensure that sufficient capacity is available for injecting and storing such additional quantities of natural gas.

Bulgartransgaz EAD maintains approximately 0 mln. m^3 of natural gas in storage at UGS Chiren pursuant to an order issued by the Minister for Energy in accordance with Article 70 of the Energy Act imposing additional public service obligations on the company. The quantities specified in the order constitute a reserve necessary to ensure uninterrupted supplies as required by Annex VIII to Regulation (EU) 2017/1938.

In the event of crisis, the strategic reserve can support the withdrawal of a total of 547.8 mcm of natural gas for a period of approximately 4.5 months at a maximum withdrawal capacity of 3.82 mcm/d.

Upon triggering the preventive action plan and the emergency plan the competent authority implements the following indicative and non-exhaustive list of measures only in the event of an emergency:

- Demand-side measures: use of strategic gas reserves, enforced use of fuels other than gas (for example, in accordance with Directive (EU) 2018/1581, which entered into force on 11 November 2018 and amended Council Directive 2009/119/EC (1)), enforced use of electricity generated from sources other than gas; enforced increase of gas production levels; enforced gas withdrawal from storages.

6. Other measures and obligations (e.g. safety operation of the system)

Regulation No 10 of 9 June 2004 lays down the procedure for imposing restrictions, suspending or limiting the production or supply of electricity, heat and natural gas (issued by the Minister for Energy and Energy Resources, published in the State Gazette (SG) No 63 of 20 July 2004, in force as from 20 July 2004).

According to the Regulation the contracts for natural gas supply and/or transmission via the relevant networks concluded with customers, respectively the general terms and conditions thereto, set out the possible levels of minimum necessary hourly consumption and minimum initial pressure at gas regulating and metering stations, the maximum allowed time and the intervals of interruptions in natural gas supply, the type of alternative fuel and the time necessary to switch to an alternative fuel in order to:

- maintain the main production cycle;
- maintain the technological regime;
- maintain the mode of operation of production lines reliant on natural gas;
- ensure that equipment remains in good operating condition;
- protect the life and health of people and prevent environmental pollution.

The natural gas consumers connected to the transmission network and the industrial users connected to the distribution network draw up measures and technological schemes for scenarios entailing varying degrees of limitation to be observed when limitations are introduced. This includes limiting natural gas consumption and maintaining alternative fuel reserves to deal with critical situations.

Distribution network operators are required to comply with the conditions and schemes in order to ensure that the relevant limitations are observed.

7. Infrastructure projects

In the context of the EU goals for building a single interconnected EU-wide gas market, the development of Bulgaria's infrastructure seeks to position the country as a gas hub in Eastern Europe in keeping with the objectives of the projects for the development of the Southern Gas Corridor and with the plans for the development of gas infrastructure at regional and European level.

The projects for the expansion of existing gas infrastructure from the Bulgarian-Turkish border to the Bulgarian-Serbian border (stage 1 of the Balkan gas hub) and for the

construction of interconnectors to Greece, Serbia and Romania are of key importance for market integration. They will contribute to guaranteeing natural gas supplies to Bulgaria and the region while creating conditions for genuine diversification of the sources and routes and a possibility for the transmission of additional quantities of natural gas to and via Bulgaria.

There is a direct link between the development of gas infrastructure in the region and the plans to expand the capacity of the only underground gas storage facility in Bulgaria (UGS Chiren) to ensure that it can serve both the domestic and the regional market, and the project for modernisation and rehabilitation of existing gas transmission infrastructure, which will increase its efficiency and reliability. Storage capacity can be further increased by constructing a new gas storage in Bulgaria.

The efficient implementation of projects of common interest is a priority for Bulgartransgaz EAD in its capacity as combined gas operator. The Fourth list of projects of common interest published by the European Commission includes the following infrastructure projects planned to be implemented in Bulgaria:

— Expansion of the capacity of UGS Chiren;

— Cluster for infrastructure development and enhancement to enable the construction of the Balkan gas hub;

— Rehabilitation, modernisation and expansion of the Bulgarian gas transmission system;

— Interconnector Bulgaria–Serbia (IBS);

— Interconnector Greece–Bulgaria, (IGB).

The implementation of these projects is interrelated and aims to enhance the effectiveness and boost the development of the single trans-European gas network, and will have a positive impact on the security of gas supplies in the Tran-Balkan risk group.

7.1 Projects for the development of natural gas transmission and storage infrastructure in the period 2019 – 2028 for which a final investment decision is to be made:

1. Refurbishing the incineration systems of 5 gas turbine aggregates (GTA) with low-emission combustion chambers;
2. Activities relating to the installation of anti-pollution (launch and reception shafts) of the planed pipeline branches to Pleven and Pazardzhik;
3. Acquisition of a share in the LNG terminal in Alexandroupolis;
4. Expansion of the capacity of UGS Chiren.

7.2 Gas infrastructure development in connection with the concept for the construction of a regional gas hub in Bulgaria (Balkan gas hub)

The Balkan gas hub concept comprises several constituent elements, which make up the project:

- new sources of natural gas;
- optimal utilisation of existing gas transmission networks and the capacity of UGS Chiren;
- modernisation and upgrade of existing infrastructure;
- development of new interconnectors to neighbouring countries;
- new gas hub infrastructure;
- creating an optimal environment for trade through a liquid gas exchange.

The infrastructure to be constructed, coupled with a favourable business and regulatory environment, will connect the markets of the countries in the Balkans and Central and Eastern Europe to the markets of countries in Western Europe.

The Balkan gas hub could rely on:

- natural gas extracted in the Bulgarian and Romanian sectors of the Black Sea

shelf;

- natural gas from sources feeding the Southern Gas Corridor (Caspian region, Middle East and the Eastern Mediterranean);
- Russian natural gas supplied via the newly constructed marine pipeline in compliance with the EU requirements of the third liberalisation package and via the existing route;

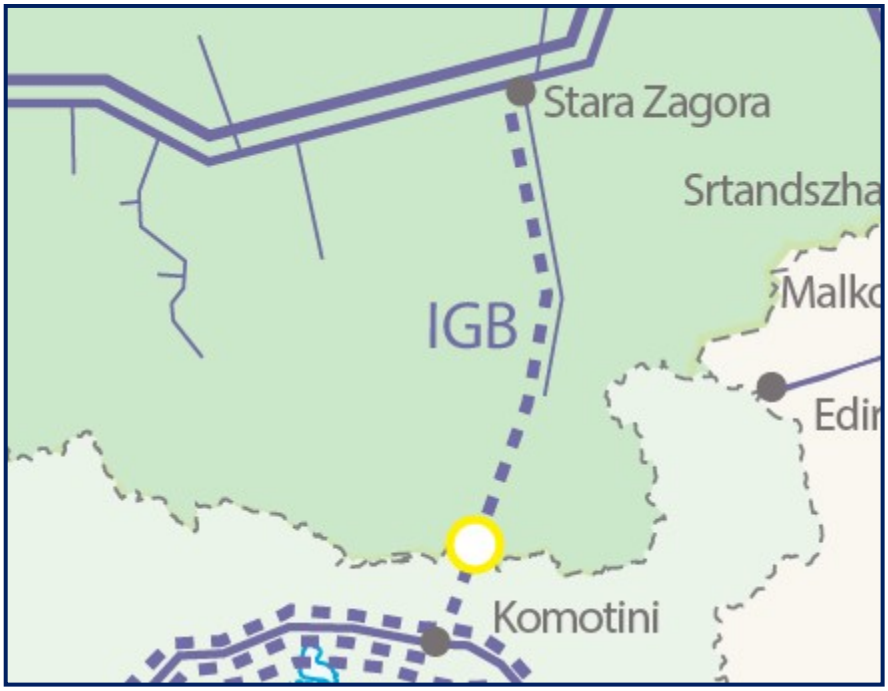
- LNG from the terminals in Greece and Turkey, including the Alexandroupolis terminal.

