

# **2022-2031 TEN-YEAR NETWORK DEVELOPMENT PLAN OF BULGARTRANGAZ EAD**

**April 2022**

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of Bulgartransgaz EAD Management Board meeting**



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## **DEFINITIONS AND ABBREVIATIONS**

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The following definitions and abbreviations are used for the purposes of this document:

**AGRS** – Automatic Gas Regulation Station

**LNG** – Liquefied Natural Gas

**GMS** – Gas Metering Station

**GPB** – Gas Pipeline Branch

**GRS** – Gas Regulation Station

**The Company** – Bulgartransgaz EAD is an independent combined gas operator in the Republic of Bulgaria

**EU** – European Union

**EC** – the European Commission

**EBRD** – European Bank for Reconstruction and Development

**EIB** – European Investment Bank

**CEF** – Connecting Europe Facility

**PCI** – Project of Common Interest

**GDC** – Gas Distribution Company

**ME** – Ministry of Energy

**MRDPW** – Ministry of Regional Development and Public Works

**EWRC** – Energy and Water Regulatory Commission (formerly SEWRC)

**BEH** – Bulgarian Energy Holding EAD

**VA** – Valve Assembly

**EEC** – End Energy Consumption

**CS** – Compressor Station

**PF** – Pigging Facility

**MPa** – Megapascal (unit of pressure)

**m<sup>3</sup> or cubic meter** – unit of volume which in this document for the purposes of determining a natural gas quantity, represents the natural gas quantity in a volume of one cubic meter at 293.15 K (200C) and absolute pressure of 0.101325 MPa.

**W** – Watt (unit of power)

**J** – Joule (unit of energy)

**EIA** – Environmental Impact Assessment

**Natural Gas Transmission** – transport of natural gas through the gas transmission networks owned by Bulgartransgaz EAD

**PEC** – Primary Energy Consumption

**BP** – Building Permit

**CIW** – Construction and Installation Works

**SMEs** – Small and medium-sized enterprises

**UGS** – Underground Gas Storage

**Gas infrastructure of Bulgartransgaz EAD** - gas transmission network infrastructure and underground gas storage in Chiren (Chiren UGS), connected to it;

**ENTSOG** – European Network of Transmission System Operators for Gas

**CESEC** - Central and South Eastern Europe Energy Connectivity - initiative for energy connectivity in Central, Eastern and Southeast Europe;

**EASTRING** – a project for construction of gas transmission infrastructure from Bulgaria through Romania and Hungary to Slovakia;

**BRUA** – Gas transmission corridor Bulgaria-Romania-Hungary-Austria;

**IAP** – Ionian Adriatic gas pipeline;

**TAP** – Trans-Adriatic Pipeline;

**TANAP**– Trans-Anatolian Natural Gas Pipeline.

## **INTRODUCTION**

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Bulgartransgaz EAD Ten-year plan for development of the natural gas transmission and storage infrastructure has been prepared pursuant to Art. 81 (d), para. 1 of the Energy Act (EA). It was developed for the period 2022-2031 and sets out the vision for development of the company as an independent transmission operator and storage facility operator. It is consistent with the main European, regional and national priorities, namely increasing the security of natural gas supply, ensuring diversification of natural gas supply sources and routes, permanent establishment of sustainable, liberalized and interconnected gas market, and it is in line with climate and environmental policies of Europe.

The priority activities for development of Bulgartransgaz EAD infrastructure in the period 2022 – 2031 are aimed at rehabilitation, modernization and expansion of the existing main and auxiliary gas transmission infrastructure and its auxiliary equipment and facilities, development of interconnectivity and expansion of storage capacity. Hydrogen projects are essential for construction of new hydrogen infrastructure and assessment for subsequent retrofitting of the existing infrastructure to ensure its adaptation to hydrogen and hydrogen mixtures transport. Their implementation will turn Bulgaria into a regional gas distribution hub, contribute to the development of its gasification, as well as to the gradual decarbonisation of energy and economy in the country.

TYNDP major objective is to ensure maximum transparency for the future Company development prospects and project ideas. It identifies and analyses the trends and factors determining the necessity of the planned investments, as well as their allocation over time. Thus, market participants are provided with information and supported in making long-term investment decisions.

The implementation of the investment strategy presented in this Plan will provide additional opportunities to increase natural gas use in the country with the respective economic, social and environmental benefits, and diversify gas supply sources and routes. It will promote the establishment of a competitive natural gas market, increase supply and provide wider choice to its participants. This, in turn, would provide price incentives as a basis of a liquid natural gas market.

Having regard to achieving full transparency and balance between the interests of the TSO and the market participants, the TYNDP is subject to public consultation based on which the interrelations between the Company's projects and the development plans of the stakeholders can be considered and synchronized in the TYNDP.

The national TYNDPs serve as a basis for development of the Gas Regional Investment Plans (GRIPs), as well as the Community-wide Network Development Plan, developed by the European Network of Transmission System Operators for Gas (ENTSOG).



### *Compressor station Strandzha*

Bulgartransgaz EAD is a sole owner joint stock company, registered on 15.01.2007 by a Decision of Sofia City Court. The owner of 100% of its shares is Bulgarian Energy Holding EAD with principal the Ministry of Energy.

By virtue of Decision of the Energy and Water Regulatory Commission, Bulgartransgaz EAD is certified independent transmission operator in Bulgaria in line with the requirements of Directive 2009/73/EC concerning the common rules for the internal market in natural gas, Regulation (EC) No 715/2009 on the conditions for access to natural gas transmission networks and Chapter Eight (a) of the Energy Act. The Decision was adopted in line with the opinion of the European Commission of 22.04.2015.

A Decision approved by EWRC confirms that Bulgartransgaz EAD meets the criteria for certification and the requirements for independence, namely:

- The Management Board of the independent transmission operator is the competent authority responsible for decisions, related to TSO current activity, the management of the network and the activities, required for preparing TYNDP;
- The Independent Transmission Operator has the right to make independent decisions regarding the assets, required for the operation, maintenance and development of the transmission network and the gas regimes control;
- The requirements for professional independence of the members of the Management Board and the members of the Supervisory Board of Bulgartransgaz EAD have been met;

- Bulgartransgaz EAD has at its disposal the necessary resources including human, technical, financial and physical, required to meet its obligations when carrying out the natural gas transport activity;
- The company has its own corporate identity, independent IT systems and equipment, independent premises and security access systems thereto, as well as its own external contractors or external consultants for the access to these systems;
- When carrying out its activity, the Independent Transmission Operator provides services that are non-discriminatory for the various network users and does not restrict, distort or prevent competition in production or gas supply.

Bulgartransgaz EAD is a combined gas operator carrying out natural gas transmission and storage activities. The company is an owner and operator of the gas transmission network infrastructure and the underground gas storage Chiren (UGS Chiren) connected to it.

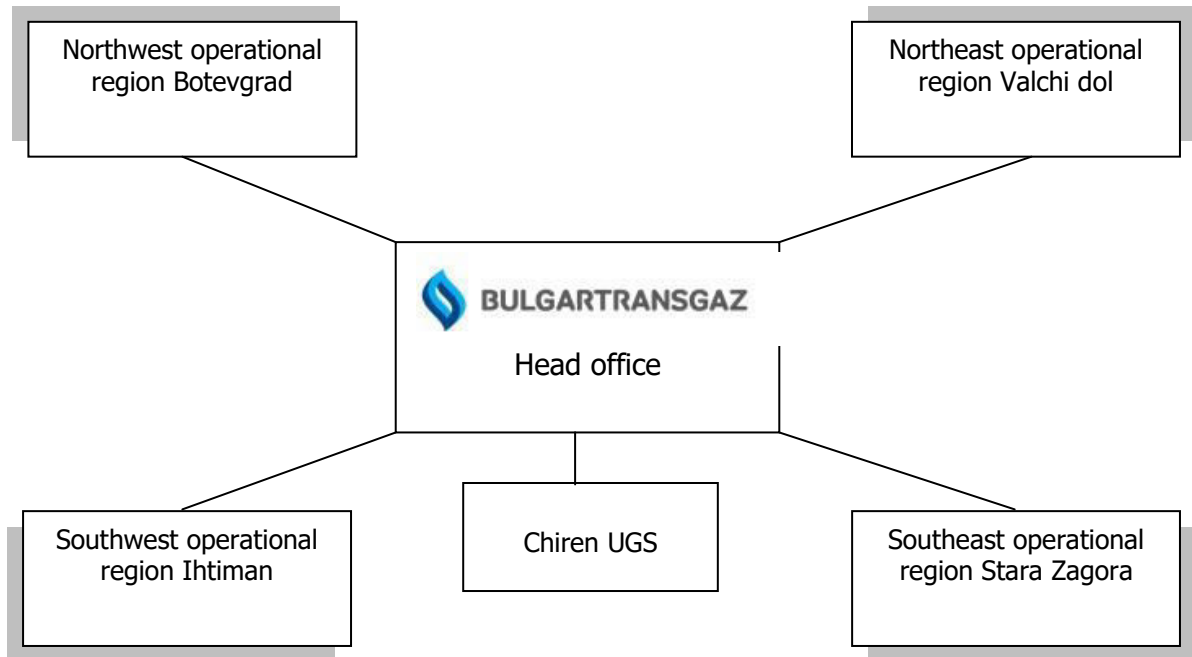
The Company is the holder of the following licenses, issued by the State Energy and Water Regulatory Commission (SEWRC):

- for natural gas transmission: Licenses No L-214-06 and No L-214-09 of 29.11.2006
- for natural gas storage: License No L-214-10 of 29.11.2006

The basic requirements for these activities are regulated by the Energy Act and the by-laws, harmonized with the European legislation in that field.

Bulgartransgaz EAD plays a key role and is responsible for the uniform management, reliable operation and efficient use of the natural gas transmission system, including the gas pipelines, compressor stations and Chiren UGS. The activities include natural gas transmission in compliance with the requirements for gas quality and metering, networks development in accordance with the long-term gas sector forecasts and plans for gas supply and the gas sector development, as well as maintenance, operation, management and development of the underground gas storage Chiren. All these services are provided to customers on a level playing field. Apart from that, engineering, investment and service activities are carried out in the Company.

The organisational structure of the Company includes a Head office and four operational regions - Northwest operational region Botevgrad, Northeast operational region Valchi dol, Southeast operational region Stara Zagora, Southwest operational region Ihtiman, responsible for the operational management and maintenance of the network on the respective territory, as well as Chiren UGS.



Since its establishment, Bulgartransgaz EAD constantly strives to improve the quality of the offered services, while promoting and fostering gas market development in Bulgaria. The company makes investments aimed at increasing reliability and development of the natural gas transmission and storage infrastructure. Bulgartransgaz EAD pursues a policy of transparency, non-discrimination and operates in full compliance with the requirements of the applicable European and Bulgarian legislation.

## DESCRIPTION OF NATURAL GAS TRANSMISSION AND NATURAL GAS STORAGE

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*Compressor Station Ihtiman*

**Gas infrastructure**, owned by Bulgartransgaz EAD on the territory of the Republic of Bulgaria consisting of gas transmission network infrastructure and an underground gas storage facility in Chiren (Chiren UGS), connected to it.

**Gas transmission network infrastructure** that provides natural gas transport to users in the country, as well as to the neighbouring countries Turkey, Greece, Serbia, Romania and North Macedonia. Gas infrastructure comprises of 3276 km gas pipelines and gas pipeline branches, as well as eleven compressor stations – CS Kardam 1, CS Kardam-2, CS Valchi Dol, CS Polski Senovets, CS Rasovo, CS Provadia, CS Nova Provadia, CS Lozenets, CS Strandzha, CS Ihtiman and CS Petrich, with approximate total installed capacity of 406 MW, electrochemical protection system, pigging facilities, communication system, information system and other auxiliary facilities.

**The Underground Gas Storage Chiren** has 24 exploitation wells and a compressor station of approximately 9 MW total installed capacity. The present storage capacity can provide storage of up to 5 813 500 MWh/d natural gas. The withdrawal and injection capacity, according to the formation pressures and other factors, is between 5 285 MWh/d up to 40 377 MWh/d (0.5 to 3.82 mcm/d at 10.57 MWh/1000 m<sup>3</sup>) for withdrawal and 5 285 MWh/d up to 33 824 MWh/d (0.5 to 3.2 mcm/d at 10.57 MWh/1000 m<sup>3</sup>) for injection. In an emergency situation, the maximum withdrawal capacity is up to 49 679 MWh/d (4.7 mcm/d at 10.57 MWh/1000 m<sup>3</sup>) in case of full gas storage facility and for a short time period (no more than 30 days).

**The main entry and exit points** of the Company gas transmission network are the

following:

**Interconnection point (IP) Negru Voda 1/Kardam** – connection between Bulgartransgaz EAD gas transmission system and the gas transmission system operated by Transgaz S.A. (Romania) on the Bulgarian-Romanian border in the area of the village of Kardam, General Toshevo Municipality;

**Interconnection point (IP) Negru Voda 2, 3/Kardam** – connection between Bulgartransgaz EAD gas transmission system and the gas transmission system operated by Transgaz S.A. (Romania) on the Bulgarian-Romanian border in the area of the village of Kardam, General Toshevo Municipality;

**Interconnection point (IP) Kulata/Sidirokastro** – connection between Bulgartransgaz EAD gas transmission network for transit transmission and the gas transmission system operated by DESFA S.A. (Greece), located on the Bulgarian-Greek border in the area of Kulata village, Petrich Municipality;

**Interconnection point (IP) Strandzha/Malkoclar** – connection between Bulgartransgaz EAD gas transmission network and the gas transmission system operated by BOTAS (Turkey), located on the Bulgarian-Turkish border in the area of the village of Strandzha, Bolyarovo Municipality;

**Interconnection point (IP) Strandzha 2/Malkoclar** – connection between Bulgartransgaz EAD gas transmission network and the gas transmission system operated by TAGTAS (Turkey), located on the Bulgarian-Turkish border in the area of the village of Strandzha, Bolyarovo Municipality;

**Interconnection point (IP) Kireevo/Zaycar** – connection between Bulgartransgaz EAD gas transmission network and the gas transmission system operated by Gastrans (Serbia), located on the Bulgarian-Serbian border in the area of the village of Kireevo, Makresh Municipality;

**Interconnection point (IP) Kyustendil/Zhidilovo** – connection between Bulgartransgaz EAD gas transmission network and the gas transmission system operated by GA-MA (North Macedonia), located on the Bulgarian-Macedonian border in the area of the village of Guyeshevo, Kyustendil Municipality.

**Interconnection point (IP) Ruse/Giurgiu** – connection between Bulgartransgaz EAD gas transmission network and the gas transmission system operated by Transgaz S.A. (Romania) on the Bulgarian-Romanian border in the area of the village of Marten, Ruse Municipality;

**GMS Galata** – an entry point from local production of the gas transmission network;

**GMS Dolni Dabnik** – an entry point from local production of the national gas transmission network;

**Entry-exit point GMS Chiren** – connection between the gas transmission network and Chiren UGS.



*Compressor Station Lozenets*

## 1. NATURAL GAS MARKET IN BULGARIA

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### **1.1. General Market Overview**

Bulgartransgaz EAD implements a consistent and targeted policy to improve connectivity with neighbouring countries by establishing new interconnection points with significant capacity and maximizing capacity at existing points.

The existing and planned gas infrastructure provides an opportunity for diversification of natural gas supplies both to Bulgaria and to the other countries in the region of Southeast Europe.



### 13.1.1. Natural gas consumption

Natural gas consumption in Bulgaria in 2021 was 35,430 GWh, which shows 13.06% increase compared to consumption in 2020 (31,337 GWh).

According to data of NSI Overall Energy Balance for 2020, natural gas had a share of 14.1% in primary energy consumption and 13.7% in final consumption of fuels and energy.

The natural gas share in the country's energy balance continues to be lower compared the average values of the EU counties but it has a potential for a significant and steady growth considering the evolving gasification and the natural gas role as a transition fuel for a low carbon economy.

### 1.1.2. Main natural gas sources

Consumption in the county is provided mostly through import. No significant natural gas fields have been found in the country. Limited natural gas quantities are produced from Galata and Dolni Dabnik fields. The share of natural gas imports in Bulgaria in 2021 was 99.4%, whereas 0.6% of consumption was provided by local production.

Bulgartransgaz EAD works actively and consistently to improve interconnectivity by strengthening and developing the interconnections with neighbouring countries and

providing opportunities for supplies from various new sources, including LNG.

Since 2020, by ensuring significant transmission capacities by Bulgartransgaz EAD and the partners, operators in neighbouring countries, as well as following reverse of gas flows in the region, there are significant natural gas quantities from alternative sources and routes to Bulgaria, and through Bulgartransgaz EAD network - to the neighbouring countries as well.

Thanks to the capacities provided at the interconnection points in 2019 and 2020, natural gas quantities from alternative sources to Bulgaria increased significantly, including liquefied natural gas from the United States, through the terminal in Revithoussa, Greece. Since January 1, 2021, Azerbaijani gas is supplied to Bulgaria through IP Kulata/Sidirokastro.

In order to facilitate users and improve the technological connectivity of the gas transmission network, Bulgartransgaz EAD has performed a number of events and introduced technological solutions. As of 01.10.2021, the existing networks (NGTN and GTNTT) are no longer separated and the system is considered as a single network that fully ensures implementation of the technical transmission capacities regardless of trade flows' direction. Respectively, the National and Transit balancing zones were united in a single balancing zone with a single Virtual Trading Point (VTP).

The establishment of a single balancing zone and respectively a single VTP enables network users and gas traders to work with a single balancing portfolio, which eliminates the risks of generating positive imbalances in one balancing zone and negative in the other one. As a result of integration of the balancing zones and VTP, the efficiency of portfolio management increased and the entry of new market participants was facilitated, thus fostering increase of liquidity and gas market development in Bulgaria.

In 2020 and 2021, natural gas quantities by sources of supply were as follows:

No.	Type of supply	2020		2021	
		Quantity, GWh	Relative share	Quantity, GWh	Relative share
<b>1</b>	<b><i>Imported natural gas including</i></b>	<b>31,011</b>	<b>99.0%</b>	<b>35,206</b>	<b>99.4%</b>
1,1	<i>Russian Federation</i>	23,602	76.1%	31,115	88.4%
1,2	<i>Other sources</i>	7,409	23.9%	4,090	11.6%
<b>2</b>	<b><i>Local Production</i></b>	<b>326</b>	<b>1.0%</b>	<b>224</b>	<b>0.6%</b>
	<b>TOTAL</b>	<b>31,337</b>	<b>100%</b>	<b>35,430</b>	<b>100%</b>

According to the report of DG Energy of the EC for Q3 of 2021, in the first three quarters of the year, the total imports of natural gas in the EU have increased by 5% compared to the same period in 2019, and of LNG have decreased by approximately 14%. For Bulgaria, natural gas imports from alternative sources in 2020 have been about 24%, while in 2021 it has decreased, but remained at about 11.6%.