The Balkan gas hub has been included in the Fourth list of projects of common interest of the European Commission as Cluster 6.8 of infrastructure development and enhancement enabling the Balkan Gas Hub. This group also includes the projects for interconnectors to Greece and Serbia and the project for modernisation and rehabilitation of the gas transmission system of Bulgartransgaz EAD.

7.3 Projects for the construction of gas interconnectors

7.3.3 Gas interconnector between Greece and Bulgaria (IGB), PCI 6.8.1

The project for the interconnector between Greece and Bulgaria (IGB) has been included as a priority project of common interest for the European Union and an element of the Balkan Gas Hub in the Fourth List of PCIs of 2019. The list includes projects that conform to the requirements laid down in Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure. The project is also considered a priority within the Central and South East Europe Energy Connectivity (CESEC) initiative of the European Union.



The Greece-Bulgaria interconnector is designed to enable the transmission of natural gas between Greece and Bulgaria by connecting the transmission system of Bulgartransgaz EAD, via an interconnector in proximity to Stara Zagora, to the transmission system of DESFA S.A. and the TAP pipeline in the area of Komotini, Greece.

The Komotini – Dimitrovgrad – Stara Zagora pipeline has a length of 182 km, of

which 152 km in Bulgaria and 31 km in Greece, and pipe diameter of 32” (813 mm). The technical capacity of the pipeline is up to 3 bcm/y, with a possibility to increase it up to 5 bcm/y by constructing a compressor station.

A possibility to construct a branch of the pipeline to Kardzhali in Bulgaria has been envisaged.

In connection with the development of the Southern Gas Corridor, an interconnector will be constructed in Greece between the IGB, the TAP pipeline and the gas transmission infrastructure of DESFA S.A.

The project is implemented by the investment company ICGB AD established in Bulgaria in which the Bulgarian Energy Holding (BEH) EAD and the joint-stock company IGI Poseidon, own equal shares. The latter company is registered in Greece and is owned by DEPA S.A. and Edison International Holding N.V., which hold equal shares in its capital. It is envisaged that the investment company will construct and own the pipeline and that it will subsequently seek to be certified as its operator, distribute its capacity and receive the revenue generated from natural gas transmission. The implementation of the project is in keeping with Bulgaria's policy of building infrastructure enabling access to alternative sources and routes for natural gas supply and expanding its physical connectivity to the Southern Gas Corridor.

The IGB project is implemented in synergy with other projects planned to be implemented in the region in the future, including the liquefied natural gas terminal in Alexandroupolis. Bulgaria is involved in its construction through the share in the capital of the project company owned by Bulgartransgaz. This arrangement will enable Bulgaria to supply natural gas from far away destinations, including the USA, Egypt, Azerbaijan, Turkey, etc.

The final stage of project implementation is currently under way. The pipeline is under construction and will become operational in 2021.

The Alexandroupolis project for an independent natural gas system (Liquefied natural gas terminal in Alexandroupolis, Greece) has been included in the Fourth list of projects of common interest (PCI) of the EU. The infrastructure comprises a floating terminal (Floating, storage and regasification unit - FSRU) for LNG reception, storage and regasification, which will be situated in the coastal area of Alexandroupolis. The construction of the independent system for natural gas supply in Alexandroupolis is handled by the Greek project company Gastrade S.A.

The LNG terminal will be connected to the gas transmission system of Greece via which the natural gas will be supplied to customers in Greece and other countries. There will be alternatives for the supply of natural gas to Bulgaria either via the interconnection between Greece and Bulgaria (IGB) or the existing interconnection point between the Bulgarian and the Greek transmission systems. The terminal's design capacity for regasification and supply of gas to the Greek transmission system is 6.1 bcm/y. The storage capacity of the LNG terminal is 0.170 mcm.

Bulgaria's Energy Strategy until 2020 envisages a 20 % shareholding interest of the Bulgarian gas transmission operator Bulgartransgaz EAD in the project company. By Decision No 6 of 8 January 2020 of the Council of Ministers Bulgaria confirmed the acquisition of 20 % of the share capital of Gastrade S.A. The LNG terminal is planned to be commissioned in 2022.

The contract concluded between Bulgartransgaz and SOCAR provides for the supply of 1 bln. m^3 of natural gas from the Shah Deniz-2 gas field from the beginning of 2020. The contract, which is of key importance for Bulgaria's priorities in the energy sector, will become operational as soon as the interconnector between Bulgaria and Greece is commissioned.

7.3.2 Gas interconnector between Bulgaria and Romania

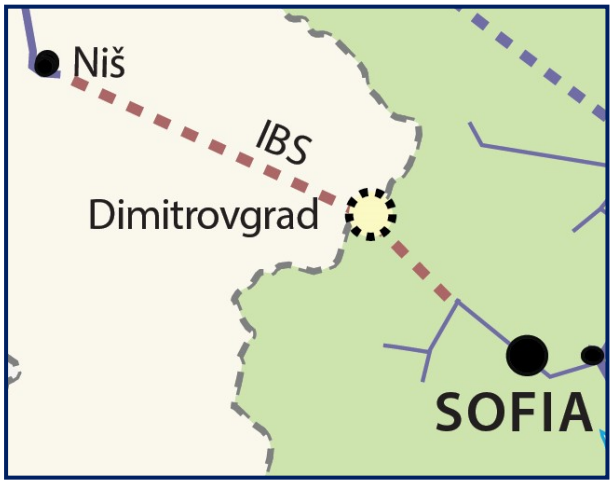
The project was jointly implemented by Bulgartransgaz EAD and Transgas S.A. in accordance with the Memorandum of Understanding signed on 1 June 2009.

The total value of the project is EUR 23 823 mln. The two companies have received grant assistance in the total amount of EUR 8.9 mln. under the European Energy Programme for Recovery pursuant to European Commission Decision C(2010)5962 of 6 September 2010. The reverse flow infrastructure has a total length of 25 km, of which 15 km in Bulgaria, 7.5 km in Romania and a 2.1 km section along the bed of the Danube river. The total capacity of the interconnector is 1.5 bcm/y (from Bulgaria to Romania) and the minimum capacity is 0.5 bcm/y (from Romania to Bulgaria). The pipe diameter is Dn 500 mm and the working pressure Pn 50 bar.

The gas pipeline was commissioned in 2016 for the transmission of gas to Romania. The completion of the Podisor gas compressor station (GCS) in Romania is an element of the interconnector infrastructure between Bulgaria and Romania and is of key importance for enabling reverse gas flow between the two countries and optimal conditions for the functioning of the interconnector. GSC Podisor has been in operation since November 2019. The interconnector between Bulgaria and Romania has reverse flow capability and ensures bi-directional gas flow between the two countries.

7.3.3 Gas interconnector between Bulgaria and Serbia (IBS)

The interconnector between Bulgaria and Serbia (IBS) is intended to have reverse flow capacity and will connect the gas transmission systems of the two countries. The pipeline will have a total length of 170 km and will run between Novi Iskar in Bulgaria and Nis in Serbia. The length of the Bulgarian section is approximately 62 km. Once constructed, the gas interconnector will have a flow-rate of 1.8 mcm/y and reverse flow capability.



The implementation of the project will ensure route diversification, interconnectivity and possibility for the transmission of natural gas to Serbia via the new entry points on Bulgaria's borders with Turkey and Greece planned to be constructed. At the same time, the interconnector will enable the supply of natural gas from Serbia in the event of emergency.

The interconnector between Bulgaria and Serbia is a project of common interest for the European Union within the meaning of Regulation (EU) No 347/2013 (PCI) and a Project of Energy Community Interest (PECI).

7.3.4 Gas interconnector between Bulgaria and North Macedonia

The project, which is currently at its blueprint stage, envisages the construction of a gas interconnector between Bulgaria and North Macedonia.

The development of interconnectivity between Bulgaria and North Macedonia will boost energy security and contribute to further energy market integration. In connection with this, the following have been signed:

- a Memorandum of Understanding for cooperation in the area of natural gas between the Ministry of Energy of the Republic of Bulgaria and the Ministry of Economy of the Republic of North Macedonia; and
- an Agreement between Bulgartransgaz EAD and the joint-stock energy company Macedonian Energy Resources (*Makedonski energiyni resursi*) in respect of a feasibility study to be conducted for the purpose of constructing a new gas interconnector between Bulgaria and North Macedonia.

The possibility of constructing the interconnector along the route between Petrich and Strumitsa has been considered.

7.4 Expansion of gas transmission infrastructure in the section from the Bulgarian-Turkish border to the Bulgarian-Serbian border and concept for the construction of a gas hub

The project for expansion of gas transmission infrastructure from the Bulgarian-Turkish border to the Bulgarian-Serbian border is an element of the Balkan Gas Hub concept and aims to reinforce Bulgaria's role as a leading commercial hub in the region and the European Union as a whole.

The project for expansion of the national gas transmission infrastructure is a priority for the Bulgarian government. Its implementation seeks to enhance the security of natural gas supply from different sources, boost competition and increase transparency on the market in natural gas thereby having a positive effect on natural gas consumers.

The project is of key importance for market integration, will provide stronger guarantees for the supply of natural gas to Bulgaria and the region while
creating conditions for genuine diversification of sources and routes and a possibility for the transmission and transit of additional quantities of natural gas to Bulgaria and across its territory.

The first stage of the project entails the construction of a gas pipeline with a length of approximately 11 (eleven) km, using pipes with a diameter of 1 220 mm, and a gas metering station situated in immediate proximity to GCS Strandzha. The two stations have been in operation since the end of 2019.

The main activity under the project is the construction of a transmission pipeline to the Bulgarian-Serbian border with a length of 474 km, using pipes with a diameter of 1 200 mm. Another project activity is the construction of two gas compressor stations, which is currently under way.

7.5 Upgrade, rehabilitation and extension of the Bulgarian gas transmission infrastructure, PCI 6.8.2

PCI 6.8.2 is a comprehensive project for modernisation, rehabilitation and expansion of existing gas transmission in Bulgaria, which includes the following activities:

- modernisation and rehabilitation of gas compressor stations;
- inspections to ascertain and describe the condition of the pipelines;
- repairs to and replacement of sections of the pipeline following inspections;
- expansion and modernisation of the existing network;
- implementing systems to optimise the management of the technical condition of the network.

The modernisation, rehabilitation and expansion of existing gas transmission infrastructure will ensure secure and reliable natural gas transmission, improve the efficiency, reliability and flexibility of the transmission system and ensure the necessary capacity and pressure. The implementation of the planned activities will further ensure

technical capacity for the transmission of additional quantities of natural gas via the existing and new entry and exit points in Bulgaria as well as a possibility to diversify the directions of transmission, depending on market interest.

The project activities are to be implemented in three phases:

Phase 1 (completed): Activities implemented in the period 2013-2018;

Stage 1 of the modernisation of 4 gas compressor stations (GCS Lozenets, GCS Ihtiman, GCS Petrich and GCS Strandzha) through the integration of 6 low-emission gas turbine compressor aggregates (GTCA), [which involves]: ☐ the construction of a pipeline between CS Lozenets and the gas purification plant in Nedyalsko (approx. 20 km) as part of the planned activities under the project for expansion of the gas transmission network;

☐ conducting inspections;

☐ installing software systems (PIMS and GIS) to optimise the management of the technical condition of the network.

Phase 2, which is currently under way, includes activities launched in 2016 which are a natural and logical continuation of overall project implementation after the completion of phase 1. Phase 2 includes

Stage 2 of the modernisation of gas compressor stations through the integration of 4 GTCAs into 3 gas compressor stations (GCS Lozenets, GCS Petrich and GCS Ihtiman), [which involves]:

☐ rehabilitation and replacement of sections of the northern semicircle of the national gas transmission network with a total length of 81 km;

☐ conducting inspections;

☐ installing additional software.

The activities under Phase 2 of PCI 6.8.2 are implemented with own funds of Bulgartransgaz EAD and grant assistance under the Connecting Europe Facility (CEF).

Phase 3 (conditional) includes infrastructure whose parameters and construction are currently subject to a number of conditions relating to future decisions to be made in respect of the IBS and concern the planned expansion of the interconnector capacity from 1.8 bcm/y to 2.4 bcm/y. The infrastructure includes a pipeline between Gorni Bogrov and Novi Iskar with an approximate length of 19 km to be constructed using DN 700 mm pipes and a 20 MW gas compressor station in Bogrov.

7.6 Projects for the expansion of gas storage capacity

Natural gas storage plays an essential role in the efforts to enhance the flexibility of gas transmission systems and is vital for the management of overloads and the optimal seasonal use of gas transmission systems. Natural gas storages will gain even greater importance in an integrated and interconnected market.

7.6.1 Project for the expansion of UGS Chiren (PCI 6.20.2)

The underground gas storage in Chiren is the only one of its kind in Bulgaria. The project for its expansion entails the gradual increase of storage capacity to ensure that larger volumes of natural gas can be stored, respectively higher gas tank pressures and increasing injection and withdrawal volumes. The expansion of UGS Chiren is a project of common interest, which has been included in the fourth list of PCIs of the European Commission. It envisages an increase in working gas volume of up to 1 bcm and in withdrawal and injection capacity of 8 up to 10 mcm/day.

UGS Chiren is a key instrument for the functioning of the gas market in Bulgaria as it compensates seasonal fluctuations in demand for natural gas, providing the necessary flexibility, allowing the system to cope with the differences between supply and demand and providing an emergency reserve. The implementation of the expansion project aims, on the one hand, to create conditions that ensure the security of supplies to consumers in Bulgaria

and the region while seeking, on the other hand, to develop UGS Chiren as a commercial gas storage in an interconnected regional and trans-European market in which the gas storage is an integral part of the regional gas system, comprising interconnectors, LNG terminals and gas storages. One of the advantages of UGS Chiren is that it is a fully operational facility and its expansion will require a significantly shorter period compared to that needed to construct a new storage.

In parallel to expansion works, the gas storage will be rehabilitated and its capacity as well as the capacity of the national gas transmission system (mainly the northern semicircle) to which the gas storage is connected will also be increased to ensure the larger daily quantities for injection and withdrawal and greater capacity for their transmission.

7.6.2 Concept for the construction of a second underground gas storage facility in Bulgaria

In order to ensure the security of supplies and boost energy market liberalisation, Bulgaria is currently exploring the possibility to construct a new gas storage. The development of gas infrastructure in the region, including projects for the expansion of the national gas transmission network, planned new interconnectors and other large-scale cross-border gas projects create a need for additional storage capacity, respectively the implementation of projects [to construct new/expand existing] storage capacities, in the long run.

While the currently functioning underground gas storage in Chiren must continue to operate, a new gas storage can serve both the domestic and the regional market once the new interconnectors to neighbouring countries become fully operational. It could be constructed in areas with a suitable geological structure, for example depleted gas fields (onshore and offshore), salt caverns or aquifers. However, the construction of a new gas storage, from conducting the necessary geological surveys to the commissioning of the facility, would take at least seven to eight years.

7.7 Domestic gas extraction in the Black Sea

Domestic extraction in the Black Sea has genuine potential to diversify energy resources. More specifically, local resources will enhance energy independence and increase the liquidity of the natural gas exchange.

The feasibility studies conducted in respect of the block have indicated sufficient potential to justify the construction of an exploratory well and provide an optimistic prospect. Assisted by the European Commission, Bulgaria has developed a concept for the construction of a gas distribution centre, which will rely on natural gas from various sources, including the gas fields in the Black Sea.