The decrease in gas quantities from alternative sources for consumption in Bulgaria and the EU can be considered as temporary. It is due, on the one hand, to the gradual recovery of

economic activity after Covid crisis of 2020 and on the other hand, to the significant growth in demand and gas prices in Asian markets, including of liquefied natural gas. As a result of this development, LNG traders have directed significant quantities to Asian countries and reduced supply to Southeast Europe.

According to U.S. Energy Information Administration (EIA) for 2021, the United States has 26%, representing the largest share of LNG exports to European markets. Other significant sources are Qatar with a share of 24% and Russia - 20%. EU countries actively pursue diversification of gas sources and supplies.

The REPowerEU plan for affordable, secure and sustainable energy, announced by the European Commission on 8.03.2022, envisages a significant increase in LNG supplies to EU countries.

### **1.1.3. Main natural gas consumers and market participants. Establishment of an organized gas market.**

The main participants on the gas market in Bulgaria are the following:

- Bulgartransgaz EAD – combined gas operator licensed to perform natural gas transmission and storage activities;
- Bulgargaz EAD – public supplier of natural gas in Bulgaria responsible for ensuring natural gas supply to end suppliers and to persons holders of a license for heat production and transmission, at prices and conditions approved by the EWRC;
- Natural gas traders – make transaction for natural gas supply with the public supplier, end suppliers, customers, other natural gas traders, production companies, natural gas storage companies and the combined operator;
- Balkan Gas Hub EAD and Bulgarian Energy Trading Platform AD – Operators of trading platforms, ensuring trading environment for an organized natural gas exchange market on a bilateral principle;
- Gas distribution companies – performing both natural gas supply from end gas supplier and natural gas distribution activities, supply natural gas to customers connected to their networks. It is their obligation to construct and develop the gas distribution networks according to the long-term business plans and conditions approved by SEWRC;
- Non-household natural gas customers connected to the gas transmission networks;
- Household and non-household natural gas customers connected to the gas distribution networks.

Production companies and two main groups of customers - gas distribution companies and non-household users are connected to Bulgartransgaz EAD gas transmission network.

The main users of natural gas transmission services in the country are the public supplier Bulgargaz EAD, trade companies from the Energy and Chemistry sectors, end suppliers, as well as other users of the gas transmission network and natural gas traders.

The "natural gas distribution" and "natural gas supply" activities by end suppliers to customers connected to the distribution networks are being carried out by regional and local gas distribution companies, operating in licence regime and price regulation conditions. Overgas Mrezhi AD, followed by Aresgas AD, Citigas Bulgaria EAD and others have the

largest market share.

At the end of 2021 on the territory of the Republic of Bulgaria 24 licensed gas distribution companies operate in 35 licensed territories, covering 173 municipalities, representing 65% of all municipalities in the country.

The total number of customers of the gas distribution companies as of 31.12.2021 is 146,243, of which 8,156 non-household and 138,087 household customers. The number of customers has grown by 10.4% in one year - from 132,424 in 2020 to 146,243 in 2021. Household customers have increased by 10.8% and non-household - by 4.9%.

The share of household gas supply in the country is still low compared to the EU countries, but tends to increase continuously. Programmes are being implemented to promote household gasification at national level. New infrastructure for natural gas distribution is also being constructed.

There are a number of projects at different implementation stages leading to an increase in the level of liberalization, liquidity and diversification of the national gas market.

As a result of the cooperation between the Bulgarian government, the EC and Bulgartransgaz EAD, in the end of 2019 the Balkan Gas Hub EAD (BGH) trading platform started its operations with the Gas Release Programme by the public supplier. As of early 2020, short-term segment (spot), long-term segment and brokering service are offered. As of December 2021, 49 participating companies have been registered on the platform, including Bulgartransgaz EAD as the only TSO member so far.

The main objective of BGH activity is to establish a liquid, transparent, reliable, stable and single regional gas market, in full compliance with the Bulgarian, as well as the European energy and financial regulations. The company holds license № L-532-11 of 25.03.2021 for carrying out the activity "organization of natural gas exchange market". In addition, the Energy and Water Regulatory Commission approved BGH natural gas trading platform as fully complying with Regulation (EU) № 312/2014 and with the current Natural gas trading rules, Natural gas market balancing rules and Daily imbalance charge calculation methodology

As a result of Balkan Gas Hub EAD operation in the last two years, gas liquidity in the country significantly increased, the practices of exchange trading have been introduced and increasing role and share of the spot market (within the day and day-ahead). According to data for 2021, the traded natural gas quantities amount to 12,671,827 MWh. The total number of transactions for the year was 6,480, showing an increase of 419.98% in the short-term segment (spot) and 341.80% in the long-term segment compared to 2020.

An important factor for the increased liquidity is the number and activity of BGH members. Most of them are leading Bulgarian companies in the field of natural gas trade. About 30% of the members on BGH market are foreign companies and the members list includes leading European traders operating in the EU single gas market. A considerable part of the foreign customers are from Bulgaria's neighbouring EU member states - Greece and Romania, as well as from other countries in South-Eastern and Central Europe.

Balkan Gas Hub EAD operation is fully in line with the European objectives on establishing an interconnected and integrated pan-European gas market and in support of the plans for gas infrastructure development across Europe. The concept of establishing and developing a gas distribution hub on the territory of the Republic of Bulgaria, as well as of a gas trading exchange, is actively supported by the European Commission and is in strict compliance with the needs identified by the High Level Group for Gas Connectivity of Central and South-east Europe (CESEC).

In this regard, on 10.09.2021, Balkan Gas Hub EAD joined the Memorandum of Understanding on cross-border cooperation on the development of an integrated natural gas market in South-Eastern and Eastern Europe - SEEGAS. At the beginning of 2022, Bulgartransgaz EAD joined SEEGAS as well.

Exchange operators and TSOs from Bulgaria, Greece, Romania, Austria, Poland and Ukraine participate together with Balkan Gas Hub EAD in the initiative for development of an integrated natural gas market in South-Eastern and Eastern Europe. The purpose of the memorandum is to establish and develop an effective clearing system for natural gas transactions and derivatives in compliance with European practices. SEEGAS is supported by the European Bank for Reconstruction and Development (EBRD), whereas one of the support mechanisms is the conduct of focused research and assistance in the development of regional capital market infrastructure (CMI), including a post-trade environment based on international standards and best practices.

BGH is an internationally recognized and legitimate gas exchange in the country, acknowledged by international institutions and organizations, as well as by international market participants. Thanks to the continuously improvement of interconnectivity, carried out by Bulgartransgaz EAD, the effect of achieving SEEGAS objectives will be witnessed not only in the country, but in the entire region as well.

Second natural gas trading venue is Bulgarian Energy Trading Platform AD.

#### **1.1.4. Bulgartransgaz EAD transport and storage activities**

Bulgartransgaz EAD transport and storage activities are regulated and carried out in line with the licenses issued by the SEWRC. The basic requirements for these activities are regulated by the Energy Act and the by-laws. As a transmission operator of an EU member state, Bulgartransgaz EAD operates in accordance with the requirements of the Third Energy Liberalization Package, which are expanded and supplemented by regulations establishing network codes laid down in Regulation EC 715/2009.

The company has concluded access and transport contracts with over 80 companies, natural gas traders, whose share in the transported quantities is increasing, especially after the launch of Balkan Gas Hub EAD trading platform.

Data on natural gas quantities transported through the gas transmission infrastructure of Bulgartransgaz EAD for 2020 and 2021 is presented in the following table:

No.	Type of supply	Quantity 2020 (MWh)	Relative share	Quantity 2021 (MWh)	Relative share
1	Natural gas transport to exit points in the country	<b>31,336,576</b>	<b>45.11%</b>	<b>35,430,139</b>	<b>25.82%</b>
2	Natural gas transport to cross-border points with neighbouring countries	<b>38,137,227</b>	<b>54.89%</b>	<b>101,778,323</b>	<b>74.18%</b>
<b>Total:</b>		<b>69,473,803</b>	<b>100%</b>	<b>137,208,462</b>	<b>100.00%</b>

In 2021, there was 13% increase in gas quantities transported to exit points in the country. There is a significant increase of nearly 167% compared to 2020 in gas quantities for transport to cross-border points. This is due to commissioning of the gas transmission system expansion from the Bulgarian-Turkish to the Bulgarian-Serbian border and the improved interconnectivity and increasing market integration with the neighbouring EU member states Greece and Romania.

Chiren UGS plays a key role in compensating seasonal fluctuations in natural gas consumption and providing an emergency reserve in case of unforeseen and force majeure situations.

The total injected natural gas quantities in Chiren UGS in 2021 were 3,930 GWh, and the withdrawn quantities were 4,961 GWh.

#### **1.1.5. Local natural gas production**

Natural gas production is carried out by Oil and Gas Exploration and Production Plc. and Petroceltic Bulgaria EOOD.

Since 2004 the company Petroceltic Bulgaria EOOD commenced natural gas local production firstly from Galata field and then from the newly discovered fields Kaliakra and Kavarna with access to the gas transmission network secured by Bulgartransgaz EAD at entry point GMS Galata.

Production was also performed by the company Exploration and Production of Oil and Gas Plc at entry point GMS Dolni Dabnik.

In 2021, about 0.6% of natural gas consumption was provided by local production from Galata and Dolni Dabnik fields.

Regarding the oil and gas exploration permits granted by the Ministry of Energy of Bulgaria, there are expectations for increase of the local production share and decrease of the country dependence on natural gas imports. The granted permits include sections both onshore and offshore in the Black Sea. Bulgartransgaz EAD investment plans will continue to be developed in synergy with the demand forecasts in the country, the potential additional natural gas quantities from local production and the import from new and existing entry

points.

## **1.2. Market potential and development prospects**

Bulgaria has strategic geographic location, well-developed gas infrastructure and by implementation of the already completed and planned new projects, the country has the potential to become an important factor in ensuring energy security and diversification of natural gas sources and routes for the region.

Despite the relatively low share of the final energy consumption, gas is important natural resource with a potential of increasing its share in the total national energy consumption over the next years.

Currently, the share of household gas supply in Bulgaria remains low compared to other EU member states, but with a continuous upward trend. Fostering gasification by expanding the gas transmission network to new regions and providing access to natural gas of new municipalities, distribution companies and customers is a priority of the energy strategy of the Republic of Bulgaria, respectively of Bulgartransgaz EAD activity.

Natural gas is at the heart of the policy of the European Union to cut greenhouse emissions by 2030. Gas infrastructure will play a key role as well for the decarbonisation and achieving carbon neutrality by 2050. EU policy is aimed at phasing-out coal use and gradual increase in the use of alternative environmentally friendly energy sources such as hydrogen.

Bulgartransgaz EAD is developing a project for construction of new gas transmission infrastructure in the region of Maritsa East Coal Basin, intended for transport of hydrogen, low-carbon gaseous fuels and their mixtures with natural gas.

Bulgartransgaz EAD also plans projects related to assessment of the opportunities and subsequent retrofitting of the existing infrastructure to ensure its adaptation for mixing natural gas with hydrogen and to construct fully hydrogen infrastructure from Sofia region to the Bulgarian-Greek border at IP Kulata/Sidirokastro.

By implementation of the projects for new gas infrastructure in the country and the region, a significant increase in natural gas quantities from alternative sources is expected, to be transported through Bulgartransgaz EAD gas transmission infrastructure to the countries in the region. Key projects are those related to construction of new LNG terminals and interconnections of Bulgaria with Serbia and Greece - the Interconnectors Bulgaria-Serbia (IBS) and Greece-Bulgaria (IGB).

Bulgartransgaz EAD participates with 20% of the share capital of Gastrade S.A. – project company which implements Alexandroupolis Independent Natural Gas System. Bulgaria's participation in the project is strategically important for diversification and security of energy supply to Bulgaria and other countries in the region.

The activities undertaken for gradual increase of Chiren UGS capacity will promote natural gas trade, increase market competition and contribute to liquid gas market operation.

As a responsible company, Bulgartransgaz EAD welcomes the European Union's plans for decarbonisation of the energy and industrial sector and strives to be adequate to the adopted pan-European priorities in the climate and energy field. In this regard, the Bulgarian

transmission operator (as of 2021) participates in the initiatives European Clean Hydrogen Alliance and European Hydrogen Backbone, aimed at widespread implementation of hydrogen technologies and creation of a model of pan-European hydrogen transmission infrastructure.

The described perspectives are in the basis of Bulgartrngaz EAD objectives and investment plans and are reflected in the overall company policy aimed at establishing Bulgaria as a significant regional gas distribution hub.

## 2. NATURAL GAS MARKET IN THE REGION

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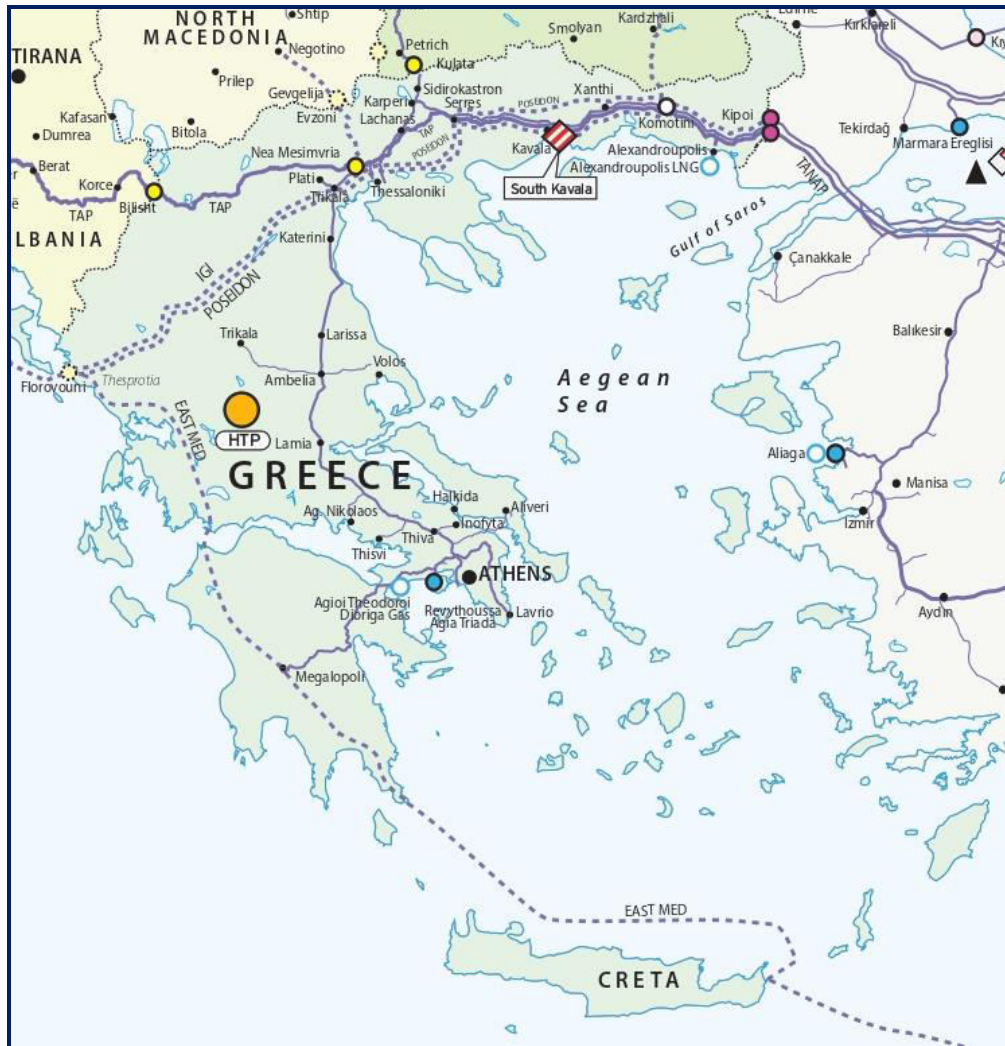
By implementation of large-scale projects in the region for development of gas transmission infrastructure, increase of gas storage capacities and new LNG terminals, as well as the potential of local production, natural gas consumption is expected to increase in the conditions of high levels of competition and liquid markets.

Improvement of interconnectivity in the region and the provided alternative supply routes will enable energy consumers to benefit from the opportunities of Balkan Gas Hub EAD and the significant new infrastructure projects.

In turn, this will contribute to increasing energy security, diversification of supply sources and achieve market integration of countries in the region.

The review of natural gas markets in the neighbouring countries outlines the main trends for development of the regional gas market in the context of diversification and more tangible price competition.

## 2.1. Greece



*Gas transmission infrastructure in Greece. Source: ENTSOG*

Natural gas consumption in Greece has been steadily growing. In 2020 consumption amounted to 5.83 bcm/y, a significant share of which is electricity generation. Consumption in the country is provided mainly by imports through Bulgaria, Turkey and from liquefied natural gas sources.

The Greek gas transmission operator DESFA S.A. is owned by a consortium between Snam, Enagas and Fluxys (66% of the capital) and the Greek state (34% of the capital). The three consortium companies are also shareholders in TAP, which plays a key role in gas transmission along the Southern Gas Corridor.

The construction of other new interconnections is among the priorities, relying increasingly on sources in the region of the Mediterranean, the Middle East and Central Asia.

### **Trans-Adriatic Pipeline (TAP)**

The 878 km long Trans-Adriatic Pipeline (TAP) is part of the Southern Gas Corridor, transporting natural gas to Europe from Shah Deniz II field in Azerbaijan. The current annual capacity is 10 bcm/y, with the opportunity to double. The pipeline is connected to the

Trans-Anatolian Gas Pipeline (TANAP) at the Turkish-Greek border and passes through Greece, Albania and the Adriatic Sea, reaching its end point in Southern Italy. The commercial operation of the gas pipeline began in November 2020.

### **EastMed**

The project provides for natural gas transportation from the fields in the Eastern Mediterranean to Europe through the island of Crete and the mainland of Greece and via IGI to Italy. The planned capacity is 10 bcm/y, with the potential to reach 16 bcm. The Final Investment Decision is to be taken in 2022 and facility construction is planned to be completed in the end of 2025. EastMed gas pipeline is a PCI included in the Fifth list of the EC and has the prospect of becoming an alternative energy corridor for Europe.

### **Poseidon**

Poseidon is part of the Southern Gas Corridor connecting Turkey-Greece-Italy. The initially envisaged capacity is 15 bcm/y at the Greek-Turkish border and with possibility to increase up to 20 bcm/y. The implementation of this project will provide Italy and the European countries with the opportunity of natural gas supply from the Caspian Sea or the Middle East. The project is also included in the Fifth list of projects of common interest (PCI) of the EC.

### **IGB**

Interconnection Greece-Bulgaria gas is being implemented by the project company IGB AD with shareholders BEH EAD (50%) and IGI Poseidon (50%). The IGB gas pipeline will be connected to the Greek national gas transmission system in the area of the town of Komotini (Greece) and the Bulgarian national gas transmission system in the area of Stara Zagora. The design capacity in the direction from Greece to Bulgaria will be up to 3 bcm/y. The gas pipeline is under construction and is of strategic importance for implementation of the Vertical Gas Corridor (Greece - Bulgaria - Romania - Hungary), providing access to natural gas from the Southern Gas Corridor and LNG to South Eastern and Central Europe, as well as to Ukraine.