8. Public service obligations that relate to security of supply

8.1 Obligations imposed on natural gas undertakings by the national authorities in relation to the security of supplies, including in relation to the safe operation of the gas system Information on all public service obligations that relate to security of gas supply

According to Chapter Six Public service obligations of the Energy Sector Act energy undertakings have an obligation to carry out their activities in the interest of the public and individual clients and in compliance with the requirements of the Energy Sector Act and other statutory acts, ensuring the security of supply, including the protection of critical infrastructure in the energy sector, the uninterrupted supply of electricity, heat and natural gas that conforms to a high standard, making effective use the fuel and energy, and protection of the environment and of the life, health and property of citizens. (Article 69 of the Energy Sector Act, ZE).

Article 70(1) of the ZE grants powers to the Minister for Energy to impose additional public service obligations to energy undertakings related to:

- the uninterrupted supply of electricity, heat and natural gas, and
- environmental protection, in consultation with the Minister for the Environment and Water;
- protection of critical infrastructures in the energy sector.
- Additional public service obligations are imposed by an order.

The ZE stipulates a requirement for public service obligations to be clearly defined, transparent, non-discriminatory, verifiable and ensuring that EU gas undertakings have equal access to domestic consumers.

Any additional costs incurred by the energy undertakings are recognised as expenses in accordance with Article 35 of the ZE. Energy undertakings have the right to file an application with the KEVR for compensation of costs arising from public service obligations imposed, including obligations related to the security of supply, environmental protection and energy efficiency.

According to Article 71 of the Energy Sector Act the energy undertakings engaged in electricity and heat transmission or electricity and natural gas distribution, which provide services of public interest and have a dominant market position within the meaning of the Protection of Competition Act (ZZK), must comply with the provisions of the ZZK insofar as these do not create actual or legal barriers that prevent the undertakings from fulfilling their [public service] obligations.

According to Article 181(1) of the Energy Sector Act the contracts for natural gas, in the case of provision of public interest services relating to the transmission, distribution and supply of natural gas, are concluded at prices regulated by the KEVR, and in all other cases at freely negotiated prices.

The requirement for transparency in the general terms and conditions of the contracts for gas supply and transmission via the distribution network, envisaged in the ZE, has been [transposed] in Articles 38a to 38h, 183a and 183b of the ZE and the Regulation on the licensing of activities in the energy sector.

According to Article 180 of the ZE each client connected to a gas

transmission and/or gas distribution network has the right to choose their natural gas supplier, irrespective of the [Member] State in which the supplier is registered, provided that the supplier observes the rules governing trade in natural gas and the requirements for the security of supply.

Additional consumer protection measures are envisaged in national law, and in particular those envisaged in Directives 2009/72 and 2009/73 applicable in a fully liberalised energy market. More specifically, it is envisaged that: The final supplier is a licensed energy undertaking, which supplies electricity or natural gas to clients that have not exercised their right to choose a supplier of electricity or natural gas. The main function performed by final suppliers is to supply [natural gas] to clients connected to gas distribution network within the area specified in their licence in accordance with publicly available general terms and conditions, when the clients have not chosen another supplier. In these cases, the prices are regulated by the Energy and Water Regulation Commission.

This ensures uninterrupted supply to the categories of customers concerned when they have not exercised their right to choose a supplier.

By performing their activity in the interest of the public and individual consumers, energy undertakings ensure the security of supply, continuous supply of electricity, heat and natural gas that conforms to a high quality standard, efficient use of fuels and energy and protection of the environment and of the life, health and property of citizens. At the

same time, they have the right to conduct transactions at freely negotiated prices on the unregulated market.

9. Stakeholder consultations

The Minister for Energy holds consultations with natural gas undertakings, the relevant organisations representing the interests of household customers and industrial consumers supplied with natural gas, including electricity producers, electricity transmission system operators and the national regulatory authority.

According to applicable national law (Regulation No 11 of 10 June 2004 on fuel reserves) power plants using natural gas as their main fuel are required to maintain on site alternative fuel reserves (fuel oil or gas oil) in order to be able to maintain the production cycle in the event of interruption in natural gas supply. The size of the reserve to be maintained is calculated for each month in a 15-month in accordance with standards approved by the Minister for Energy. In the event of full disruption of natural gas supply, the alternative fuel reserves are sufficient to maintain continuous operation of the plant for an average period of 5 to 15 days during which the necessary action to ensure long-term supply is to be taken, if necessary.

Pursuant to Article 72(1) of the ZE (new in SG No 54/2012, in force as from 17 July 2012) the Minister for Energy, after consulting natural gas undertakings, the organisations representing the interests of household and non-household customers and the Commission, establishes at national level:

1. a preventive action plan detailing the measures required to remove or mitigate the effects of the risks identified, in accordance with the risk assessment made;

2. an emergency action plan detailing the measures to be taken to eliminate or mitigate the effects of interrupted gas supplies.

The risk assessment is performed on the basis of the elements specified in Regulation (EU) 2017/1938 for the respective risk group. Following the assessment, plans setting out measures to mitigate the consequences of potential disruption of supplies to the risk group are drawn up.

3. When adopting the plans referred to in paragraph 1 the Minister for Energy cooperates with the competent authorities in the region and the European Commission to ensure that they are compatible with the plans of other EU Member States in the region and to develop regional action plans. The competent authority responsible for adopting decisions on the introduction of limitations in Bulgaria is the Minister for Energy or a duly authorised Deputy Minister. The Minister for Energy notifies the introduction of the restrictive conditions referred to in paragraphs 1 to 3 to the Commission (KEVR) and to the European Commission in the cases envisaged in the Regulation referred to in Article 9(4) and makes a public announcement through the media. The mayors determine the restrictions on heat and natural gas supply in the territory of the municipality after consultations with the Minister for Energy in accordance with the Regulation referred to in Article 74(1).

The Commission for Energy and Water Regulation (KEVR) is the national regulatory body responsible for issuing, modifying, supplementing, suspending, terminating and withdrawing licences for electricity and/or heat generation, the transmission of electricity, heat or natural gas, the distribution of electricity or natural gas, the storage of natural gas at storage facilities and/or liquefying natural gas or the import, the unloading and regasification of liquefied natural gas at LNG facilities, trade in electricity, organising an electricity exchange, the public supply of electricity or natural gas, the supply of electricity or natural gas to final consumers, the distribution of traction electricity along railway distribution networks and the supply of electricity by a supplier of last resort.

The KEVR defines the rules for access to electricity transmission networks and gas transmission networks, electricity distribution networks and gas distribution networks and

natural gas storage facilities, including quality standards for services and supplies, and where necessary reviews them to ensure effective access.

It certifies electricity transmission and gas transmission system operators as compliant with the requirements for independence, monitors their compliance and submits relevant notifications to the European Commission.

The Commission requires that, where necessary, transmission and distribution system operators propose modifications to the rules and the general terms and conditions of the contracts provided for in the Energy Sector Act to be approved by the Commission acting on their proposal.

It monitors the transition from a regulated market to an organised market based on the principle of freely negotiated prices in accordance with electricity trading rules.

According to the amendments to the Energy Sector Act, which entered into force on 8 October 2019, the energy regulator approves a platform for trading in natural gas on a proposal of the gas transmission network operator. As noted in the report of the working group, in accordance with the requirements laid down in Commission Regulation (EU) No 312/2014 establishing a Network Code on Gas Balancing of Transmission Networks, in order to procure short term standardised products, the transmission system operator trades on a trading platform.

The platform must meet certain requirements, such as providing sufficient support throughout the gas day to both the network users and the transmission system operators; providing transparent and non-discriminatory access; providing services on an equal treatment basis, ensuring anonymous trading until a transaction is concluded, and providing a detailed overview of the current bids and offers to all trading participants. In accordance with the requirements laid down in Commission Regulation (EU) No 312/2014 the transmission system operator Bulgartransgaz EAD has designated the trading platform of Balkan Gas Hub EAD as compliant with the requirements and criteria laid down in the Regulation.

10. Regional dimension

One of the key objectives of Regulation (EU) 2017/1938 is to enhance regional cooperation between risk group countries through planning so that decisions on the security of gas supply are not taken solely on the basis of national assessments and considerations but take into account the regional dimension. The latter enhances the accuracy of the assessments and measures to prevent and mitigate crises and lead to economies of scale in taking joint action. Furthermore, it lowers the security costs of supplying natural gas to consumers, including industrial consumers, who are concerned about the impact of such costs on their ability to compete on the international market.

The Regulation seeks to achieve this by clearly outlining the regional dimension of many security framework elements, including through a requirement for common risk assessments and regional chapters of the mutually agreed measures to be included in the national preventive action plan and the national emergency plan (the plans).

The plans envisage a gradual approach, starting with the countries agreeing on a cooperation mechanism and followed by an exchange of proposals on cooperation within the risk groups, together with each country drafting its national plans.

The preventive action plan envisages further strengthening of interconnectivity between the Member States in the risk group. A Memorandum of Understanding on the implementation of the Vertical Gas Corridor was signed by representatives of the gas companies Bulgartransgaz EAD, ICGB AD (Bulgaria), DESFA S.A. (Greece), FGSZ LTD (Hungary) and SNTGN TRANSGAZ S.A. (Romania) at a meeting, which took place in Bucharest, Romania.

The development of the regional market in natural gas in recent years is driven by an expected increase in consumption in neighbouring countries. These projections are based on the long-term contracts for natural gas supply from the Russian Federation via the Balkan route, on the one hand, and on market development, on the other, in view of the possibilities for natural gas supply from new sources via the Southern Gas Corridor (including the TANAP and TAP pipelines currently under construction and the possibility for supply from Azerbaijan), and the potential of domestic production. These expectations are consistent with the plans for the construction of new interconnectors between Bulgaria's gas transmission systems and those of Greece and Serbia, completion of the interconnector with Romania, the development of the Balkan Gas Hub, and the expansion and modernisation of the gas transmission infrastructure of Bulgartransgaz EAD in order to adapt to the major projects in the region. In accordance with the requirements laid down in EU and national law and in line with good practices on the EU gas market and its own transparency policy Bulgartransgaz EAD has adopted a ten-year plan for development of the company's networks for the period 2019-2028. Its implementation will enhance the security of natural gas supply to Bulgaria and all risk group countries. The further enhancement of security and the efforts to diversify the sources of natural gas supply are bolstered by the implementation of the Balkan Gas Hub concept, which is fully aligned with the projects for the development of gas infrastructure in South East Europe. The project also takes into account the needs of the region identified by the Central and South-Eastern European Gas Connectivity (CESEC) High Level Group and in the EU's Energy Union Strategy.

The projects for modernisation, rehabilitation and expansion of Bulgaria's gas transmission network of common European interest (PCI) within the meaning of Regulation *EU) No 347/2013 also play an important role for regional stability. In view of their links to the IGB, IBS and IBR projects, they have also been included as priority projects in the list of the Central and South-Eastern European Gas Connectivity (CESEC) Group and in the Action Plan thereto (CESEC Action Plan).

Bulgaria has expressed an interest and will participate in the implementation of the EU's strategic initiatives for construction of the necessary infrastructure and diversification of the sources of natural gas supply to the EU, notably the Southern Gas Corridor, access to liquefied natural gas, the interconnectors along the North-South axis, the new Vertical gas corridor, etc. In light of the efforts to diversify the routes and sources of natural gas supply, these projects gain special significance both for Bulgaria and the entire region of South East Europe. In connection with this, in the in the short and medium term Bulgaria will seek to foster competition between different sources and producers of natural gas for the country (the so-called gas-to-gas competition). This will provide an incentive for negotiating competitive prices for the Bulgarian economy.

There are plans to construct and put into operation a new interconnector to Serbia.

The final stage of the project for the construction of an interconnector between Greece and Bulgaria is currently under way. The pipeline is under construction and will become operational in 2021.

Key cross-border pipelines, which will be connected to the existing gas transmission network of Bulgartransgaz EAD will also cross Bulgaria's territory. The successful implementation of the company's plans will ensure that Bulgaria's gas infrastructure connects the single European market of natural gas to markets in the Caspian region, Central Asia, the Middle East, the Eastern Mediterranean and North Africa. This will secure natural gas supplies to Bulgaria and the region while creating conditions for genuine diversification of the sources and for natural gas supply to and via Bulgaria. The planned measures to enhance the stability of gas supplies to Bulgaria will have a positive impact on the overall security of supplies to all risk group countries and to Eastern Europe.

11. Calculation of the N – 1 formula at the level of the risk group.

Eastern Trans-Balkan risk group (according to the common risk assessment at group level)

In accordance with Annex II to Regulation (EU) 2017/1938 the N – 1 formula describes the ability of the technical capacity of the gas infrastructure to satisfy total gas demand in the calculated area in the event of disruption of the largest gas infrastructure during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years.

Table 2 Dmax of the Member States

Member States	**D_{max} (M(S)m³/d)(1)**
Bulgaria	16.06
Greece	27.93
Romania	72

The largest gas infrastructure of common interest for the Trans-Balkan gas supply risk group is IP Orlovka–Isaccea. For the purpose of calculating the N – 1 standard, the entire region comprising the three countries is considered as a total 'calculated area' and only the entry points connecting the region to countries outside it have been taken into account. The cross-border capacity points in the region have not been included. When viewing Romania, Bulgaria and Greece as a single region with several entry points (EP), Mediesu (EP1) and Isaccea (EP2) in Romania are entry points for the Russian gas transited via Ukraine. Some of the gas supplied to Isaccea is transited through Romania and Bulgaria via IP Negru voda I, IP Negru voda II and IP Negru voda III to Greece via Petrich – Sidirokastro. The entry point for gas supplied from Hungary to Romania is Csanadpalota (EP3) and the entry point for gas supplied from Turkey to Greece is Kipoi. The table below (Table 3) sets out the maximal entry point daily gas flow capacity (for 2019 in M(S)m³ / d) of the Eastern Trans-Balkan risk group. An additional entry point Strandzha-2/Malkochlar (EP5), which became operational at the beginning of 2020, has been added.

Table 3 Maximal entry point technical capacity in the region in 2019, M(S)m³/d

<table>
<tr><th colspan="2">Ukraine→ Romania</th><th>Hungary → Romania</th><th>Turkey → Greece</th><th>Turkey → Bulgaria</th></tr>
<tr><td>EP 1</td><td>EP 2</td><td>EP 3</td><td>EP 4</td><td>EP 5</td></tr>
<tr><td>Mediesu</td><td>Isaccea</td><td>Csanadpalota</td><td>Kipoi</td><td>Strandzha-2/Malkoclar</td></tr>
<tr><td rowspan="3">11</td><td>23.6</td><td rowspan="3">4.8</td><td rowspan="3">4.5</td><td rowspan="3">15.7</td></tr>
<tr><td>18.8*</td></tr>
<tr><td>50.4*</td></tr>
<tr><td colspan="4">113.1 (total) /128.8 with EP5/</td><td></td></tr>
</table>

1 The values have been provided by the national competent authorities, except for the figure for Greece, which was estimated by the JCR on the basis of statistical modelling of domestic demand (i.e. regression model of national average daily temperature and domestic demand). The methodology used and the calculation of Dmax for Greece are included in the national risk assessment, which has been submitted to the European Commission.