### **Ionian Adriatic Pipeline**

Plans for TAP expansion to the northwest were developed and possible routes were discussed – the Ionian-Adriatic Gas Pipeline (IAP) of 5 bcm/y capacity to supply gas to Albania, Montenegro, Southern Croatia and Bosnia and Herzegovina, for which a Memorandum of Understanding was signed between the countries at political level. The IAP gas pipeline is planned to be connected to TAP.

### **Revithoussa LNG Terminal**

Revithoussa liquefied natural gas terminal has annual capacity of up to 7 bcm and 225,000 m<sup>3</sup> storage capacity. Higher liquidity in the natural gas market is achieved through it and it contributes to security of gas supply to Greece and the region.

In 2019, the first deliveries were made to the Bulgarian liquefied natural gas market through the terminal, including from the USA.

### **Alexandroupolis Independent Natural Gas System**

The terminal has 5.5 bcm/y design capacity for regasification and supply to the Greek gas

transmission system. The storage capacity is 170 thousand m<sup>3</sup>. Potential supply sources include large LNG producers such as the USA, Algeria and Qatar.

In August 2020, Bulgartransgaz EAD signed the final Agreement for purchase and sale of 20% of Gastrade S.A. capital - project company for terminal implementation. On 28.01.2021, after permission from the Commission for Protection of Competition of the Republic of Bulgaria, the process of shares acquisition by Bulgartransgaz EAD in the project company was finalized.

In January 2022, a final investment decision was made for project construction. It is expected to be run into commercial operation by 01.01.2024.

The project will be in synergy with expansion of Chiren underground gas storage. Terminal construction will also contribute to implementation of the overall Balkan Gas Hub concept, which envisages to connect the natural gas markets of the countries in Central and East Europe by construction and development of the necessary gas transmission infrastructure.

### Gas storages South Kavala

The Fifth list of projects of common interest envisages construction of an underground gas storage facility with planned annual capacity of up to 720 mcm. The project consists in transformation of the almost depleted underwater natural gas field into an underground storage facility.

Currently, Greece does not have its own underground gas storage.

In terms of local production, Greece is following its plans to search for and develop new gas fields. In 2019, the country signed a contract on granting rights of exploration and production of hydrocarbons in the offshore areas - West and Southwest Crete with an international Consortium, including Total (40%), ExxonMobil (40%) and the Greek Hellenic Petroleum (20%).

## 2.2 Turkey



*Gas pipelines infrastructure in Turkey Source: ENTSOG*

Natural gas consumption in Turkey in 2020 amounted to 48.2 bcm, which is an increase of approximately 10% on an annual basis compared to 2019. During the winter period, peak consumption reached levels of 250-300 mcm/d, with expectations of demand growth in the future due to the growth of the country's economy.

A large share of natural gas in Turkey is used to generate electricity. Demand is expected to increase in the future, as Turkey plans construction of new gas-fired power plants. Following the recent discovery of offshore gas fields with significant reserves, much of the country's electricity generation is planned to be covered by local production.

Turkey produces small amounts of natural gas, covering an insignificant part of domestic consumption. The share of Russian gas imported through the two Black Sea gas pipelines, Blue Stream and TurkStream, has been decreasing in recent years. This is due to the fact that supply is diversified through supplies from Iran and Azerbaijan, as well as liquefied natural gas from various sources.

Deliveries from Shah Deniz II field in Azerbaijan are made through the Trans-Anatolian Gas Pipeline (TANAP). The first stage capacity is 16 bcm/y, of which 10 bcm/y are transited to the European markets and 6 bcm/y are intended to cover Turkish domestic consumption.

Turkey has four liquefied natural gas terminals (two floating and two on-shore) with a total capacity of supply over 26 bcm/y, and expansion is planned for part of them in the forthcoming years. The construction of a third floating terminal (Saros FSRU) is underway. The implementation and commissioning of the project is expected at the end of 2022.

The utilisation of LNG terminals in the country reaches 42%. This is mainly due to increased supplies from Algeria. The country imports liquefied gas also from Qatar, the United States and others. LNG share in gas imports to Turkey in 2020 exceeded 30% and ranks seventh in the world in LNG imports.

Currently, the capacity of all gas storage facilities in Turkey, together with the built storage capacities in the country's operating regasification terminals, exceeds 4.5 bcm. This amounts to about 10% of the overall annual natural gas consumption in Turkey in recent years (45-50 bcm).

In June 2021, the discovery of 135 bcm in Amasra-1 well in North Sakarya gas field in the Black Sea was announced. Thus, the discoveries of gas fields in the Turkish Black Sea aquatory reach 540 bcm.

## 2.3 Romania



*Gas Transmission Infrastructure in Romania Source: ENTSOG*

Natural gas consumption in Romania in 2020 totalled to 11.7 bcm. According to data of the Agency for the Cooperation of Energy Regulators (ACER) for 2020, local production accounted for 76% of the total share in the country. Deliveries to the country were made from Hungary (13%), Russia (10%) and other sources (1%).

The necessary additional quantities to cover demand in the country were provided by imports, also through the interconnection points with Bulgaria.

Romania is characterised by a well-developed gas transmission infrastructure and interconnectivity with Ukraine, Bulgaria, Hungary and Moldova, and high degree of development of the distribution networks.

The Programme for gas infrastructure development in Romania is bound to a large extent to the development of the Black Sea fields. In this regard, modernization and expansion are planned of the existing gas corridor connecting the Romanian gas transmission network with the Hungarian one, including gas pipelines and compressor stations.

### **Eastring**

Gas pipeline providing bidirectional transmission of annual capacity between 225,500 GWh and 451,000 GWh, connecting Slovakia to the EU's external border via Bulgaria, Hungary and Romania. It will provide access to gas fields in the Caspian region and the Middle East. The project will ensure an additional opportunity to diversify gas supply routes and sources, as well as contribute to security of gas supply, mainly in the countries of Southeast Europe.

## RO-HU/BRUA

Phase II of the project, including capacity increase in direction from Romania to Hungary by up to 4.4 bcm/y, a gas pipeline from the Black Sea to Podisor and provision of bidirectional transmission of the connection between Romania and Hungary. The project is included in the Fifth list of projects of common interest.

Romania has a gas industry with established traditions and significant local production. There are 8 gas storage facilities in the country with of natural gas storage volume over 3 bcm active gas. Romania's gas storage development plans envisage a doubling of the storage capacity in the forthcoming years, which will cover about half of the country's annual consumption.

Available natural gas quantities produced from the Romanian aquatory are envisaged to enter also in the Balkan Gas Hub.

### 2.4 The Republic of North Macedonia



*Gas transmission infrastructure in the Republic of North Macedonia. Source: ENTSOG*

Consumption of natural gas in the country is still low. For 2020 it amounted to 0.33 bcm with a tendency to gradual increase.

The high-pressure gas infrastructure supplies mostly the area of the city of Skopje. The natural gas market is developing. At present, natural gas is used mainly in industry and by local district heating companies. Due to the lack of gas transmission infrastructure, consumers in the south-eastern part of the country are supplied with compressed natural gas imported from Bulgaria.

The Ministry of Economy of North Macedonia estimated that natural gas consumption will increase significantly over the next years after the construction and run into operation of new co-generation heat and power plants (CHP). Increase of gas consumption by

households in the country was foretasted as well. Estimates indicate that natural gas demand in the future could reach about 1 bcm/y.

Currently, the Republic of North Macedonia has one interconnection point - (IP) Kyustendil/Zhidilovo with a capacity of 27,384 MWh/d about 0.8 bcm/y, connecting Bulgartransgaz EAD gas transmission network and GA-MA AD gas transmission system. It is used as an entry point and to transport natural gas in the direction from Bulgaria to the Republic of North Macedonia.

In September 2021 the joint-stock company for energy activities National Energy Resources Skopje, state-owned NER JSC SKOPJE and the Greek gas operator DESFA S.A., signed a cooperation agreement on development and construction of Interconnector Greece-North Macedonia for natural gas transmission.

Greece-North Macedonia Interconnection project envisages construction of a gas pipeline of 123 km total length, 68 km of which on the territory of the Republic of North Macedonia. The Interconnector will start from the town of Nea Mesimvria (Greece) to the town of Negotino (Macedonia). The initial gas pipeline transmission capacity is planned to be up to 1.5 bcm/y.

Bulgartransgaz EAD and NER JSC SKOPJE have signed an agreement to develop an interconnector project between the two countries with Petrich-Strumica route. Through project implementation, access to additional quantities of natural gas imports will be provided from Bulgaria and Chiren UGS.

Following implementation of the project for a liquefied gas terminal in Alexandroupolis, through the existing Bulgarian gas transmission system and the planned new interconnectors, the Republic of North Macedonia will have access also to liquefied natural gas.

## 2.5. Serbia



*Gas transmission infrastructure in Serbia Source: ENTSOG*

Natural gas consumption in Serbia in 2020 remained approximately 2.5 bcm. Local production meets only 10.7% of demand, while the remaining natural gas quantities are provided mainly by imports from the Russian Federation based on long-term contracts. Natural gas production in Serbia takes place in Vojvodina region and the only natural gas producer is the Company for exploration, production, refining and trade in oil and oil derivatives and exploration and production of natural gas Naftna Industrija Srbije.

Serbia is actively working to provide alternative sources of natural gas supply. Until the end of 2020, natural gas supply to Serbia came from the Russian Federation, through Ukraine by the interconnector with Hungary, and from January 1, 2021 along the new route through Bulgaria.

A significant project is the implementation of the planned Interconnection Bulgaria-Serbia (IBS), which was announced by the EC as a PCI included in the Fifth PCI list. The gas pipeline will have 1.8 bcm/y capacity with capability of reverse transmission. The interconnector is envisaged to be run into operation by 2023. It will enable gas import from Azerbaijan from liquefied gas terminals in Greece. The funds for project implementation on Serbian territory have been provided by European funds, by the European Investment Bank and the Serbian budget.

Another project for development of interconnectivity is the construction of an interconnector

with Bosnia and Herzegovina (Novo Selo-Bijeljina).

In January 2019, Gazprom and JP Srbijagas signed a Memorandum of Understanding regarding development of the project for expansion of the existing underground gas storage Banatski Dvor. The plans include gradual increase of storage capacity up to 750 mcm.

## **2.6 Current status, market potential and development prospects**

In the last years, Bulgaria made significant investments in rehabilitation, modernization and capacity increase of the existing gas infrastructure. The country is actively working to increase the energy security by accelerating the process of diversifying natural gas sources and routes.

Bulgartransgaz EAD has the necessary infrastructure capable to meet the demand in the country on different routes independent from one another. The company has a successful cooperation with TSOs from the countries in the region. This is evidenced by the implementation of joint projects that contribute to the diversification of natural gas sources and increase the energy security. Significant supply has been realized from various sources, such as Azerbaijan, USA, including LNG supply from the terminal in Revithoussa, Greece. LNG terminals further contribute to increasing the competition for the benefit of the end users by providing a choice of pricing conditions.

Development of the interconnectivity between Bulgarian and the countries from the region has a significant importance to achieving a market integration. There are objective expectations for growth in the natural gas consumption. Bulgartransgaz's projects for capacity increase of Chiren UGS, technical capacity increase at the interconnection points and development of the national gas transmission infrastructure will contribute to achieving a higher degree of market integration and ensuring the natural gas supplies for the country and the region, providing access to various natural gas sources including LNG terminals.

The project for the construction of the Liquefied Natural Gas Terminal Alexandroupolis where Bulgartransgaz EAD participates with 20% of the share capital of the project company is strategically important for the diversification and security of energy supply for Bulgaria and other countries in the region.

The Company envisages staged expansion of Chiren UGS in the period until 2024. Providing additional storage volume will promote natural gas trade, increase market competition and contribute to liquid gas market functioning. The expansion of Chiren UGS is also in synergy with the LNG terminal project near Alexandroupolis and will enable gas traders and consumers in the region to take full advantage of the dynamic development and competitive advantages provided by the liquefied natural gas market.

In view of the expected changes resulting from the Green Deal and the achievement of the indicative targets for 2030 and 2050, activities related to the EU's energy transition trends are under way by facilitating the entry of renewable and low-carbon gases, including hydrogen.

Some countries have already developed strategies and roadmaps for the implementation of hydrogen in the existing infrastructure.

According to European Network of Transmission System Operators for Gas (ENTSO-G) data, approximately 90 projects in the field of hydrogen and another 90 projects for change in the purpose of the transmission infrastructure and fuel base have been submitted to ENTSOG for inclusion in the 2022 Ten-Year Network Development Plan.

Bulgartransgaz EAD being a responsible company welcomes the European Union's plans for decarbonisation of the energy and industrial sector and strives to be adequate to the adopted pan-European priorities in the climate and energy field. In this regard, the Bulgarian TSO, since 2021 participates in European Clean Hydrogen Alliance and European Hydrogen Backbone, initiatives aimed at widespread implementation of hydrogen technologies and establishment of a model of pan-European hydrogen transmission infrastructure.

In the context of Hydrogen Roadmap Europe and in line with the energy and climate strategic goals and priorities of Bulgaria, Bulgartransgaz EAD envisages:

- construction of infrastructure for transport of hydrogen and low-carbon gaseous fuels for supply of power plants and other consumers in Maritsa East Coal Basin;
- retrofitting of the existing gas transmission infrastructure for operation with up to 10% hydrogen;
- new hydrogen infrastructure between the Sofia region and the Bulgarian-Greek border in Kulata region.

Developing its gas transmission infrastructure and storage capacity and providing new supply routes and cross-border transmission of natural gas, Bulgartransgaz EAD responds adequately to the tendency for increased imports and diversification of supply sources as well as with regard to the pan-European priorities in the climate and energy sector.

The implementation of the planned infrastructure projects in the country and the region will lead to stable integration of the gas market, ensure connectivity with the gas hubs in Central and Eastern Europe, as well as facilitate access to new sources. Favourable conditions for diversification will be created respectively reducing the energy dependency, which will also lead to an increase in the gas volumes traded on the gas exchange.

The activities related to the development of the gas transmission system will continue throughout the period of this TYNDP.

EU accounts for 11.9% of the world natural gas consumption, but at the same time the EU has only 0.6% of the world's reserves. The EU is currently heavily dependent on gas imports. There has been an increase in LNG imports to the EU from Qatar, the United States and Nigeria and a decrease in LNG supplies from the Russian Federation. Currently, there is a high LNG demand on the Asian markets, but there are prospects for a significant increase on the European natural gas markets. EC report shows that EU countries have imported 58 bcm of LNG during the first three quarters of 2021, the main sources being the United States (15.9 bcm), Qatar (12 bcm) and Russia (11.3 bcm).

Within the concept of increasing the EU energy security, increase of LNG supply to the member states is set out by construction of infrastructure and ensuring domestic markets access to the global LNG market.

According to the REPowerEU plan, the steep LNG supply levels of EU in January 2022 have

contributed to the security of natural gas supply during the winter season. EU is strengthening its international partnerships by diversifying the supply. The Union's technical capabilities allow imports of 50 bcm/y more LNG from alternative sources such as Qatar, USA, Egypt, West Africa. Reducing the amount of Russian gas by 10 bcm/y can be achieved by diversifying gas sources such as Azerbaijan, Algeria, Nigeria.

On 19/11/2021, the EC published the Fifth List of Projects of Common Interest (PCI). Out of 98 energy infrastructure projects, 20 are for gas infrastructure, 6 for CO<sub>2</sub> networks and 5 in the field of smart grids. In the coming years, priority will be given to the PCI implementation compatible with the undertaken ambitious climate and environmental commitments under the European Green Deal which includes a set of policies proposed by the European Commission, which must make Europe climate-neutral until 2050.



*Chiren UGS*

### 3. NATURAL GAS TRANSPORT

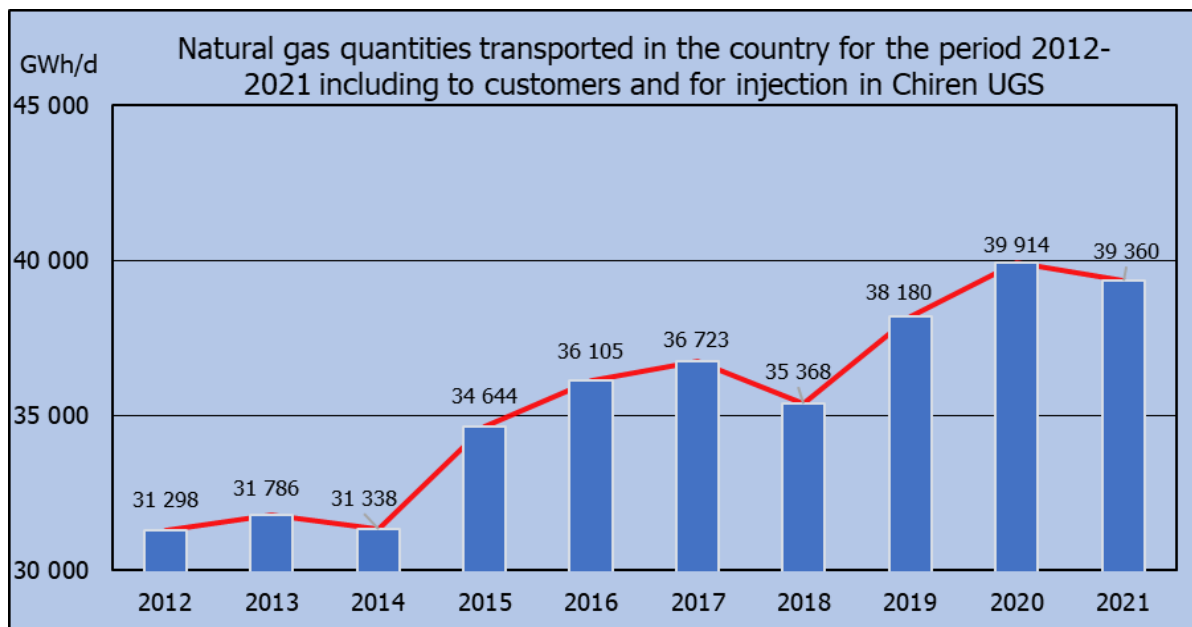
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In its capacity of a licensed gas transmission operator Bulgartransgaz EAD shall ensure:

- Uniform management and reliable operation of the gas transmission networks to secure natural gas transport in compliance with the requirements for service quality and reliability;
- Maintenance, rehabilitation and modernization of the sites and facilities of the gas transmission networks according to the national and European technical requirements, occupational safety rules and the conditions for environmental protection, while applying the good practices in these areas;
- Development of the gas transmission networks in line with the economic feasibility and the social and economic needs of our country;
- Access of clients to the gas transmission services under transparent and non-discriminatory conditions according to the requirements of the national and the Community legislation and the good European practice.

The natural gas transport (including quantities transported for injection in Chiren UGS) in 2021 amounts to 39,360 GWh and is approximately the same as the previous 2020 (39,914 GWh).