Tables 4 and 5 set out a summary of all parameters above used for the purpose of the N – 1 index calculation in the assessment of risk for the Trans-Balkan group with and without demand-side measures set out in **Table 6** (Article 6(1) and Annex VIII to the Regulation). Furthermore, as envisaged in the Regulation, the N – 1 index is calculated at 30 % and 100 % of the maximum working volume of the gas in underground storage. The calculation of the N – 1 index for the period 2019-2022 also takes into account the new planned changes in infrastructure and production in the region.

Table 4 Calculation of the N – 1 formula for the Trans-Balkan risk group without Deff (Deff means the part of Dmax that can be sufficiently covered in a timely manner using market-based demand-side measures in the event of a disruption of gas supply)

	2019		**2020**		**2021**		**2022***	
	Dmax (M(S)m³/d)	**GWh/d****	**Dmax (M(S)m³/d)()**	**GWh/d**	**Dmax (M(S)m³/d)()**	**GWh/d**	**Dmax (M(S)m³/d)**	**GWh/d**
EP_m (tot)	113.10	1 195.47	113.10	1 195.47	110.50	1 167.99	137.40	1 452.32
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	14.60	154.32
Greece	4.50	47.57	4.50	47.57	4.50	47.57	9.60	101.47
Romania	108.60	1 147.90	108.60	1 147.90	106.00	1 120.42	113.20	1 196.52
P_m (tot)	26.16	276.51	26.55	280.63	47.70	504.19	47.04	497.21
Bulgaria	0.16	1.69	0.55	5.81	1.10	11.63	1.64	17.33
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	26.00	274.82	26.00	274.82	46.60	492.56	45.40	479.88
S_m (tot) (100 % filled)	33.25	351.45	33.25	351.45	33.25	351.45	33.25	351.45
Bulgaria	3.75	39.64	3.75	39.64	3.75	39.64	3.75	39.64
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	29.50	311.82	29.50	311.82	29.50	311.82	29.50	311.82
S_m (tot) (30 % filled)	10.96	115.85	10.96	115.85	10.96	115.85	10.96	115.85
Bulgaria	2.11	22.30	2.11	22.30	2.11	22.30	2.11	22.30
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	8.85	93.54	8.85	93.54	8.85	93.54	8.85	93.54
LNG_m (tot)	20.20	213.51	20.20	213.51	20.20	213.51	20.20	213.51
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Greece	20.20	213.51	20.20	213.51	20.20	213.51	20.20	213.51
Romania	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I_m	92.80	980.90	92.80	980.90	90.20	953.41	90.20	953.41
D_{max} (tot)	115.99	1 226.01	115.99	1 226.01	115.99	1 226.01	115.99	1 226.01
D_{eff}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N-1 (%) (100 % filled)	**86.91 %**		**86.47 %**		**104.71 %**		**127.33 %**	
N-1 (%) (30 % filled)	**66.92 %**		**67.26 %**		**85.49 %**		**108.11 %**	

Table 5: Calculation of the N – 1 formula for the Trans-Balkan risk group, incl. Deff

	2019		2020		2021		2022*	
	(M(S)m³/d)	GWh/d	M(S)m³/d	GWh/d	(M(S)m³/d	GWh/d	M(S)m³/d)	GWh/d
EP_m (tot)	113.10	1 195.47	113.10	1 195.47	110.50	1 167.99	137.40	1 452.32
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	14.60	154.32
Greece	4.50	47.57	4.50	47.57	4.50	47.57	9.60	101.47
Romania	108.60	1 147.90	108.60	1 147.90	106.00	1 120.42	113.20	1 196.52
P_m (tot)	26.16	276.51	26.55	280.63	47.70	504.19	47.04	497.21
Bulgaria	0.16	1.69	0.55	5.81	1.10	11.63	1.64	17.33
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	26.00	274.82	26.00	274.82	46.60	492.56	45.40	479.88
S_m (tot) (100% filled)	33.25	351.45	33.25	351.45	33.25	351.45	33.25	351.45
Bulgaria	3.75	39.64	3.75	39.64	3.75	39.64	3.75	39.64
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	29.50	311.82	29.50	311.82	29.50	311.82	29.50	311.82
S_m (tot) (30 % filled)	10.96	115.85	10.96	115.85	10.96	115.85	10.96	115.85
Bulgaria	2.11	22.30	2.11	22.30	2.11	22.30	2.11	22.30
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	8.85	93.54	8.85	93.54	8.85	93.54	8.85	93.54
LNG_m (tot)	20.20	213.51	20.20	213.51	20.20	213.51	20.20	213.51
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Greece	20.20	213.51	20.20	213.51	20.20	213.51	20.20	213.51
Romania	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I_m	92.80	980.90	92.80	980.90	90.20	953.41	90.20	953.41
D_{max} (tot)	115.99	1 226.01	115.99	1 226.01	115.99	1 226.01	115.99	1 226.01
D_{eff}	5.72	60.50	5.72	60.50	5.72	60.50	5.72	60.50
N – 1 (%) (100 % filled)	**90.61 %**		**90.96 %**		**110.14 %**		**1.94 %**	
N – 1 (%) (30 % filled)	**70.39 %**		**70.75 %**		**89.93 %**		**113.72 %**	

** IBS+ITB+TAP*

The N – 1 calculations for the period 2019-2022 set out in Table 4 show that in the event of disruption of the single largest gas infrastructure (IP Orlovka-Isaccea), the technical capacity of the remaining infrastructure will be capable of satisfying total gas demand in the region during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years only after 2021 (considering the level of gas in storages at 100 % of the maximum working volume). The calculation of the N – 1 formula for 2019 and 2020 yields a value below 100 % (Table 4) and, at a level of gas in storages at 30 % of the maximum working volume, the N – 1 formula calculation is below 100 % even in 2022. Taking demand-side measures into account, the N – 1 index set out in

Table 5 improves by 4 % up to 6 % (in absolute numbers) for the years 2019 to 2022. Despite this, the N – 1 calculations for the years concerned remain below 100 %, regardless of whether demand-side measures are implemented or not. The approach set out in Tables 4 and 5 rests on the assumption that EPm includes the total quantity of gas supplied to the region, not taking into account that a share of this quantity is transit gas. There are currently two exit points (EXP) in the region for the purpose of gas transmission to neighbouring countries — the exit point to Turkey at Malkoclar (EXP1) and the exit point to North Macedonia at Zhidilovo (EXP2).

Table 6 Demand-side and supply-side measures

Demand-side measures:	**Supply-side measures:**
- use of natural gas resources; - enforced use of stocks of alternative fuels (e.g. in accordance with Council Directive 2009/119/EC (1)); - enforced use of electricity generated from sources other than gas; - enforced increase of gas production levels; - enforced storage withdrawal;	- various steps of compulsory demand reduction including [sic]; - enforced fuel switching; - enforced utilisation of interruptible contracts, where not fully utilised as part of market-based measures, - enforced firm load shedding.

The maximal technical capacity of exit points is set out in Table 7 (data for 2019, in M(S)m^3 /d). Thus, taking these two exit points into account, an alternative approach to calculating the N – 1 formula can be taken by discounting transit gas from the total quantity of gas entering the region, i.e. subtracting 46.88 M(S) m^3/d from the N – 1 formula calculation. The figures based on the application of the second approach and set out in Tables 8 and 9 show that reliance on gas transit has great importance for the N – 1 formula calculation for the Balkan region, at least for the years 2021 and 2022 for which the N – 1 infrastructure standard exceeds 100 % (see also Tables 4 and 5). When gas transit flows are discounted (flows intended for neighbouring countries along the supply chain, i.e. Turkey and North Macedonia), the N – 1 calculation is below 100 % even in the scenario of demand-side measures application in the period 2019-2022.

Table 7 Maximal technical capacity (in M(S) m^3/d) at entry points in the region as at 2019

Bulgaria → Turkey	**Bulgaria → North Macedonia**
EXP1	**EXP2**
Malkoclar	**Zhidilovo**
44.35	2.53
46.88 (total)	

Table 8 Calculation of the N – 1 formula for the Trans-Balkan risk group, without transit gas (second approach) and excluding Deff.