The natural gas quantities transported in the last ten years (including the quantities transported for injection in Chiren UGS) are shown in the diagram:



The natural gas quantities indicated as delivered in the country from import and local production (39,360 GWh) and respectively the actually transported natural gas quantities (35,430 GWh) differ due to the fact that the transmission activity also includes:

1. Quantities transported for injection in Chiren UGS;
2. Difference between the injected and withdrawn quantities in Chiren UGS;
3. Technological losses, technological differences due to the accuracy of the metering devices, etc.

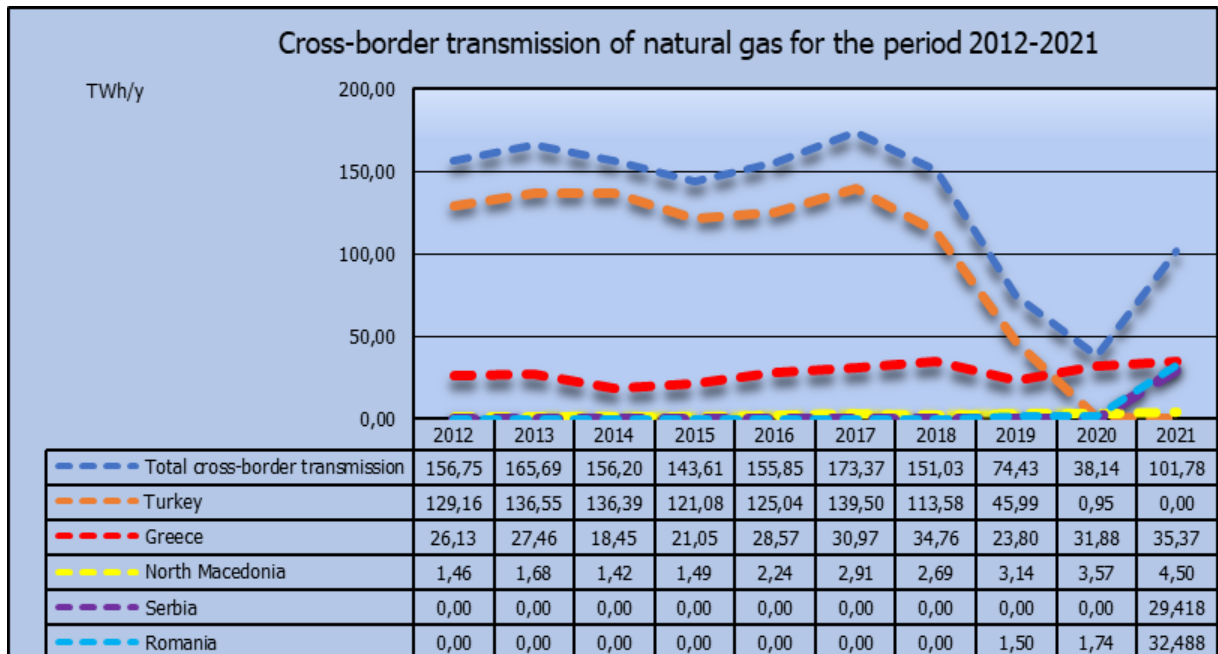
#### 4. CROSS-BORDER NATURAL GAS TRANSPORT

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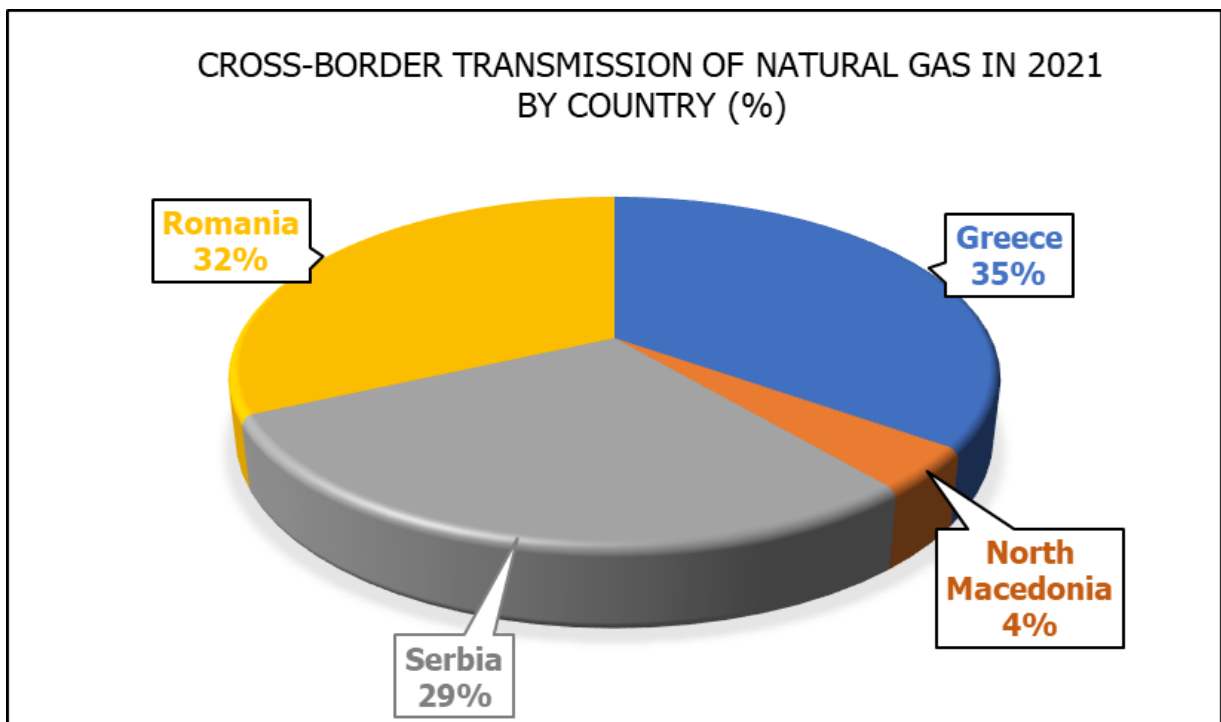
The cross-border physical transport of natural gas quantities in 2021 amounts to 101.78 TWh or 2.5 times more compared to 2020 (38.14 TWh). The transported quantities meet 100% of the consumption in North Macedonia and significant part of the consumption in Greece and Serbia.

In the next years, the transported quantities are expected to increase and exceed the levels from 2020/2021 with the implementation of the new projects to Serbia and other priority projects in the region.

Cross-border transport through the territory of Bulgaria for the period 2012-2021 is shown in the diagram below:



The percentage distribution of cross-border transport in 2021 by countries was:



## 5. NATURAL GAS STORAGE

Pursuant to Licence No. Л--214-10/29.11.2006, issued by SEWRC, Bulgartransgaz EAD

provides natural gas storage services by using its own underground gas storage (UGS) Chiren near the village of Chiren, Vratsa Municipality. The gas storage has 24 exploitation wells, a compressor station with approximately 9 MW total installed capacity and auxiliary technological facilities necessary for securing the natural gas storage. Currently, when filled in at a maximum, Chiren UGS is able to cover about 25-30% of the daily needs during the cold winter months. The injected and withdrawn natural gas quantities depend on the market conditions and the optimal technical capabilities of Chiren UGS in compliance with the rules for safe operation. Bulgartransgaz EAD and the natural gas companies who have clients with irregular consumption are obliged to maintain a strategic reserve related to the security of supplies and the seasonal fluctuation coverage.

Currently, Chiren UGS is considered mostly as a gas storage facility of local importance – major instrument for covering seasonal fluctuations in the natural gas consumption and supply in the country and for ensuring the security of supply.

In the long run, prospects are for it to be transformed into a commercial storage playing an important role in developing the competition and increasing the benefits for natural gas consumers in the conditions of an integrated and interconnected regional gas market.

The development of the envisaged interconnections with Greece and Serbia together with the LNG terminal in Alexandroupolis will enhance the market integration in the region and represents a prerequisite Chiren UGS to play an increasingly important role in securing additional flexibility of the gas transmission systems at a regional level.

In this regard, the implementation of the project for expansion of the capacity of the existing gas storage facility in Chiren was launched.

The Chiren UGS expansion project is a first step of the gas storage capacity expansion concept in the region, set as a PCI of the EU. The active gas volume in the storage facility is envisaged to increase from 5,814 GWh to 10,570 GWh and the daily withdrawal shall increase up to 85-106.4 GWh/d.

In 2020, 3,822 GWh of natural gas were injected and 4,369 GWh were withdrawn, and in 2021, 3,930 GWh of natural gas were injected and 4,961 GWh were withdrawn.

Information on natural gas injection and withdrawal by months is shown in the table below:

Natural gas quantities withdrawn and injected in 2020 and 2021								
Month	Withdrawal				Injection			
	2020		2021		2020		2021	
	GWh	thousand cubic meters	GWh	thousand cubic meters	GWh	thousand cubic meters	GWh	thousand cubic meters
January	1,196.952	112,931	1,234.603	116,936	-	-	0	0
February	874.263	82,485	1,008.092	95,499	-	-	0	0
March	420.672	39,690	885.848	83,919	-	-	0	0
April	13.527	1,284	115.90437	11,026	-	-	0.000	0
May	-	-	0	0	903.475	85,395	663.679	63,057
June	-	-	139.8324	13,311	825.389	78,199	644.012	61,305
July	-	-	0	0	734.725	69,524	755.545	71,684
August	-	-	0	0	688.861	65,171	821.713	77,740
September	-	-	0	0	663.287	63,110	743.672	70,390
October	162.728	15,424	32.565	3,093	6.352	602	301.278	28,611
November	574.230	54,405	550.139	52,136	-	-	0	0
December	1,126.692	106,735	994.227	94,369	-	-	0	0
<b>Total:</b>	<b>4,369</b>	<b>412,954</b>	<b>4,961</b>	<b>470,289</b>	<b>3,822</b>	<b>362,001</b>	<b>3,930</b>	<b>372,788</b>

## **SCENARIOS FOR CAPACITY DEMAND AND SOURCES TO COVER THE DEMAND IN THE COUNTRY**

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*Metering lines in GMS*

### **1. NATURAL GAS DEMAND**

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The demand scenario has been developed taking into account the relationship between the historical gas consumption in the country and the main macroeconomic indicators, comparative analysis of the gas markets in the EU and Bulgaria and the expected increase in the consumption resulting from the connection of new users and expansion of the production capacities.

The relationship between the final and primary energy consumption (FEC and PEC) and the GDP growth for past periods have been analysed as well<sup>1</sup>.

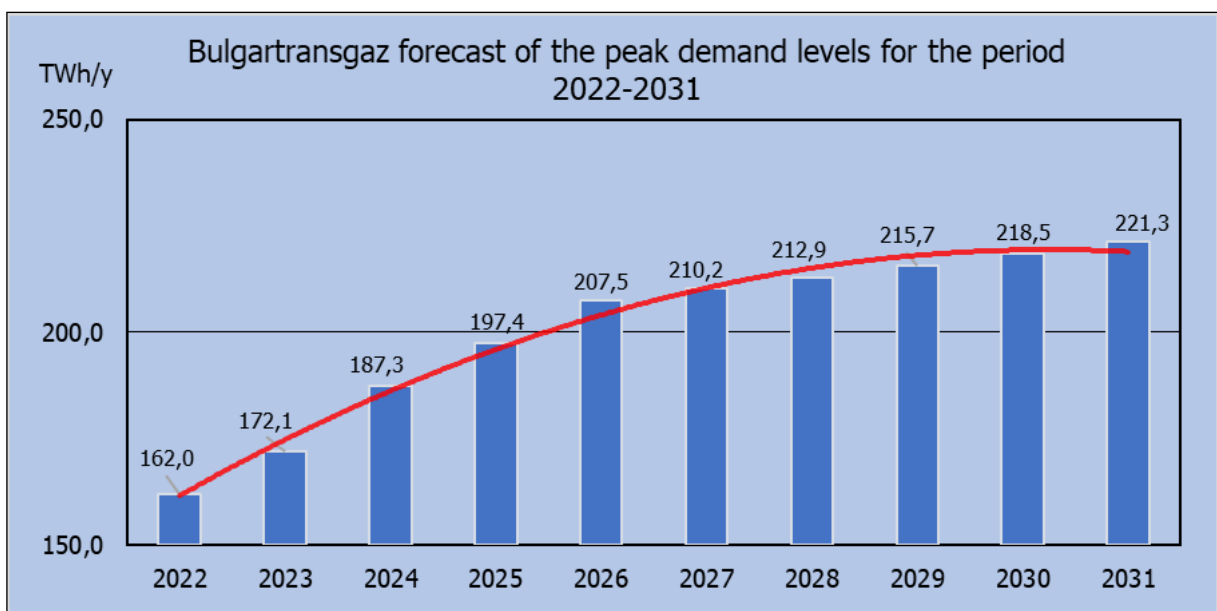
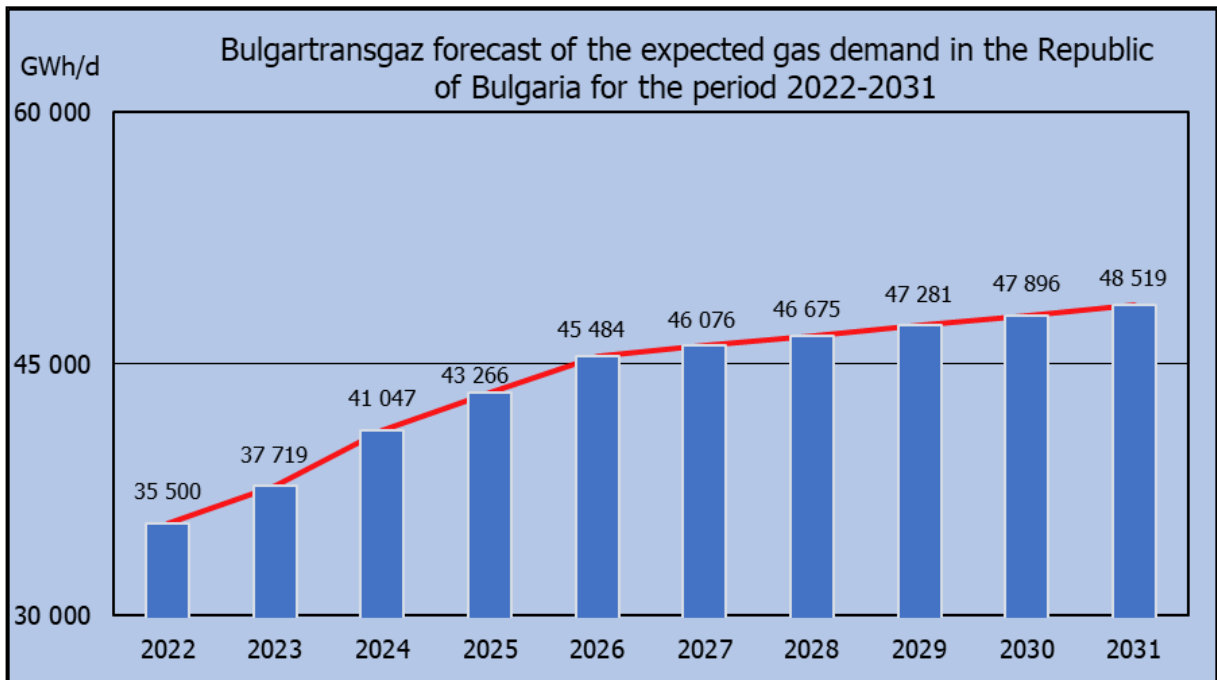
The main assumptions made based on an analysis of the past ten-year period and a comparative analysis of the EU gas market are as follows:

- Sustainable economic growth;
- Economy recovery after the COVID-19 pandemic;
- Increasing the natural gas share in PEC and FEC in the countries from the region in connection with increasing the level of gasification and reducing the use of coal;
- Increase of the natural gas supply from alternative sources to Bulgaria and the region.

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<sup>1</sup> National Statistical Institute, [www.nsi.bg](http://www.nsi.bg); Eurostat, [www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

Forecast on natural gas consumption in Bulgaria and expected peak daily demand levels during the winter months are shown in the diagrams:

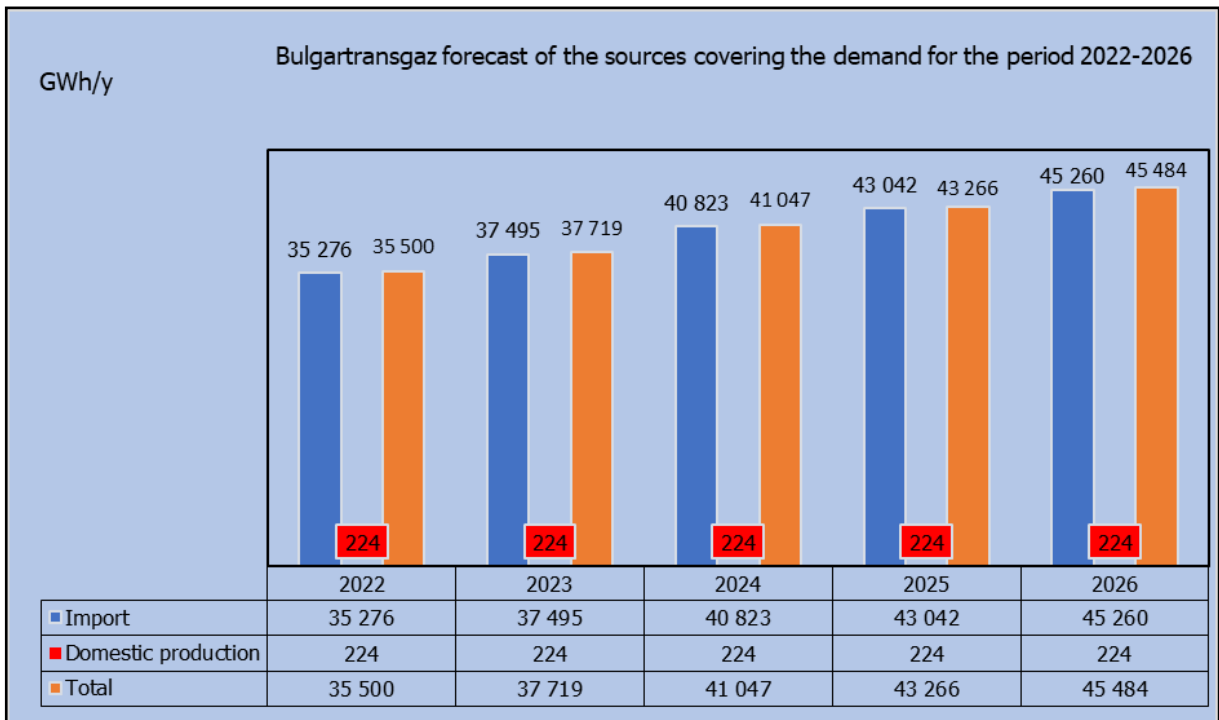


## 2. SOURCES TO MEET THE DOMESTIC DEMAND

In 2021, natural gas demand has been satisfied as follows:

- Import - 34,354 GWh (99.4%);
- Local production – 224 GWh (0.6%).

The forecast for the sources to meet the demand for the period 2022-2026 is shown in the diagram below:



## 2.1 Import

Since 2019, due to the increased transport capacity from Greece and Romania to Bulgaria, supply from alternative sources has been carried out. The natural gas mix from imports is supplemented by new sources, coming from new routes and suppliers resulting from the implementation of the new gas projects and developed fields.

Main natural gas sources for the country and the region within the considered period are:

- Increased natural gas quantities from sources of the Southern Gas Corridor - Caspian region, Middle East and Eastern Mediterranean by realization of the Interconnection projects, TAP and TANAP;
- Increased LNG quantities from various sources through the LNG terminals in Greece and Turkey, and the plans for capacity increase of the existing terminals, as well as construction of new ones;
- Natural gas from the gas hubs in Central and Western Europe through the planned new gas corridors between the Balkans and Central and Western Europe;
- Russian natural gas supplied through existing routes;
- Local production in Bulgaria;
- Local production in Romania;
- Natural gas produced from the Black Sea.

## 2.2. Local Production

In 2022, local production is expected to remain insignificant.

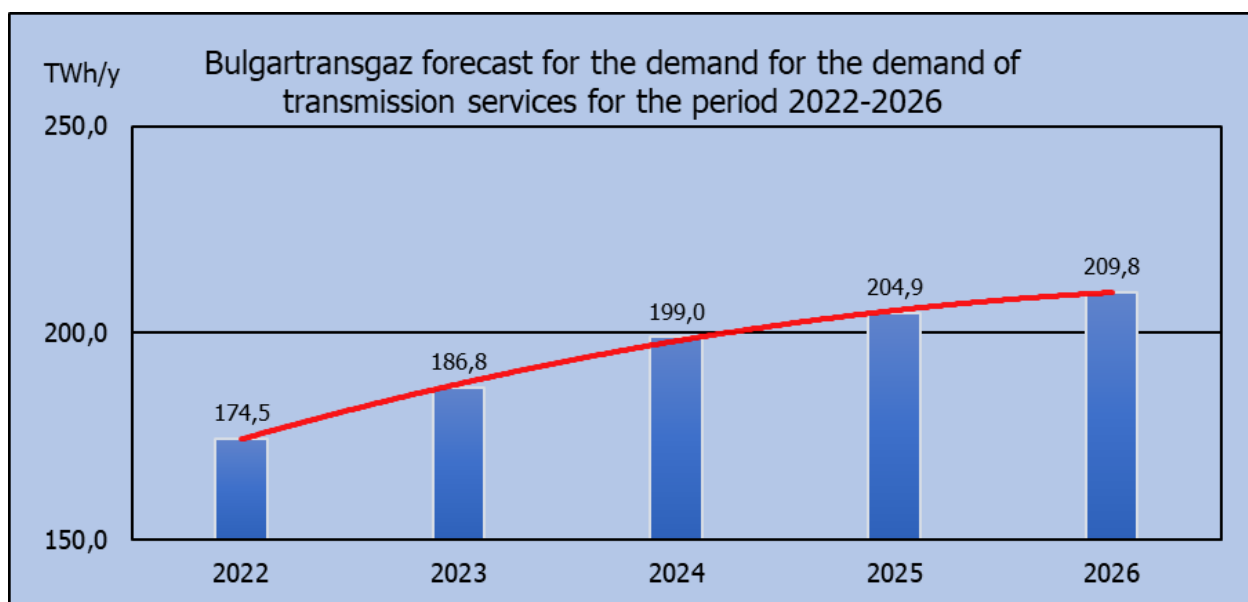
### 3. DEMAND FORECAST OF NATURAL GAS TRANSPORT SERVICES THROUGH BULGARTRANGAZ EAD INFRASTRUCTURE

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Bulgartransgaz EAD expects the demand for natural gas transport services to increase in the coming years in connection with:

- the realisation of the Balkan Gas Hub concept;
- the development of the gas exchange, run by Balkan Gas Hub EAD and the establishment of a liquid regional gas market;
- the Chiren UGS capacity expansion;
- the accelerated diversification of natural gas sources in the region of South Eastern Europe;
- the commissioning of the planned new interconnections;
- the modernisation, rehabilitation and reconstruction of the existing infrastructure;
- the utilisation of the available capacity possibilities of the gas transmission system, operated by the Company;
- the growth in natural gas consumption in the country.

Forecast for the transported natural gas quantities to exit points of the gas transmission system, including interconnection points is shown in the following chart:





*GMS Strandzha*

The calculation of the N-1 standard has been prepared for the period 2022 - 2026 according to Article 5 of Regulation (EU) No. 2017/1938 concerning measures to safeguard security of gas supply and repealing Regulation (EU) 994/2010:

The N-1 formula describes the capability of the technical capacity of the gas infrastructure to satisfy the total gas demand in the area under calculation 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 capacity of the remaining infrastructure should be able to supply the necessary gas quantities to satisfy the total gas demand in the area under calculation, i.e.  $N-1 > 100\%$ .

The infrastructure standard implementation formula used for this TYNDP is as follows:

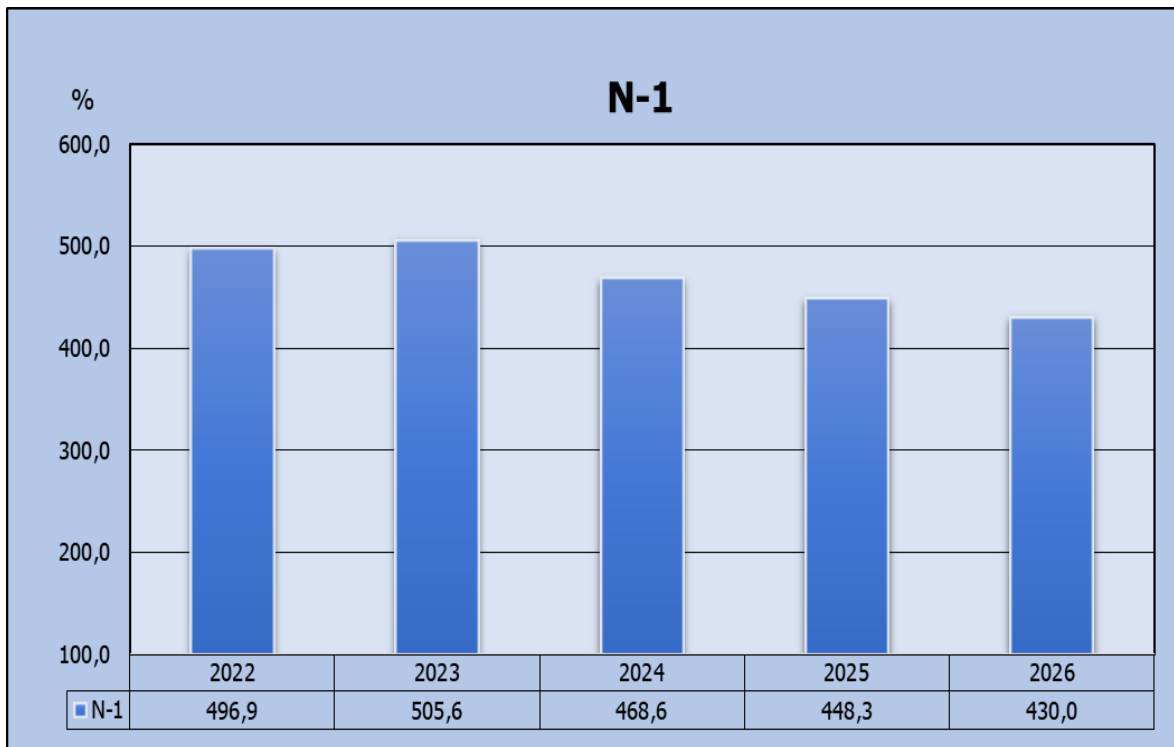
$$N - 1(\%) = \frac{\sum_{m=1}^7 EP_m + S_{max} + P_{max} - I_{max}}{D_{max}}$$

where:

<b>EP<sub>1</sub></b>	Technical capacity of IP Strandzha 2/Malkoclar, mcm/d
<b>EP<sub>2</sub></b>	Technical capacity of GMS Negru Voda 1/Kardam, mcm/d
<b>EP<sub>3</sub></b>	Technical capacity of Interconnector Bulgaria-Serbia, mcm/d
<b>EP<sub>4</sub></b>	Technical capacity of IP Kulata/Sidirokastro, mcm/d
<b>EP<sub>5</sub></b>	Technical capacity of IP Ruse/Giurgiu (IBR), mcm/d
<b>EP<sub>6</sub></b>	Technical capacity of the Interconnection Greece-Bulgaria (IGB), mcm/d
<b>EP<sub>7</sub></b>	Technical capacity of IP Kireevo/Zaycar, mcm/d
<b>S<sub>max</sub></b>	Withdrawal from UGS Chiren – the maximum possible
<b>P<sub>max</sub></b>	National gas production – the maximal possible production
<b>D<sub>max</sub></b>	National consumption – peak consumption
<b>I<sub>max</sub>= EP<sub>1</sub></b>	The single largest gas infrastructure - IP Strandzha 2/Malkoclar, mcm/d

The results of the N-1 formula for the next five years are as follows (capacity data in the formula N-1 are expressed in mcm/d in line with the Regulation):

Year	P <sub>max</sub>	S <sub>max</sub>	EP <sub>2</sub>	EP <sub>3</sub>	EP <sub>4</sub>	EP <sub>5</sub>	EP <sub>6</sub>	EP <sub>7</sub>	D <sub>max</sub>	Ep1=I <sub>max</sub>	N-1
mcm/d											%
2022	0,06	4,70	2,28	0,00	6,12	4,30	9,04	31,78	15,35	54,22	496,9
2023	0,06	5,40	2,28	5,49	6,12	4,30	9,04	31,78	16,31	54,22	505,6
2024	0,06	6,10	2,28	5,49	6,12	4,30	9,04	31,78	17,75	54,22	468,6
2025	0,06	6,80	2,28	5,49	6,12	4,30	9,04	31,78	18,71	54,22	448,3
2026	0,06	7,50	2,28	5,49	6,12	4,30	9,04	31,78	19,67	54,22	430,0



The calculations made by the formula N-1 for the infrastructure standard show that in case of disruption of the single largest gas infrastructure, the capacity of the other existing infrastructure will be able to ensure the necessary gas quantities to satisfy the overall demand on the territory of the Republic of Bulgaria for one day of exceptionally high natural gas demand.

Over the past years Bulgartransgaz EAD realised a significant progress in ensuring the interconnectivity with the gas transmission systems of neighbouring countries, enhancing the transmission capacities and providing the possibility for gas supply to the country through various routes. The Company has alternative natural gas supply routes, enabling the satisfaction to a full extent of the domestic natural gas demand independently from one another.



*Construction of a pipeline network part of a high pressure gas pipeline*

Bulgartransgaz EAD ensures security, reliability and free and equal access to the gas infrastructure. This is a prerequisite for the development and liberalization of the domestic gas market and the integration of the gas transmission system with the regional and the European one in order to create a single, competitive, pan-European gas market.

The supply and demand analysis, the risk assessment and the obligations of the combined gas operator to the public determine the necessary investments planned to be made in the period 2022-2031.

The investments provided for the period 2022 - 2031 will contribute to achieving the following key objectives:

- 1. Increase and guarantee of the technical security, safety and reliability of the gas infrastructure and compliance with the requirements for environmental protection** to satisfy the expected increased gas demand in the country and the region by:
  - Investments for reconstruction, rehabilitations and overhauls of the transmission networks including investments in the existing compressor stations, existing pipeline network infrastructure and existing gas regulation and metering stations, and in Chiren UGS;
  - Investments for construction of new facilities to the existing infrastructure necessary to enhance the efficiency of operation;
  - Investments in ancillary infrastructure, including the fibre optic network.

**2. Providing opportunity for the development of competitive market and diversification** of the gas supply sources and routes, resulting in greater energy independence and an opportunity to create a regional gas hub, including spot market by means of:

- Construction of the necessary facilities to connect the existing gas transmission infrastructure with the future trans-European gas corridors and the Southern Gas Corridor projects, which envisage to ensure diversification of natural gas supply sources and the gas transmission routes to Europe;
- Connection of gas production companies in the country to the gas transmission network;
- Development and implementation of electronic systems for operations' control.

**3. Ensuring the security of gas supplies to the country** by means of:

- Investments in the construction of interconnections to connect the gas transmission networks located outside the territory of the country.
- Investments for expansion of the underground gas storage, both regarding the withdrawal and the injection facilities, and the capabilities for storage of larger amounts of natural gas.

**4. Access of new municipalities and new end users to natural gas**, thereby contributing to an enhanced environmental protection, quality of life, energy efficiency and savings from cheaper fuel by means of:

- Expansion of the existing gas transmission networks to new regions in the country;
- Construction of new gas metering and gas regulation stations, providing an opportunity for connection of new end users to the gas transmission networks or gas distribution networks.

This chapter of the TYNDP constitutes structured information about the basic infrastructure planned for construction, expansion, reconstruction and modernization during the next ten years (2022- 2031).

Considering the long-term period of investment planning - a ten-year period as well the inclusion in the TYNDP of the projects, for which at present no final investment decision is made and projects whose development is related to the implementation of other international projects in the gas sector, for the purpose of greater clarity the Network Development Plan has been structured into 3 main groups, defining the particular sites, timetable for their implementation and expected amount of the investments:

- Investments for which decision for implementation in the period 2022 - 2024 has already been taken - Projects for the development of the gas transmission and storage infrastructure with investment decision already taken - Table 1;
- Investments whose implementation depends on the development of international projects implemented on the territory of the country - investments for the development of the gas transmission and storage infrastructure depending on the development of international projects and third parties projects in the period 2022 - 2031 – Table 2;
- Projects for the development of the gas transmission and storage infrastructure in the period 2022-2031 for which no investment decision has been taken but there are investment intentions for their implementation during the 10-year period - Table 3;

Additionally, item 5 of this Section provides a more detailed description of the projects of key significance to the process of liberalization, diversification of the natural gas supply sources and routes, development of the gas network in the region and contribution to the national economy.

## 1. NATURAL GAS TRANSMISSION AND STORAGE INFRASTRUCTURE DEVELOPMENT PROJECTS IN THE PERIOD 2022 - 2024 FOR WHICH INVESTMENT DECISION HAS BEEN TAKEN

Investments for the more significant projects of the network for which a decision has been taken and which are scheduled for implementation in the period 2022 - 2024, are presented in consolidated form in Table 1. The implementation of some of the projects has commenced before 2022, but work on them continues during the period 2022 - 2024. For such projects only the estimated value of the investments during that three-year period is indicated in the Table. The funds specified represent the funding that shall be ensured by Bulgartransgaz EAD.

**Table 1**

<b>Natural gas transmission and storage infrastructure development projects in the period 2022 - 2024 by consolidated projects</b>	<b>Implementation schedule</b>	<b>Estimated amount of investment in thousand BGN (w/o VAT)</b>
<b>I. 2022-2024 RECONSTRUCTIONS, REHABILITATIONS AND OVERHAULS</b>		
<b>1. Investments in Compressor stations:</b>		
Reconstructions and rehabilitations of CS Polski Senovets and CS Valchi dol	2024	795
CS Valchi dol – repair of complex distribution switches 6 kV	2022	1 160
<b>2. Investments in existing AGRSs</b>		
Reconstruction, reorganization and modernization of AGRS, GRS and GMS: AGRS Samokov – new external power supply, GRS Strashimirovo – external power supply, GRS Pleven - its own water source for firefighting needs	2023-2024	113
Modernization and activities for the automatization of GRS and major AGRS overhauls	2023-2024	625
<b>3. Chiren UGS</b>		
Overhaul, modernization and reconstruction of major technological installations and systems at Chiren UGS – decrease in vibrations of the gas motor compressors and the technological lines from gas motor compressor to II sand damper; implementation of „Control of technological parameters system of 4 gas-motor compressor“; implementation of a performance regulation system of 2 gas-motor compressors; repair of boiler room with boiler replacement; repair of gas separator ГC-11-64-1600 heater; reconstruction gas supply of emergency gas unit; reconstruction of three-phase separator as a degasifier	2022-2023	3 495
<b>4. Infrastructure under License № L-214-06 dated 29.11.2006</b>		

Natural gas transmission and storage infrastructure development projects in the period 2022 - 2024 by consolidated projects	Implementation schedule	Estimated amount of investment in thousand BGN (w/o VAT)
Overhaul with replacement of the section of the transmission in the section CS Valchi dol – VA Preselka; replacement of the section of the transmission in the section PF Beglej – VA Dermantsi – VA Batultsi – VA Kalugerovo; Reconstruction of gas pipeline branch Vratsa 1, including replacement of sections and construction of receive chamber at Chiren UGS by displacement of the existing chamber at GRS Vratsa; Repair of main gas pipeline northern semi-ring replacing the pipe sections; Replacement of section linear valve (LV) Kalugerovo - LV Vrachesh;	2022-2023	76 079
<b>5. Infrastructure under License № L-214-09 dated 29.11.2006</b>		
Reconstruction of protective facilities, restoration of ground cover of the Gas Pipeline for Greece, repair of PF Stryama; Reverse connection of TG1 (transit gas pipeline) at CS Lozenets and reconstruction of PF Lozenets 1; HDD drilling of Gas Pipeline for Greece where it crosses Stryama river at firefighting valve (FV) 1203-1205 (Topolnitsa village) and at FV+812 (Slivnitsa village); reinforcement of the river bank of Stryama river at FV 840+300 (Krushitsa village)	2022-2024	5 462
Repair of gas pipeline Dn 1000 to the Republic of Turkey in the sections between CS Strandzha and the Bulgarian - Turkish border; Repair of gas pipeline DN 1000 to the Hellenic Republic and the Republic of North Macedonia in the section between LV Yavorovo and LV Gorno Belev;	2022-2023	35 491
<b>II. INVESTMENTS IN CONSTRUCTION OF NEW FACILITIES TO THE EXISTING INFRASTRUCTURE NECESSARY TO INCREASE THE EFFICIENCY OF OPERATION</b>		
<b>1. Gas transmission infrastructure</b>		
Construction of cleaning facilities (launch-receive chambers) for gas pipeline branches Dimitrovgrad, Burgas, Sevlievo, Razgrad, Plovdiv.	2022 – 2023	2 846
Connection to Interconnection Greece-Bulgaria (IGB)	2022	100
Gas pipeline from Chiren UGS to VA Chiren-Butan of the existing gas transmission network	2021-2024	1 060
AGRS Dermantsi – for gas pipeline branch Lukovit, VA Dermantsi	2023-2024	550

<b>Natural gas transmission and storage infrastructure development projects in the period 2022 - 2024 by consolidated projects</b>	<b>Implementation schedule</b>	<b>Estimated amount of investment in thousand BGN (w/o VAT)</b>
<b>2. Natural gas storage</b>		
Design and construction of a system separating formation fluids and the blown gas as a result of the gas gathering of the wells and the remaining technological equipment drainage; Expansion of the capacity of Chiren UGS – above-ground equipment	2022 – 2024	3 808
<b>3. Investments in auxiliary networks</b>		
New external power supply and Switchyard of the administrative building of the main office; Yana warehouse - roofed warehouse for pipes and equipment	2023-2024	820
LNG terminal near Alexandroupolis	2022-2023	30 667
<b>III. ACCESS OF NEW MUNICIPALITIES AND NEW END USERS TO NATURAL GAS</b>		
<b>1. Investments in projects for expansion of the existing gas transmission networks to new regions of the country</b>		
Construction of gas transmission pipelines with AGRS to Svishtov, Panagyurishte and Pirdop.	2022	21 342
Construction of gas transmission pipelines with AGRS to Bansko and Razlog	2022-2024	26 008
<b>2. Investments for construction of new gas metering and gas regulation stations</b>		
Construction of new GMSs and AGRSs - purchase of existing assets to develop the gas market	2022-2024	300

2. INVESTMENTS IN THE DEVELOPMENT OF NATURAL GAS TRANSMISSION AND STORAGE INFRASTRUCTURE IN THE PERIOD 2022-2031 UNDER PROJECTS OF INTERNATIONAL IMPORTANCE

The investments that depend on the development of international projects, carried out on the territory of Bulgaria, are shown in Table 2.