	2019		2020		2021		2022*	
	(S)mcm/d	GWh/d	(S)mcm/d	GWh/d	(S)mcm/d	GWh/d	(S)mcm/d	GWh/d
EP_m (tot)	113.10	1 195.47	113.10	1 195.47	110.50	1 167.99	137.40	1 452.32
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	14.60	154.32
Greece	4.50	47.57	4.50	47.57	4.50	47.57	9.60	101.47
Romania	108.60	1 147.90	108.60	1 147.90	106.00	1 120.42	113.20	1 196.52
$ExitP_m$ (tot)	46.88	495.52	46.88	495.52	46.88	495.52	46.88	495.52
EXP1	44.35	468.78	44.35	468.78	44.35	468.78	44.35	468.78
EXP2	2.53	26.74	2.53	26.74	2.53	26.74	2.53	26.74
P_m (tot)	26.16	276.51	26.55	280.63	47.70	504.19	47.04	497.21
Bulgaria	0.16	1.69	0.55	5.81	1.10	11.63	1.64	17.33
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	26.00	274.82	26.00	274.82	46.60	492.56	45.40	479.88
S_m (tot) (100 % filled)	33.25	351.45	33.25	351.45	33.25	351.45	33.25	351.45
Bulgaria	3.75	39.64	3.75	39.64	3.75	39.64	3.75	39.64
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	29.50	311.82	29.50	311.82	29.50	311.82	29.50	311.82
S_m (tot) (30 % filled)	10.96	115.85	10.96	115.85	10.96	115.85	10.96	115.85
Bulgaria	2.11	22.30	2.11	22.30	2.11	22.30	2.11	22.30
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	8.85	93.54	8.85	93.54	8.85	93.54	8.85	93.54
LNG_m (tot)	20.20	213.51	20.20	213.51	20.20	213.51	20.20	213.51
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Greece	20.20	213.51	20.20	213.51	20.20	213.51	20.20	213.51
Romania	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I_m	92.80	980.90	92.80	980.90	90.20	953.41	90.20	953.41
D_{max} (tot)	115.99	1 226.01	115.99	1 226.01	115.99	1 226.01	115.99	1 226.01
D_{eff}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N – 1 (%) (100 % filled)	**113.72 %**		**46.06 %**		**64.29 %**		**86.91 %**	
N – 1 (%) (30 % filled)	**26.50 %**		**26.84 %**		**113.72 %**		**67.70 %**	

Table 9 Calculation of the N – 1 formula for the Trans-Balkan risk groups, without transit gas (second approach) and including Deff

	2019		2020		2021		2022*	
	(S)mcm/d	GWh/d	(S)mcm/d	GWh/d	(S)mcm/d	GWh/d	(S)mcm/d	GWh/d
EP_m (tot)	113.10	1 195.47	113.10	1 195.47	110.50	1 167.99	137.40	1 452.32
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	14.60	154.32
Greece	4.50	47.57	4.50	47.57	4.50	47.57	9.60	101.47
Romania	108.60	1 147.90	108.60	1 147.90	106.00	1 120.42	113.20	1 196.52

EP_m (tot)	46.88	495.52	46.88	495.52	46.88	495.52	46.88	495.52
EXP1	44.35	468.78	44.35	468.78	44.35	468.78	44.35	468.78
EXP2	2.53	26.74	2.53	26.74	2.53	26.74	2.53	26.74
EP_m (tot)	26.16	276.51	26.55	280.63	47.70	504.19	47.04	497.21
Bulgaria	0.16	1.69	0.55	5.81	1.10	11.63	1.64	17.33
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	26.00	274.82	26.00	274.82	46.60	492.56	45.40	479.88
S_m (tot) (100 % filled)	33.25	351.45	33.25	351.45	33.25	351.45	33.25	51.45
Bulgaria	3.75	39.64	3.75	39.64	3.75	39.64	3.75	39.64
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	29.50	311.82	29.50	311.82	29.50	311.82	29.50	311.82
S_m (tot) (30 % filled)	10.96	115.85	10.96	115.85	10.96	115.85	10.96	115.85
Bulgaria	2.11	22.30	2.11	22.30	2.11	22.30	2.11	22.30
Greece	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Romania	8.85	93.54	8.85	93.54	8.85	93.54	8.85	93.54
LNG_m (tot)	20.20	213.51	20.20	213.51	20.20	213.51	20.20	213.51
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Greece	20.20	213.51	20.20	213.51	20.20	213.51	20.20	213.51
Romania	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
I_m	92.80	980.90	92.80	980.90	90.20	953.41	90.20	953.41
D_{max} (tot)	115.99	1 226.01	115.99	1 226.01	115.99	1 226.01	115.99	1 226.01
D_{eff}	5.72	60.50	5.72	60.50	5.72	60.50	5.72	60.50
N – 1 (%) (100 % filled)	**48.09 %**		**48.45 %**		**67.63 %**		**91.42 %**	
N – 1 (%) (30 % filled)	**27.88 %**		**28.23 %**		**47.41 %**		**71.21 %**	

11.2. Developed cooperation mechanisms at group level

11.2.1 Procedure for exchange of information between competent authorities within the risk group.

In accordance with Article 13 [sic] of Regulation (EU) 2017/1938 When the competent authority declares one of the crisis levels [...], it must immediately inform the Commission as well as the competent authorities of the Member States with which the Member State of that competent authority is directly connected.

When the competent authority declares an emergency it follows the pre-defined actions as set out in its emergency plan and must immediately inform the Commission and the competent authorities in the risk group as well as the competent authorities of the Member States with which the Member State of that competent authority is directly connected in particular of the action it intends to take. The competent authority is to notify other risk group members only when an emergency is declared. Despite this, with a view to enhancing coordination, if the competent authority of the Ukrainian and/or Trans-Balkan

risk group declares an emergency, it must notify the other risk group members and the European Commission at the same time.

Furthermore, if the competent authority of the risk groups identifies a potential disruption affecting gas supplies from Ukraine, it must notify the other competent authorities as soon as practicable before declaring an emergency.

List of the events triggering risks of reduction or discontinuation of natural gas supply:

- reduced flows from interconnector points to Ukraine (Drozdovichi, Uzhgorod, Beregovo, Tekovo or Orlovka);
- reduced flow of Russian gas to one or more members of the group;
- incidents or detection of technical problems, which may lead to constraints in natural gas flow, affecting the main pipelines connecting Member States belonging to the risk groups;
- estimate of the expected (one or two days in advance) exceedingly high demand due to extreme weather in a Member State from the risk group.

The list of competent authorities will be updated on an annual basis by the competent authority acting as facilitator and where a change occurs in the contact details of a competent authority by the competent authority concerned.

The solidarity mechanism is still under evaluation by the competent authorities of the Member States. Once agreements have been concluded, the participating Member States will notify the group of the mechanism's existence and a notice will be published in accordance with established procedure.

Where the application of the solidarity measure is requested, the Member States must ensure that the relevant volume of gas is effectively delivered to solidarity protected customers in their respective territories. The solidarity measure referred to in Article 13 envisages that a Member State which is directly connected to the requesting Member State or (where the Member State so provides) its competent authority or transmission system operator or distribution system operator must, as far as possible, take the necessary measure without creating unsafe situations. The aim is to ensure that the gas supply to customers other than solidarity protected customers in the territory of the Member State providing solidarity is reduced or does not continue to the extent necessary and for as long as the gas supply to solidarity protected customers in the Member State requesting solidarity is not satisfied. In exceptional circumstances and upon a duly reasoned request by the relevant electricity or gas transmission system operator to its competent authority, the gas supply may also continue to certain critical power plants as defined pursuant to Article 11(7) in the Member State providing solidarity if the lack of gas supply to such plants would result in severe damage in the functioning of the electricity system or would hamper the production and/or transportation of gas.