**Table 2**

<b>Investments in natural gas transmission and storage infrastructure in the period 2022 – 2031 by consolidated projects</b>	<b>Implementation schedule</b>	<b>Estimated amount of investment in thousand BGN (w/o VAT)</b>
<b>I. PROJECTS PROVIDING THE OPPORTUNITY TO DIVERSIFY THE GAS SUPPLY SOURCES AND ROUTES</b>		
<b>1. Interconnections</b>		

<b>Investments in natural gas transmission and storage infrastructure in the period 2022 – 2031 by consolidated projects</b>	<b>Implementation schedule</b>	<b>Estimated amount of investment in thousand BGN (w/o VAT)</b>
Interconnection Bulgaria-Serbia (IBS)	2022-2023	143 197 <sup>2</sup>
<b>2. Natural gas storage</b>		
Expansion of Chiren UGS capacity <sup>3</sup>	2022 - 2024	596 914

The financial resources for the Interconnection Bulgaria-Serbia represent the funding that is envisaged to be secured by Bulgartransgaz EAD.

The total estimated value for the PCI Expansion of Chiren UGS capacity is about EUR 308 million, whereas roughly EUR 78 million are approved and to be granted by the Connecting Europe Facility.

### 3. NATURAL GAS TRANSMISSION AND STORAGE INFRASTRUCTURE DEVELOPMENT PROJECTS IN THE PERIOD 2022 - 2031 ON WHICH FINAL INVESTMENT DECISION IS TO BE TAKEN

In order to determine the subsequent realisation of the projects listed below, preliminary studies will be carried out on the appropriateness and method of implementation and funding, principle technical solutions, scope, location, etc.

**Table 3**

<b>Natural gas transmission and storage infrastructure development projects in the period 2022 - 2031 for which no investment decision has been taken</b>	<b>Forecast implementation period</b>	<b>Estimated amount of investment in thousand BGN (w/o VAT)</b>
<b>1. Infrastructure under License № L-214-09 dated 29.11.2006</b>		
1.1. Construction of a reverse flow connection line at CS Provadia	2022-2023	1 550
1.2. Construction of a reverse flow connection line at CS Ihtiman	2022-2022	1 700
<b>2. Infrastructure under License № L-214-06 dated 29.11.2006</b>		
2.1. Actions on construction of cleaning facilities /launch and receive chambers/ of gas pipeline branches for Pleven and Pazardzhik	2022-2023	2 010
2.2. Design, construction and commissioning of infrastructure suitable for transport of hydrogen and low-carbon gaseous fuels to supply customers in Maritsa East coal basin	2022-2025	32 639

<sup>2</sup> The amount of the investment is determined based on studies and analysis made by Bulgartransgaz EAD linked with the preparatory actions to attract financing from Operational programme Innovations and Competitiveness and Connecting Europe Facility and it reflects the value of the already signed contracts.

<sup>3</sup>Project of common interest in the meaning of Regulation (EU) 347/2013, included under number 6.20.2 in the Fifth list of Projects of Common Interest (PCI).

The funds under items 1.1, 1.2 and 2.1 of Table 3 represent Bulgartransgaz EAD forecast value for the required financing. Funds under item 2.2. represent the estimated amount of the investment of Bulgartransgaz EAD.

#### 4. 2022 – 2031 INVESTMENT PROGRAMME

This Section presents Bulgartransgaz EAD Investment Programme for the period 2022-2031 divided into the following activities:

- **Investments** - actions aimed at the expansion, reconstruction, modernization and overhauls, grouped into three main sections:
  - Construction of new facilities;
  - Reconstruction, rehabilitation and overhauls of long-term tangible assets;
  - Delivery of machinery and equipment.

#### 4.1. Three-year Investment Programme (2022-2024) including investment activities on which final investment decision has been taken

in BGN thousand, VAT excluded

Programme/Section	Total 2022	Total 2023	Total 2024
<b>TOTAL Annual Investment Programme:</b>	<b>229,258</b>	<b>114,240</b>	<b>40,231</b>
<i><u>SECTION I.1 - Construction of new sites</u></i>	<i><u>156,171</u></i>	<i><u>51,705</u></i>	<i><u>29,013</u></i>
<i>Infrastructure under License № L-214-09 dated 29.11.2006</i>	<i>1,419</i>	<i>2,235</i>	<i>405</i>
Pipeline network	306	2,200	0
Compressor stations, administrative and operating regions	0	35	405
Communication and information systems	1,113	0	0
<i>Infrastructure under License № L-214-06 dated 29.11.2006</i>	<i>142,144</i>	<i>27,743</i>	<i>27,568</i>
Pipeline network	141,604	27,446	26,401
Compressor stations, administrative and operating regions	0	50	170
Communication and information systems	420	113	878
AGRS and GMS	120	134	119
<i>Natural gas storage</i>	<i>3,408</i>	<i>200</i>	<i>200</i>
Main technological installations and systems, operating unit	0	200	200
Expansion of Chiren UGS capacity	3,408	0	0
<i>Total for allocation by types of activities</i>	<i>9,200</i>	<i>21,527</i>	<i>840</i>
Pipeline network	<i>9,200</i>	<i>21,467</i>	<i>0</i>
Compressor stations, administrative and operating regions	0	60	840
<i><u>SSECTION I.2 - Reconstruction, rehabilitation and overhauls of long-term tangible assets</u></i>	<i><u>67,422</u></i>	<i><u>57,365</u></i>	<i><u>5,218</u></i>
<i>Infrastructure under License № L-214-09 dated 29.11.2006</i>	<i>25,116</i>	<i>16,855</i>	<i>1,566</i>
Pipeline network	25,116	16,505	66

Compressor stations, administrative and operating regions	0	350	1,500
<i>Infrastructure under License № L-214-06 dated 29.11.2006</i>	<i>38,324</i>	<i>39,829</i>	<i>1,418</i>
Pipeline network	37,114	39,460	100
Compressor stations, administrative and operating regions	1,160	54	795
AGRS and GMS	50	315	523
<i>Natural gas storage</i>	<i>3,419</i>	<i>76</i>	<i>0</i>
Main technological installations and systems, operating unit	3,419	76	0
<i>Total for allocation by types of activities</i>	<i>563</i>	<i>605</i>	<i>2,234</i>
Pipeline network	435	555	1,500
Compressor stations, administrative and operating regions	128	50	734
<i>SECTION I.3 - Supply of machinery and equipment</i>	<i>5,665</i>	<i>5,170</i>	<i>6,000</i>

**4.2. 2025-2031 Investment programme, including mandatory investment activities ensuring capacity capabilities of the networks**

in BGN thousand, VAT excluded

Programme/Section	Total	Total	Total	Total	Total	Total	Total
	2025	2026	2027	2028	2029	2030	2031
<b>TOTAL Annual Investment Programme:</b>	23 564	25 740	26 127	27 558	28 036	29 563	30 141
SECTION I.1 - Construction of new sites	11 441	15 420	16 191	17 001	17 851	18 743	19 680
SECTION I.2 - Reconstruction, rehabilitation and overhauls of long-term tangible assets	4 623	2 320	2 436	2 558	2 686	2 820	2 961
SECTION I.3 - Supply of machinery and equipment	7 500	8 000	7 500	8 000	7 500	8 000	7 500

## 5. DESCRIPTION OF KEY PROJECTS

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In the context of the European objectives of building an interconnected and single pan-European gas market, the development of infrastructure in the Republic of Bulgaria is directly related to the positioning of the country as one of the gas hubs in Eastern Europe in line with the projects for the Southern Gas Corridor development and the plans for gas infrastructure development in the region and Europe. An important place in the European energy policy is also occupied by the strategic goals for improving the security of supply, diversification of sources and routes of natural gas supply and achieving decarbonisation of the energy sector and climate neutrality.

The following projects, which are part of the Gas Hub Balkan Concept, will be key for the market integration and enabling the transport of additional natural gas quantities to and through Bulgaria:

- The interconnections with Greece and Serbia;
- Expansion of Chiren UGS capacity;
- The LNG terminal near Alexandroupolis.

The implementation of these projects is interrelated and will contribute to the realization of the Concept for a Gas Hub in Bulgaria, as well as the development of the single European gas network.

### **5.1. Development of the gas infrastructure regarding the concept for the construction of a regional gas hub in Bulgaria – Balkan Gas Hub**

The gas hub concept is based on several key elements which together form the project:

- New natural gas sources;
- Optimal use of the existing gas transmission networks and Chiren UGS;
- Modernization and expansion of the existing infrastructure;
- Construction of new interconnections with the neighbouring countries;
- New infrastructure for the gas hub;
- Creation of optimal trade environment through a liquid gas exchange.

Balkan Gas Hub is included in the Fifth list of projects of common interest of the EC as 6.8 Cluster of infrastructure development and enhancement enabling the Balkan Gas Hub. In this cluster are included the projects for interconnections with Greece and Serbia, as well as the project for modernization and rehabilitation of the gas transmission system of Bulgartransgaz EAD.

In 2019 Bulgartransgaz EAD registered its own company Balkan Gas Hub EAD, which undertook actions for creating an organized exchange market with various trade segments and for the adoption of the necessary legislation amendments for providing a trade and regulatory environment. In January 2020 multilateral trade on the organized exchange market started on the platform of Balkan Gas Hub EAD, including a short-term (spot) segment, long-term segment and brokering service. In 2021, additional technical

functionalities have been implemented corresponding to the requirements of Regulation 1227/2011 REMIT. Balkan Gas Hub EAD joined the SEEGAS initiative to enable the cooperation with major exchanges in the region, contributing to the improvement of the trading environment. Over the past year, a significant increase was registered in both the number of customers and the trading volumes through the trading platform provided by the company.

A number of projects in the field of transport and storage of natural gas and infrastructure for liquefied natural gas are under implementation, which are important for the development of the natural gas market in the country and the region.

The realisation of the Bulgaria - Serbia interconnection will achieve diversification of the routes, interconnection and natural gas transmission to Serbia using the planned new entry points with Turkey and Greece. At the same time, in case of a crisis it could be used for natural gas supply from Serbia.

Being part of the priority projects for Europe, the Interconnection Bulgaria – Serbia has been acknowledged to be key infrastructure that will contribute significantly to the improvement of the energy interconnectivity between the countries in Europe. The contribution of the project to the accomplishment of the single objectives of the EU member states is also taken into account, namely affordable, secure and sustainable energy for all citizens, and in a longer term the decarbonisation of the economy. Natural gas shall have a key role in achieving these objectives in the Eastern Europe countries.

The interconnection Greece - Bulgaria provides an additional connection for the systems of Bulgartransgaz EAD and DESFA S.A. and access to the liquefied natural gas terminal near Alexandroupolis and the TAP gas pipeline.

The IGB realisation is linked with the policy of the Republic of Bulgaria targeted at securing an infrastructure for the access to alternative sources and natural gas import routes.

The construction of the gas pipeline will enable Bulgaria and Greece to respond efficiently in cases of possible cuts in the supply from external sources or seasonal peaks in consumption on natural gas - an infrastructure will be in place to cover the crisis supply and satisfy peak consumption in the month of big consumption.


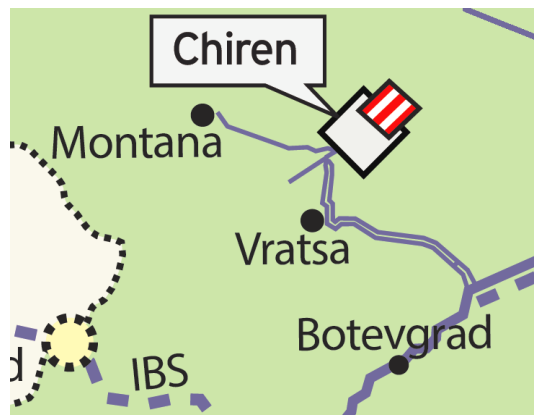
Bulgartransgaz EAD involvement in Alexandroupolis Independent Natural Gas System (INGS) has a strategic importance as it will provide additional natural gas quantities to the gas markets in the region by offering new supply sources and routes. The project implementation will thus enhance the diversification of natural gas sources and will promote competition for the benefit of end users.


Through the existing and envisaged gas pipelines in the region, natural gas from the terminal will be delivered to consumers both in Bulgaria, and in North Macedonia, Serbia, Romania, Hungary, Moldova and Ukraine, providing them with the opportunity to benefit from the dynamically developing LNG market and the advantages it offers - flexibility, competitiveness and security of supply and access to new suppliers.



The expansion of Chiren UGS is aimed at establishing conditions to guarantee the security of supply to Bulgarian customers and the customers on the countries from the region. The expansion of storage capacity is in full compliance with EU policies on natural gas reserves,




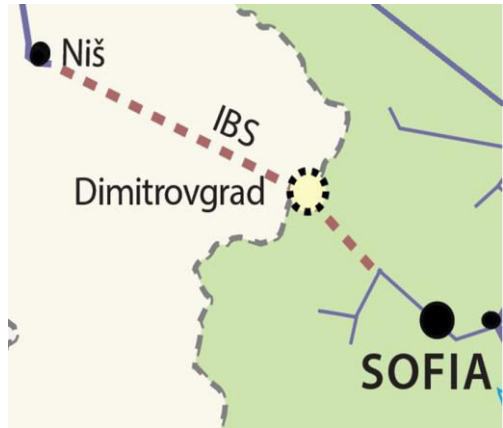
laid down in the REPowerEU announced by the EC on 8.03.2022: joint European action for a safer and more sustainable energy at an affordable price


The development of the gas infrastructure and the realisation of the concept of a Bulgarian gas distribution centre (Balkan Gas Hub) determine the role of Chiren UGS as a commercial storage facility. Providing additional storage volume will promote natural gas trade, increase market competition and contribute to liquid gas market functioning. The expansion of Chiren UGS is in synergy with all projects of the Company, including the project for LNG terminal near Alexandroupolis.

<b>Expansion of Chiren UGS capacity, PCI 6.20.2</b>	
 <b>Co-funded by the European Union</b>	
<b>Identification of the project in lists:</b> PCI 6.20.2 Chiren UGS Expansion Part of Cluster 6.20 for the increase of storage capacity in South-Eastern Europe Determined to be a national site with a Decision No.709 of the Council of Ministers based on §1 of the Additional Provisions of the State Property Act.	
<b>Type of the project:</b> Underground Gas Storage	
<b>Description of the Project:</b> Chiren UGS expansion - increase in the active gas to 1 bcm and increase in the injection and withdrawal capacity to 8-10 mcm/d.  <b>Technical data:</b> - Above-ground part: Compressor equipment with auxiliary equipment, GMS, separation installations, heating and dehydration, etc. - Wells: 10 exploitation and 3 observational wells, gatherings, auxiliary activities, etc. - Gas pipeline from Chiren UGS to the existing gas transmission network of Bulgartransgaz EAD with a length of 45 km and DN700.	
<b>Expected amount of the investment:</b> ~ EUR 308 million, VAT excluded.	<b>Funding:</b> 1. Bulgartransgaz EAD own funds; 2. Co-financing from the Connecting Europe Facility (CEF) amounting to EUR 78 million for the above-ground equipment and wells.
<b>Expected commissioning date:</b>	2024
<b>PROJECT PHASES</b>	Design and issuance of permits
<b>Current status of project implementation:</b> - January 2022 – a grant agreement under the CEF of about EUR 78 million; <b>Above ground equipment:</b> Developed Investment Design - Technical Design Phase; EIA procedures and issuance of a complex permit, announced public procurement for the award of the supply and construction works. <b>Wells:</b> Announced public procurement for the design and construction works <b>Gas pipeline:</b> Announced public procurement for the design <i>*Detailed information under the individual parts of the infrastructure is given in item 5.5.1.</i>	
<b>Expected benefits:</b> Ensure security of supply; Enhance market integration; Boost market competition; Encourage gas trade in the region.	
<b>Project website:</b> <a href="https://www.bulgartransgaz.bg/chiren">https://www.bulgartransgaz.bg/chiren</a>	

<b>The Alexandroupolis Independent Natural Gas System (INGS)</b>	
<b>Identification of the project in lists:</b> CESEC priority project	
<b>Type of the project:</b> Floating terminal for reception, storage and re-gasification of LNG	
<p><b>Description of the Project:</b> It is located 17.6 km SW from the port of Alexandroupolis and about 10 km from the shore. The facility will be linked to the national gas transmission system of Greece and the Bulgarian gas transmission system via the existing IP Kulata/Sidirocastro and the interconnection Bulgaria–Greece currently under construction.</p>	
<p><b>Technical data:</b>            Floating terminal for reception, storage and re-gasification of LNG            Design capacity of regasification and supply to the Greek gas transmission system: 5,5 bcm/y            Design storage capacity: 170 thousand m<sup>3</sup> of liquefied natural gas.</p>	
	
<b>Expected commissioning date:</b>	01.01.2024
<b>PROJECT PHASES</b>	Design and issuance of permits
<p><b>Current status of project implementation:</b></p> <ul style="list-style-type: none"> <li>- January 2022 - a final investment decision has been made by all shareholders for the construction of the project;</li> <li>- October 2021 - the project company Gastrade published long-term capacity products, offered as of the expected date of commercial operation (01.01.2024)</li> <li>- January 2021 - a call for tender for engineering, procurement and construction of a permanent mooring system of Alexandroupolis Independent Natural Gas System.</li> </ul>	
<p><b>Expected benefits:</b>            Strengthening the diversification of the sources of natural gas to the region;            Enhancing the security of supply for the region;            Stimulating the competition in favour of the end consumers;</p>	
<p>Contractor of the project is Gastrade S.A. Bulgartransgaz EAD has a 20% shareholding stake in Gastrade S.A. In accordance with Decision No.6/08.01.2020 of the Council of Ministers</p>	
<p><b>Project website:</b> <a href="http://www.gastrade.gr/">http://www.gastrade.gr/</a></p>	
<p><b>Project website:</b> <a href="https://www.bulgartransgaz.bg/chiren">https://www.bulgartransgaz.bg/chiren</a></p>	

<b>Rehabilitation, modernization and expansion of the Bulgarian transmission system - Phase 2, PCI 6.8.2</b>	
 <b>Co-funded by the European Union</b>	
<b>Identification of the project in lists:</b> PCI 6.8.2. Rehabilitation, modernization and expansion of the Bulgarian transmission system CESEC priority project A project of national significance in accordance with Decision 312 from 10.02.2018 of the Council of Ministers	
<b>Type of the project:</b> Rehabilitation and modernisation of the gas transmission system on the territory of Bulgaria	
<b>Technical data (Phase 2):</b> <b>Stage 2 of compressor stations modernization</b> Integration of 4 new gas turbine compressor units (GTCUs) in 3 CSs; CS Lozenets – 2 units; (GTCU) CS Petrich – 1 unit; (GTCU) CS Ihtiman – 1 unit. (GTCU) <b>Rehabilitation (replacement) of sections with a total length of 81 km:</b> Section 1: PF Beglezh – VA Dermantsi – VA Batultsi – VA Kalugerovo with a length of 58 km and DN700 Section 2: PF Valchi Dol – LVA Preselka with a length of 23 km and DN700	
	
<b>Expected amount of the investment:</b> ~ EUR 340 million, VAT excluded.	<b>Funding:</b> Stage 2 of modernisation of 3 CSs - Bulgartransgaz EAD own funds. Rehabilitation (replacement) of 81 km of sections: 1. Bulgartransgaz EAD own funds 2. Co-financing from the Connecting Europe Facility (CEF) amounting up to EUR 27,184 million (Action 6.8.2-0034-BG-W-M-18).
<b>Expected commissioning date:</b>	2022
<b>PROJECT PHASES</b>	Execution of construction works
<b>Current status of the compressor stations modernization</b> CS Petrich - commissioned in February 2021 CS Ihtiman - commissioned in November 2021 CS Lozenets - commissioned in November 2021 <b>Current status of implementation of sections with a total length of 81 km:</b> A section of 58 km has been commissioned in January 2022 Section of 23 km – construction works are ongoing <i>*Detailed information on the individual parts of the infrastructure is given in item 5.4.1.</i>	
<b>Expected benefits:</b> Providing the required capacities and reliable natural gas transport Improving the efficiency, reliability and flexibility of the transmission system Ensuring the technical possibilities for transmission of additional natural gas quantities through the territory of the country entering from existing and new entry/exit points Possibilities to diversify the transmission directions depending on market interest	
<b>Project website:</b> <a href="https://www.bulgartransgaz.bg/rehabilitacija">https://www.bulgartransgaz.bg/rehabilitacija</a>	

<b>Interconnection Bulgaria-Serbia (IBS) on the Bulgarian territory, PCI 6.8.3</b>	
 EUROPEAN UNION EUROPEAN REGIONAL DEVELOPMENT FUND	 OPERATIONAL PROGRAM INNOVATIONS AND COMPETITIVENESS
	<b>Co-funded by the European Union</b>
<b>Identification of the project in lists:</b> PCI 6.8.3 INTERCONNECTION BULGARIA-SERBIA (IBS) CESEC priority project A project of national significance in accordance with Decision 111 from 10.02.2013 Council of Ministers	
<b>Type of the project:</b> Gas pipeline and auxiliary equipment	
<b>Description of the Project:</b> A new reversible interconnection between the gas transmission systems of the Republic of Bulgaria and the Republic of Serbia. <b>Technical data:</b> Length (in km): A total of 170 km; 62 km of which on Bulgarian territory, Pipeline diameter: DN700 Capacity: capacity of ~ 1.8 bcm with a possibility as well for reverse flow. Technological sites: Gas metering station, 2 automatic gas distribution stations and gas pipeline branches, cleaning facilities, valve groups Commencement: the region of the town of Novi Iskar, Republic of Bulgaria End location: Bulgarian-Serbian border.	
	
<b>Expected amount of the investment:</b> ~ EUR 81 million, VAT excluded.	<b>Funding:</b> 1. Bulgartransgaz EAD own funds; 2. Co-financing from <b>Operational Program Innovation and Competitiveness 2014-2020 (OPIC)</b> up to EUR 2,8 million for preparatory activities; 3. Co-financing from the Connecting Europe Facility (CEF) amounting to EUR 27,603 million Action 6.8.3-0013-BG-W-M-18)
<b>Expected commissioning date:</b>	2023
<b>PROJECT PHASES</b>	Design and issuance of permits
<b>Current status of project implementation:</b> - Environmental procedures, the following acts are issued: Decision No. EO-8/2015 assessing the need of an environmental assessment (a decision no EA to be carried out for the entire route); Decision No.EO-2/2021 assessing the need of an environmental assessment (decision: to not carry out an EA on the change in route) Decision No.2-ПП/2021 assessing the need of an EIA (a decision no EIA to be carried out); - Archaeological studies along the route; - An investment design has been developed in the technical design phase for each stage; the latter shall be agreed with the competent controlling authorities and operating companies. Concerning AGRS Dragoman stage, a request has been submitted to the competent authority for issuing a building permit. - Public procurement on the selection of a contractor of the activities involving the detailed design, supply of materials and equipment, construction and commissioning of construction site. The public procurement is in an appeal procedure that is not completed yet.	
<b>Expected benefits:</b> Diversification of natural gas supplies to Bulgaria and the region. Enhancing the security of supply to Bulgaria and the region; Incentivising the gradual increase in natural gas consumption; Encouraging investors' interest and generating economic benefits for the regions through which the gas pipeline passes.	
<b>Project website:</b> <a href="https://www.bulgartransgaz.bg/ibs">https://www.bulgartransgaz.bg/ibs</a>	

<b>Interconnection Bulgaria-Greece (IGB), PCI 6.8.1</b>	
<b>Identification of the project in lists:</b> PCI 6.8.1 Interconnection Bulgaria-Greece (IGB) CESEC priority project A project of national significance in accordance with Decision 615 of 14.07.2009 of the Council of Ministers of the Republic of Bulgaria.	
<b>Type of the project:</b> Gas pipeline and auxiliary equipment	
<b>Description of the Project:</b> A new reversible interconnection between the gas transmission systems of the Republic of Bulgaria and the Hellenic Republic.  <b>Technical data:</b> Length (in km): A total of 182 km; 151 km of which on Bulgarian territory. Pipeline diameter: DN800 Capacity: capacity ~ 3 bcm/y with an opportunity for increase up to 5 bcm/y with the construction of a compressor station Technological sites: GMS, AGRS, PF Commencement: the region of the town of Stara Zagora, the Republic of Bulgaria End location: Alexandroupolis, the Hellenic Republic.	
<b>Expected commissioning date:</b>	2022
<b>PROJECT PHASES</b>	Under construction
The project shall be realised by a joint investment company ICGB AD with shareholders Bulgarian Energy Holding EAD (50%) and the Greek investment company IGI Poseidon (50%).  <b>Project website:</b> <a href="https://www.icgb.eu/home">https://www.icgb.eu/home</a>	

## **5.2. Other projects for development of Bulgartransgaz EAD infrastructure in early stage of development**

### **5.2.1. Interconnection Bulgaria – North Macedonia**

The project is in a conceptual phase and envisages the construction of a new gas interconnection between the Republic of Bulgaria and the Republic of North Macedonia following the route Petrich - Strumica.

The development of the interconnection between the Republic of Bulgaria and the Republic of North Macedonia will contribute to improving energy security and integration of the energy markets.

In this regard the following documents have been signed:

- Memorandum of Understanding and cooperation in the field of natural gas between the Ministry of Energy of the Republic of Bulgaria and the Ministry of Economy of the Republic of North Macedonia
- Memorandum between Bulgartransgaz EAD and the Macedonian Energy Resources joint stock company (currently National Energy Resources) for the performance of energy activities for a feasibility study for the construction of a new gas interconnection between the Republic of Bulgaria and the Republic of North Macedonia.

The Parties debate the organisation of a market test for the project with a view to deciding on its realisation.

### **5.2.2. Opportunities for new gas storages in Bulgaria**

To ensure the security of supply and encourage the gas market liberalization a study of the possibilities for new gas storage facility in Bulgaria is planned. The development of gas infrastructure in the region, including the projects from the Southern gas corridor, the planned gas interconnections and other big cross-border gas projects determine the need in the long run of securing additional storage capacity and the realization of new gas storage facility projects accordingly.

Together with the existing underground gas storage Chiren, which is undergoing an expansion, second storage facility in Bulgaria would be of further benefit for the regional market. It could be constructed in suitable geological structure – depleted gas fields (onshore or offshore), salt caverns or aquifer. It should be considered that the construction of a new underground gas storage from the start of the geological and research activities to its commissioning would take a considerable period of time.

## **5.3. Development of existing network by the construction of new gas pipeline branches**

The development of the existing network is an essential process in terms of creating opportunities for sustainable economic environment favouring the development of Bulgarian

economy. Besides supporting the economy, the implementation of such projects is directly related to the development of the respective regions - in business and social aspect. The projects envisaged would increase the number of Bulgarian households with access to natural gas, would accelerate the process of gasification in the country and the improvement of energy efficiency. Moreover, temporary jobs will be provided in the process of their construction. In general, their implementation is associated with significant environmental effect - reducing harmful emissions from burning solid and liquid fuels.

### **5.3.1. Projects in progress**

#### **○ Gas pipeline branch Razlog - Bansko**

The gas pipeline design length is about 37 km, maximum flow rate 30 000 m<sup>3</sup>/h and diameter DN 250 and working pressure of PN 54 bar. The route of the gas pipeline is expected to run on the north slopes of the Pirin mountain, continuing on the south slopes of the Rila mountain and reaching AGRS Razlog-Bansko, located in the lands belonging to the town of Razlog near the border with the lands belonging to the town of Bansko.

The project is funded by a grant under Kozloduy International Decommissioning Fund to the amount of EUR 195,5 thousand. Co-funding by Bulgartransgaz EAD that is currently expected is to the amount of EUR 14,767 million; another funds will be invested for state fees, the easement, compensations, archaeological surveys, consultancy services under Art. 166 of the PPA, etc.

A contract has been signed for the preparation of a technical and detailed design, detailed spatial plan (DSP) and EIA, which is under implementation. An EIA Decision has been issued for Site No. 4-4/2018; a Detailed Spatial Plan - Parcelling Plan has been approved and enforced. The investment design has been prepared - phase Technical Design that is coordinated with the control bodies and interested parties. The activities involving the acquisition of all rights in rem are ongoing. The planned deadline for completion of the project is the end of 2025.

#### **○ Gas pipeline branch Panagurishte - Pirdop**

The gas pipeline length is planned to be about 62 km, maximum capacity 25 000 m<sup>3</sup>/h and diameter DN 250 and operating pressure of PN 54 bar. The route of the gas pipeline branch is as follows: From VA (valve assembly) Vinogradets, located on the southern ring of the main gas pipeline to AGRS to the west of the town of Panagurishte and route from the town of Panagurishte to AGRS to the west of Pirdop.

The project is funded by a grant under Kozloduy International Decommissioning Fund to the amount of EUR 6,834 million. Co-financing on behalf of Bulgartransgaz EAD is to the amount of EUR 12 888 million; funds will also be invested to pay the state fees, the easement, compensations, etc.

An EIA Decision has been issued for Site No. 4-5/2018; a Detailed Spatial Plan - Parcelling Plan has been approved and enforced. The investment design has been prepared - phase Technical Design that is coordinated with the control bodies and the interested parties.

A public procurement for the procurement of main material and equipment has been launched in line with the rules of the European Bank for Reconstruction and Development on

the electronic platform of the Bank <https://ecepp.ebrd.com/>. A contract has been signed, and implemented.

A public procurement for the selection of a contractor of the construction and installation works has been organised according to the PPA. A contractor has been chosen and contract signed, and its implementation has started.

The planned deadline for completion of the project is the third quarter of 2022.

- **Gas pipeline branch to the town of Svishtov**

The gas pipeline length is 42 km, diameter DN 200 and operating pressure PN 54 bar. The gas pipeline starts at VA Patresh, located on the northern semi-ring of the main pipeline, and it ends at the AGRS, located south of Svishtov.

The project is funded by a grant under Kozloduy International Decommissioning Fund to the amount of EUR 3,770 million. Co-funding by Bulgartransgaz EAD is to the amount of EUR 8,266 million and a further EUR 0,54 million will be invested for state fees, the easement, compensations, archaeological surveys, consultancy services under Art. 166 of the SDA, etc.

A Feasibility study has been carried out. A designer of the Technical and Detailed Design, DSP and EIA (where necessary) has been selected. The Contract is in the process of implementation and only the activity involving the designer's supervision during the construction works is carried out. The Technical and Detailed Designs have been prepared by the designer and approved by all institutions according to the Bulgarian legislation; the building permit has been issued by the MRDPW.

A public procurement for the procurement of main material and equipment has been launched in line with the rules of the European Bank for Reconstruction and Development on the electronic platform of the Bank <https://ecepp.ebrd.com/>. A contract has been signed and implemented – the main materials and equipment for the project have been delivered.

A public procurement for the selection of a contractor of the construction and installation works has been organised according to the PPA. A contractor has been chosen and contract has been signed, whose implementation has started.

The planned deadline for completion of the project is mid-2022.

### **5.3.2. Possibilities for construction of new gas pipeline branches**

- **Gas pipeline branch with AGRS Graf Ignatievo to towns of Hisarya – Banya – Karlovo - Sopot**

The gas pipeline branch is expected to be about 54 km supplied by the existing main gas pipeline, the Southern semi-ring, between the road Plovdiv – the village Stroevo – Malak Chardak – Golyam Chardak and the gas pipeline branch to Plovdiv, located at about 4 km east of the main road Karlovo – Plovdiv. The AGRSs are planned to be in the vicinity of the towns of Sopot and Karlovo (or one AGRS for the two towns). Branches are envisaged to the towns of Hisarya and the town of Banya and the village of Kaloyanovo. The branch could further supply gas also the municipalities of Sopot and Hisarya, the town of Banya, Karlovo and the village of Kaloyanovo.

Currently exploratory activities to determine the scope, manner of execution, financing and

taking a final investment decision are envisaged.

### **5.3.3. Possibilities for the construction of an infrastructure suitable for transport of hydrogen and low-carbon gaseous fuels**

In order to meet the EU's climate and energy targets of a climate-neutral economy and energy, a number of European initiatives have been launched for the large-scale deployment of hydrogen technologies, promoting the production, transmission, distribution and use of low-carbon and green hydrogen. These initiatives will be further developed in the framework of the REPowerEU plan, which the EC is ready to develop in cooperation with the Member States by mid-2022.

Taking into account the EU's priorities for climate neutrality, Bulgartransgaz EAD is considering the possibilities for developing its infrastructure in the light of the plans to replace conventional fuels with hydrogen. Solutions for preparation of the existing gas transmission network for compatibility with the inclusion of hydrogen and other low-carbon gases in the network, as well as for completely new routes for green hydrogen transmission are being considered. Currently the company is working on the development of three hydrogen-oriented projects:

- Project for infrastructure for transport of hydrogen and low-carbon gaseous fuels in the Maritsa East Coal Basin;
- Project idea for infrastructure for transport of pure hydrogen between the region of Sofia, the Bulgarian-Greek border near Kulata (joint initiative with DESFA S.A.), allowing future expansion to Romania and the Maritsa East Coal Basin;
- Project idea for retrofitting (preparation) of the existing gas transmission infrastructure to operate with up to 10% hydrogen.

## **5.4. Major projects for reconstructions, rehabilitations and overhauls of gas infrastructure**

### **5.4.1 Modernization, rehabilitation and expansion of the Bulgarian gas transmission system, PCI 6.8.2**

PCI 6.8.2 is a complex project for the modernization, rehabilitation, and expansion of the existing gas transmission infrastructure on the territory of Bulgaria that is implemented in three time phases and includes the following types of activities:

- Inspections to determine and characterize the gas pipelines' condition;
- Repair and replacement of gas pipeline sections following inspections;
- Expansion and modernization of the existing network;
- Implementation of systems for optimization of the management process of the network technical condition.

CS Nova Provadia, of Phase 2 of PCI 6.8.2. Stage 2 of the modernization of 3 compressor stations by integrating 4 gas turbine compressor units (GTCUs) has been completed. The compressor stations have been commissioned as follows: CS Petrich in February 2021, CS Ihtiman in November 2021 and CS Lozenets in November 2021

Rehabilitation (replacement) of sections of the Northern semi-ring of the gas transmission network of 81 km in total is continuing. In January 2022, the section PF Beglesh – VA Dermantsi – VA Batultsi – VA Kalugerovo (58 км) was commissioned. The works for the section PF Valchi dol to linear valve assembly Preselka (23 km) are ongoing.

The rehabilitation of the sections (procurement, works and commissioning) is implemented with co-financing under the Connecting Europe Facility (CEF) in the tune of close to EUR 27 million and is expected to end by mid-2022.

Detailed information on the individual sites of Phase 2 is given in items 5.4.1.1. and 5.4.1.2. below.

Decisions on the realisation of the activities from Phase 3 are to be made concerning the final completion of all phases of PCI 6.8.2. Phase 3 includes a conditional infrastructure linked with the future decisions regarding the Interconnection Bulgaria-Serbia on Bulgarian territory project (IBS) and relates to the increase in capacity of the interconnector from 1,8 to 2,4 bcm/y. The conditional infrastructure includes a new gas pipeline Gorni Bogorov – Novi Iskar with an approximate length of 19 km, DN 700 and CS Bogorov – 20 MW.

#### **5.4.1.1. Replacement of gas pipeline section “PF Beglej – VA Dermantsi – VA Batultsi – VA Kalugerovo” (Part of Phase 2 of PCI 6.8.2)**

The replacement of the gas pipeline section “PF Beglej – VA Dermantsi – VA Batultsi – VA Kalugerovo”, of 58 km length and diameter DN 700, commissioned in two stages in 1973 and 1975 relates to features found as a result of in-line inspections and a limitation imposed within the maximum allowable operating pressure of 44 bar compared to the design pressure of 54 bar. The realisation of the project will guarantee the reliability of the operation and ensure the natural gas transport capacity.

In April 2016, a public procurement for the selection of a contractor for the design activities has been announced. On 14.10.2016, a contract was concluded with subject: Preparatory works related to the rehabilitation (reinforcement) of the Northern semi-ring of the gas transmission network including pre-investment studies and an investment study for building site: „Replacement of a transmission (main) gas pipeline in the section PF Beglej - VS Dermantsi - VS Batultsi - VS Kalugerovo”.

The scope of the contract includes carrying out of an environmental impact assessment (option) in case the competent authority requires it. According to Decision No 3-PR/2017 of 10.10.2017 of the Minister of Environment and Water, an EIA should be carried out for the site.