Solidarity in accordance with REGULATION (EU) No 2017/1938 is to be provided to the States in the group solely on the basis of compensation. The State requesting solidarity must promptly pay, or ensure prompt payment of, fair compensation to the State providing solidarity. Such fair compensation must include at least all reasonable costs that the Member State providing solidarity incurs from an obligation to pay compensation by virtue of fundamental rights guaranteed by Union law and by virtue of the applicable international obligations when implementing this Article and further reasonable costs incurred from payment of compensation pursuant to national compensation rules.

11.2 Regional coordination system for gas (ReCo System for Gas)

In accordance with Article 3(6) of Regulation (EU) 2017/1938 the Regional Coordination System for Gas (ReCo System for Gas) established by ENTSOG and comprising standing expert groups plays a significant role in cooperation and the exchange of

information between transmission system operators in the case of emergency at regional or EU level.

The three ReCo crisis management teams are the North Eastern team, the Southern team, and the Eastern team. Most members of the Trans-Balkan risk group belong to the Eastern crisis management team. The ReCo Eastern team was established in November 2017. Until November 2019, the designated facilitator of the team was Open Grid Europe (a German TSO). This role was subsequently taken over by Fluxys (a Belgian TSO), which will serve as the designated facilitator until November 2021. The role of the facilitator is to act as the first operator that notifies the others in an emergency and activates the communication system.

Transmission system operators (TSO) cooperate and exchange information, including on gas supply flows in a crisis situation, using the Regional Coordination System for Gas (ReCo System for Gas) established by the ENTSOG. ReCo teams are primarily intended to enable the exchange of information between gas transmission system operators along existing channels. This has the potential to facilitate the approval of common emergency procedures, the organisation of urgent communication system resilience tests and the commissioning of studies for their improvement.

Although all operational procedures of ReCo teams may be regarded as emergency measures, the existence of ReCo teams is considered a preventive measure.

After an emergency, the competent authority of the Member State that declared an emergency shall, as soon as possible but not later than six weeks after the lifting of the emergency, provides the Commission with a detailed assessment of the emergency and the effectiveness of the measures implemented, including an assessment of the economic impact of the emergency, the impact on the electricity sector and the assistance provided to or received from the Union and its Member States. Such assessment shall be made available to the GCG and must be reflected in the updates of the preventive action plans and the emergency plans.

11.3 Preventive measures

Infrastructure measures to strengthen interconnectivity between neighbouring Member States

The preventive measures to ensure the security of gas supply contained in the preventive action plan are clearly defined, transparent, proportionate, non-discriminatory and verifiable, do not unduly distort competition or the effective functioning of the internal market in gas and do not endanger the security of gas supply of other Member States or of the Union. They are designed to address the risks identified in the risk assessment, such as those relating to the need to enhance interconnections between neighbouring Member States, further improve energy efficiency, reduce gas demand and [offer the] the possibility to diversify gas routes and sources of gas supply and the regional utilisation of existing storage and LNG capacities, if appropriate, in order to maintain gas supply to all customers as far as possible.

All preventive non-market-side measures, for example those set out in Annex VIII, adopted on or after 1 November 2017, are part of the preventive action plan, comply with the criteria laid down in Article 6(2) and the Union-wide TYNDP elaborated by ENTSOG pursuant to Article 8(10) of Regulation (EC) No 715/2009.

So far, the potential for more efficient and less costly measures through regional cooperation has not been fully exploited. This has to do not only with better coordination of national mitigation actions in emergency situations, but also with national preventive measures, such as national storage or policies related to LNG, which can be strategically important in certain regions of the Union.

Given that such measures can be particularly damaging to the security of gas supply, it is appropriate that they enter into force only when they are approved by the Commission or have been amended in accordance with a Commission decision.

Another important preventive measure are the activities of the company planned to be implemented in the period 2019-2023, which will ensure that the infrastructure necessary to receive gas transmission flows from and to different regions is in place. Bulgartransgaz EAD will make an effort to ensure the necessary cross-border capacity to enable bi-directional natural gas transmission via the networks. The actual utilisation of this capacity and the direction of the flows will depend on the evolution of the domestic and European gas market. Bulgartransgaz EAD works in a dynamic environment and strives to develop Bulgaria's gas transmission and storage infrastructure in an efficient manner, in line with national, regional and common European priorities, goals and strategies geared to ensure security, stability, diversification, market integration, competition and liberalisation.

The priority activities in the context of the further development of the infrastructure of Bulgartransgaz EAD for the period 2019-2028 are:

- expansion of gas transmission infrastructure from the Bulgarian-Turkish border to the Bulgarian-Serbian border;
- maintenance of basic and ancillary gas infrastructure in a state of good technical repair to ensure its reliability and efficiency;
- modernisation, rehabilitation of the gas transmission network and ancillary equipment and facilities;
- development of interconnectivity;
- expansion of natural gas storage capacity;
- development and launch of an IT platform that conforms to the requirements of the third energy package. In connection with the latter activity, a public procurement tender will be conducted for the award of a contract for the supply and deployment of an information system (platform) for the commercial dispatching of natural gas. The contract will enable the deployment and use of a commercial dispatching platform that is well-established on the European gas market, which will enable activities, such as user registration, contracting, capacity management, order administration, comparison procedures, quantity allocation, balancing, settlement, invoicing, etc., which are relevant to the main activity of natural gas transmission performed by Bulgartransgaz EAD and to TSO-network user relations.

New interconnectors to Greece and Serbia will be constructed and put into operation.

The final stage of the project for the construction of an interconnector between Greece and Bulgaria is currently under way. The pipeline is under construction and will become operational in 2021.

Current plans envisage that key cross-border pipelines to be connected to the existing gas transmission network of Bulgartransgaz EAD will cross Bulgaria's territory. The successful implementation of the company's plans will ensure that Bulgaria's gas infrastructure connects the single European market of natural gas to markets in the Caspian region, Central Asia, the Middle East, the Eastern Mediterranean and North Africa. This will secure natural gas supplies to Bulgaria and the region while creating conditions for genuine diversification of the sources and for natural gas supply to and via Bulgaria.

The planned development of gas infrastructure in the region has a direct bearing on the intended expansion of the existing gas storage in Chiren and the modernisation and rehabilitation of the gas transmission network of Bulgartransgaz EAD. The implementation of these projects is interlinked and aims to enhance the effectiveness and bolster the development of the Trans-Balkan and common European gas network.

One of the investment priorities of Bulgartransgaz EAD is the construction of pipeline branches in order to accelerate gasification in Bulgaria and maximise the relevant

economic, social, environmental and other benefits for citizens while improving air quality in large cities and enhancing environmental protection.

The implementation of this Preventive Action Plan is expected to significantly improve the quality and volume of the services offered by Bulgartransgaz EAD in relation to the transportation and storage of natural gas. It will also enable Bulgaria to evolve into a major regional gas centre (hub) with sufficient technical capacity to handle incoming and outgoing flows of natural gas from a variety of sources along a number of new routes.

The implementation of these infrastructure projects will lead to genuine diversification in the Balkan region and will thus significantly lower the impact of most selected risk scenarios while having a positive impact on economic development, enhancing efficiency at the level of risk group Member States and, on environmental protection throughout the region.

In accordance with the requirements of Council Directive 2008/114/EC on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection Bulgaria, Romania and Greece have designated 13 gas infrastructures of Bulgartransgaz EAD as European critical infrastructures (ECI). In line with their commitments as EU and NATO Member States the three countries continue to work actively on matters relevant to energy security at Union level. This ensures that, in respect of the measures to protect key infrastructure relevant for the security of supply in relation to control by third-country entities, they are able to apply collective security of supply measures , when security of supply cannot be achieved via market-based measures alone.

Drawn up by:
The working group established by Order No RD-16-457 of 27 August 2018 of the Minister for Energy

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