EIA Report has been prepared and a Decision No. 3-3/2018 of the Minister of Environment a Water has been issued which approves the realisation of the investment intention. A Detailed Spatial Plan - Parcelling Plan and Investment design - Phase Detailed Design for the section have been developed and approved by the competent authorities according to the SDA.

All activities from the contractual subject-matter, except for the exercise of the designer’s supervision during construction, have been completed in 2020. The exercise of the designer's supervision during the construction works came to an end in 2021. As a result, five building permits have been issued, as follows: for Stage 3 – gas transmission pipeline

from VA Batultsi to VA Kalugerovo – pipeline network part; for Stage 2 – gas transmission pipeline from VA Dermantsi to VA Batultsi; for Stage 4 – PF Beglezh; for Stage 1 – gas transmission pipeline from PF Beglezh to VA Dermantsi and for Stage 3 – gas transmission pipeline from VA Batultsi to VA Kalugerovo – valve assemblies.

In 2018, a procedure under the PPA was held and a contract for the construction of a gas transmission pipeline in the section VA Batultsi - VA Kalugerovo was signed. The works for the pipeline network part and the valve assemblies was terminated and a permit to use was issued No.CT-05-35/20.01.2021 by Directorate for National Construction Supervision (DNCS). In the beginning of February, 2019, a procedure under PPA was announced for a Constructor for the section VA Beglezh- VA Batultsi and PF Beglezh. After the open public procurement procedure, a contract for the constructor of the section PF Beglezh - VA Batultsi and PF Beglezh was signed. The construction of Stage 2 has been completed and a Permit to use No. CT-05-693/14.09.2021 has been issued. The implementation of Stages 1 and 4 has been completed and a Permit to use No. CT-05-21/14.01.2022 has been issued.

To comply with the legal requirements linked to the issuance of building permits and construction of the building sites, three contracts were signed: for the preparation of complex reports on the assessment of the compliance of the investments designs with the material requirements towards building sites for each stage; for the exercise of construction supervision during the works for the section VA Batultsi to VA Kalugerovo and for the exercise of construction supervision during construction for the section PF Beglezh to VA Batultsi and PF Beglezh. The activities under the three contracts have been completed.

#### **5.4.1.2. Replacement of gas pipeline section "PF Valchi dol – VA Preselka" (Part of Phase 2 of PCI 6.8.2)**

The section of the gas transmission pipeline PF Valchi dol – VA Preselka is part of the Northern semi-ring of the national gas transmission network (NGTN), commissioned in 1975. The section is of approximate length of 23,3 km, outside diameter DN700, built of steel pipes DN 711. The section is the first one downstream CS Valchi Dol on the Northern semi-ring of the NGTN and is subject to increased thermal load. Considering the established defects as a result of in-line inspections and in order to ensure the reliability of operation, the necessary capacity for natural gas transmission and the long-term integrity of the section, it is necessary to replace it.

In May 2017 a public procurement for selection of a Contractor for the design activities was announced. On 15.12.2017, a contract was concluded with subject: "Study and investment design for construction site "Replacement of a transmission (main) gas pipeline in the section PF Valchi Dol - VA Preselka" to a Project of common interest 6.8.2". The activities of the contract subject-matter, except for the exercise of the designer's supervision during construction, have been completed. As a result of contract implementation, a Detailed Spatial Plan - Parcelling plan (DSP-PP) was prepared for the section, approved by an order of the Deputy Minister of Regional Development and Public Works, and an investment design, phase detailed design, agreed by all interested parties. In February 2021 the investment design was filed in the Ministry of Regional Development and Public Works for approval and a building permit was issued.

In December 2019, a procedure was announced under the Public Procurement Act for the

selection of a contractor to perform the replacement of the section of the transmission pipeline from the Valchi dol gas pipeline to VA Preselka, as well as to develop an investment project for an optical cable network in the section. A contract with the contractor was signed on 05.06.2020. The replacement of the transmission gas pipeline started in March 2021 and is currently underway.

The investment design for the optic cable line was coordinated by all interested parties and was filed for approval and a building permit was issued by MRDPW. The construction of the optical cable line will be carried out after the construction of the gas pipeline at the location of the dismantled one. Two contracts were signed for a consultant under Article 66 of the SDA for the gas transmission pipeline and the optics. The consultancy contract for the replacement of the gas pipeline is implemented in accordance with the execution of the works. From the activities under the consultancy contract for the construction of the optical line the activity involving the development of a complex report on the conformity of the investment design has been carried out. The exercise of the construction supervision will be carried out with the construction of the optics.

#### **5.4.2. Construction of pigging facilities (launch and receive traps) for gas pipeline branches Devnya, Burgas, Dimitrovgrad and Pernik**

Currently there are no pigging facilities installed on these branches. The construction of launch and receiving traps will enable regular cleaning and in-line inspections to track the actual operating state of the transmission gas pipelines without any need of gas flow interruption and the maintenance of the design pressure as well.

A public competition procedure under the Public Procurement Act (PPA) was held in 2018, entitled Design, Construction and Commissioning of building site Launch and Receiving Traps at Gas Pipeline Branch Burgas based on which a contract was signed, currently underway. An investment design has been prepared for the building site, Phase Working design, approved by Bulgartransgaz EAD and coordinated accordingly with the operating companies, the other interested parties and the Consultant under Article 166 of SDA. A building permit has been issued, a building site has been opened and the construction and installation works have started. All CIW on the launch chamber construction in Lozarevo village, Sungulare Municipality have been completed. In order to complete the construction works of the receiving chamber in the town of Kameno, Kameno Municipality, the lightning protection of the facility and, accordingly, laying the crushed stone pavement on its site are to be implemented. Strength and tightness tests have been carried out at the site and, accordingly, the tapping activities of a launching and receiving chambers at Burgas Gas Pipeline Branch have been executed. Expected site completion date: March 2022.

In 2019 a public procurement procedure was held, entitled: Study, design, delivery (excluding the delivery obligation of the Employer) construction and commissioning of building site: Launch and Receiving Traps at Gas Pipeline Branch Dimitrovgrad. In the beginning of 2020, a contractor was selected and the contract was signed. An investment design has been prepared for the building site, Phase Detailed design, approved by Bulgartransgaz EAD and coordinated accordingly with the operating companies, the other interested parties and the Consultant under Article 166 of SDA. Building permits for the launch and respective the receive trap have been issued. It was necessary to revise the

detailed designs under Article 154 of SDA for both chambers and the revisions were submitted in Stara Zagora Municipality and Dimitrovgrad Municipality on 15.09.2021 and issued by the Chief Architect of Stara Zagora Municipality - Order No 19-24-90/26.10.2021 for supplementing the Building Permit No 19-512/12.10.2020, entered into force on 16.11.2021, and by the Chief Architect of Dimitrovgrad Municipality - Order No 109/12.10.2021 for supplementing the Building Permit No 95/04.09.2020, entered into force on 27.10.2021.

Following public procurement procedures contractors have been selected and contracts signed the exercise of consultancy activity under Art. 166, para. 1 of the Spatial Development Act (SPA) for both sites.

#### **5.4.3. Reconstruction of a gas pipeline branch Vratsa 1 including replacement of sections and construction of a receiving chamber at Chiren UGS by replacement of the existing chamber at GRS Vratsa.**

The reconstruction is meant to increase the natural gas transport reliability in the national gas transmission network. Equalizing the diameter of the entire gas pipeline section "Gas Pipeline Branch (GPB) Vratsa-1" (from pigging facility (PF) Batultsi-1 to Chiren UGS) is envisaged and a new receiving chamber at Chiren UGS is to be build and thus conditions will be provided to perform pigging activities and in-line inspections. The receiving chamber will be dismantled from the existing receiving PF (GMS Vratsa – new) and set on new terrain designed for receiving PF located at the place prior to the connection of GB Vratsa-1 with Chiren UGS. A valve assembly is envisaged to be built near to linear valve No 4. The new LV shall divide section LV Tsarevets to Chiren UGS into two shorter sections thus facilitating the pigging activities. A contract for spatial planning, investment design, construction and commissioning of the building site which is in process of implementation, was signed in 2018. A detailed design has been prepared, which has been agreed with all stakeholders and control bodies and the dismantling and construction and installation works are in the process of implementation.

#### **5.4.4. Overhauls of gas turbine engines and scheduled maintenance and GTCUs inspections**

All Gas turbine engines (GTE) have the so-called **resource in-between repair works** in working hours (resource until inspection) and **general technical resource** in working hours which are in line with the respective operational documents and the aim is to ensure the operational reliability, safety, efficiency and preservation of the operational parameters of the GTE.

Following expiry of the resource in-between repair works or in case of failure of the equipment during operation, an overhaul shall be carried out to recover the mechanical, environmental and gas dynamic parameters, as well as to ensure its safe and reliable operation in the future (following the overhaul) working hours until reaching the general technical resource.

#### **5.4.5. Reducing the vibrations in the pipeline tie-in of gas motor compressors (GMC) and technological line from GMC to Second sand damper in Chiren UGS**

The realization of the construction "Reducing the vibrations in the pipeline tie-in of GMC and technological line from GMC to Second sand damper in UGS Chiren" aims to reduce the vibrations in the technological equipment of Chiren UGS within limits lower than 10 mm/s by construction and installation works and repairs and removing the deviations from the documents registered in the operation of the injection pipelines in Chiren UGS. An investment design, working design phase, has been prepared for the project, and a building permit has been issued. A public procurement for the selection of a contractor for the construction and installation works for the site has been indicated and a contract has been signed. A contract for the designer's supervision during the works for the site has been signed as well.

A public procurement was held and a contract signed for the award of the consultancy activity under Article 166, para 1 of the SDA.

All contracts i.e. for construction, designer's supervision and consultant services are being implemented.

#### **5.4.6. Repair of Pigging Facility Stryama**

PF Stryama is a technological facility to a Gas Pipeline DN1000, securing the in-line devices receipt and launch whose aim is pipeline cleaning and in-line inspection. PF's repair work is required in connection with the facility accident in 2011.

In 2018, a public procurement was carried out in order to select a contractor to repair the PF based on a prepared investment design. The procurement was terminated and re-announced in 2019, as a result it has been awarded in February 2020. A contractor was selected, and a contract signed, currently under implementation.

### **5.5 Construction of new sites to the existing infrastructure, required in order to increase the operational efficiency**

#### **5.5.1. Expansion of Chiren UGS capacity**

The project for Chiren UGS Expansion envisages:

- increase in the reservoir pressure of up to 150 bar (now 110 bar);
- increase in the active gas volume of up to 1.0 bcm (now 0.55 bcm);
- increase in the daily flowrate of up to 8-10 mcm/d (now max. 3.8 mcm/d, 4.7 mcm/d in forced mode for a short period).

To achieve the objectives of the expansion, work will be focused on three aspects:

1. Design and construction of new surface equipment – a compressor station with all of the auxiliary equipment to ensure the reliable and continuous operation in the regime of injection and withdrawal of gas and a new gas metering station (GMS).
2. Design and construction of underground facilities - ten new high flowrate exploitation and three observation wells and new gatherings connecting the exploitation wells to the compressor station.

3. Design and construction of a gas pipeline connecting Chiren UGS with the existing gas transmission network of Bulgartransgaz EAD.

#### **“Expansion of Chiren UGS capacity - above-ground part”**

In March 2021, a contract for the design of the above-ground equipment to expand Chiren capacity and their connection to the existing ones was signed.

An investment design has been prepared - a detailed design phase, which has been agreed by the Contracting Authority and is in process of coordination by the competent authorities and operating companies.

According to the approved design decision, the site of Chiren UGS is envisaged to be located in the lands of Chiren village, Vratsa Municipality, Vratsa District, on agricultural territory and in October 2021 a field archaeological search was carried out.

In June 2021, a public procurement was announced for consultancy activity under Article 166, para 1 of SDA.

In March 2022, a public procurement on the supply of the necessary materials and equipment, construction and commissioning of construction site: Expansion of Chiren UGS capacity - above-ground part

#### **Expansion of Chiren UGS capacity - Wells**

As part of the activities that will be assigned, wells will be built, including ten new high flowrate exploitation and three observation wells, as well as new gatherings connecting the exploitation wells with the compressor station and other adjacent facilities.

The construction of the facilities will create a technical opportunity for gradual expansion of UGS Chiren, and will improve its operational safety and will increase its capacity.

In March 2022, a public procurement for the “Spatial planning, investment design, procurement of the necessary materials and equipment, construction and commissioning of the construction site: Expansion of Chiren UGS capacity - Wells

#### **Expansion of Chiren UGS capacity - Gas pipeline connecting Chiren UGS to the existing gas transmission network of Bulgartransgaz EAD in the area of Butan village**

The gas pipeline construction from the existing gas transmission network of Bulgartransgaz EAD to Chiren UGS is directly related to the possibilities for storage capacity expansion of the storage facility itself, thus increasing the safety of operation and security of natural gas transmission to and from Chiren UGS and creating conditions for repair activities to be carried out on the gas transmission network without interruption of the transmission to and from the gas storage.

The capacity of the storage facility will be increased from a commercial point of view, which will contribute to greater security and flexibility in terms of the natural gas trade, the injection and withdrawal processes as well as the integration of the underground storage facility in the gas transmission system in Bulgaria and the region. A possibility to supply

natural gas to adjacent regions will be secured, thereby allowing the replacement of the currently used solid fuels, thereby contributing to the reduction of harmful emissions.

A public procurement was announced in March 2022 for Spatial planning and elaboration of investment design - technical design, phase for site: Gas pipeline connecting Chiren UGS to the existing gas transmission network of Bulgartransgaz in the area of Butan village, in order to obtain a Building Permit.

**DEVELOPMENT OF THE CAPACITY OF BULGARTRANGAZ EAD****GAS INFRASTRUCTURE IN THE PERIOD 2022-2026**

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This section of the Ten-Year Network Development Plan aims at displaying the development of capacity of the gas infrastructure owned by Bulgartransgaz EAD as a result of the realization of the infrastructure projects and the modernization and rehabilitation of the existing infrastructure and facilities.

The activities of the Company planned for the period 2022-2026 will provide the necessary infrastructure enabling gas flows reception for further transport from and to different regions. Bulgartransgaz EAD provides the necessary cross-border capacity that enables bidirectional transmission of natural gas through the networks. The actual utilization of that capacity and the particular directions of flows will depend on the gas market development in Europe and in the country.

**Estimated capacities for the period 2022 -2026**

As of 1 January, MWh/d	2022	2023	2024	2025	2026
<b>Gas transmission network (GTN)</b>					
<b>Entry capacity</b>	<b>1 393 560</b>	<b>1 458 816</b>	<b>1 466 146</b>	<b>1 473 479</b>	<b>1 480 813</b>
IP Strandzha 2/Malkoclar	572 044	572 044	572 044	572 044	572 044
IP Negru voda 1	215 015	215 015	215 015	215 015	215 015
Interconnection Ruse/Giurgiu (IBR)	45 339	45 339	45 339	45 339	45 339
Interconnection Greece-Bulgaria (IGB)**	95 344	95 344	95 344	95 344	95 344
Interconnection Bulgaria - Serbia (IBS)*	0	57 918	57 918	57 918	57 918
GMS Chiren	40 022	47 360	54 690	62 023	69 357
Local Production	26 002	26 002	26 002	26 002	26 002
IP Kulata/Sidirokastro**	64 530	64 530	64 530	64 530	64 530
IP Kireevo/Zaycar	335 264	335 264	335 264	335 264	335 264
<b>Exit capacity</b>	<b>1 064 099</b>	<b>1 144 196</b>	<b>1 151 526</b>	<b>1 190 569</b>	<b>1 191 707</b>
IP Negru voda 1/Kardam	155 727	155 727	155 727	155 727	155 727
Exit zone Bulgaria	279 675	292 410	292 410	324 120	317 924
Interconnection Ruse/Giurgiu (IBR)	26 832	26 832	26 832	26 832	26 832
Interconnection Greece-Bulgaria (IGB)**	21 174	21 174	21 174	21 174	21 174
Interconnection Bulgaria - Serbia (IBS)**	0	57 918	57 918	57 918	57 918
IP Kulata/Sidirokastro	117 265	117 265	117 265	117 265	117 265
Kyustendil/Zhidilovo	27 384	27 384	27 384	27 384	27 384
IP Kireevo/Zaycar	398 126	398 126	398 126	398 126	398 126
GMS Chiren	37 916	47 360	54 690	62 023	69 357

\* Physical and/or commercial reverse flow capacity.

\*\* These capacities at entry and exit point are design ones and may change after being commissioned.

\*\*\* A possible capacity increase may take place after beyond 2023 in connection with the realisation by DESFA S.A. Of projects for CS Kipi and CS Ambelia.

## CONCLUSION

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Bulgartransgaz EAD is a company, operating in dynamically changing environment. The Company efficiently develops the infrastructure for transmission and storage of natural gas in Bulgaria in line with the national, regional and European priorities, goals and strategies to achieve security, stability, diversification, market integration, competition and liberalisation. Natural gas is at the heart of the policy of the European Union to cut greenhouse emissions by 2030. Gas infrastructure will play a key role as well for the decarbonisation and achieving carbon neutrality by 2050.

The priority activities in the development of Bulgartransgaz EAD infrastructure in the period 2022 – 2031 are the following:

- Maintenance of a technically good working, reliable and efficient main and auxiliary gas infrastructure;
- Modernization, rehabilitation and expansion of the existing gas transmission networks and equipment;
- Development of the interconnectivity;
- Expansion of the natural gas storage capacity.

During the period 2022 – 2031 the construction and commissioning of new gas interconnections with the neighbouring countries are scheduled as well as the commissioning of the LNG terminal near Alexandroupolis. Upon implementation of the Company's plans, the Bulgarian gas infrastructure will connect the common European natural gas market with the markets in the Caspian region, Central Asia, the Middle East, the Eastern Mediterranean basin. As a result, the natural gas supplies to the country and the region will be ensured, creating real conditions for diversification of the sources and routes of natural gas supply to and through Bulgaria.

Directly related to the intentions for development of the gas infrastructure in the region are also the plans for expansion of the existing gas storage facility Chiren and the modernization and rehabilitation of Bulgartransgaz EAD gas transmission network. The implementation of all these projects is interrelated and aims at contributing to the efficiency and development of the common European gas network.

The priority of Bulgartransgaz EAD investment activity is the construction of new gas pipeline branches in order to create conditions for acceleration of the country gasification with the relevant economic, social, environmental and other benefits for local communities. Projects for the construction of an infrastructure for the transport of hydrogen and low-carbon gaseous fuels are envisaged as well.

The expected outcome from the implementation of this TYNDP is the significant increase in the quality and volume of the services offered by Bulgartransgaz EAD related to natural gas transport and storage which is in direct connection with the transformation of Bulgaria into a significant regional gas hub - a hub where technical capabilities shall be created for entry and exit of natural gas flows coming from various sources and along new routes.

The TYNDP implementation will strengthen the successful business model of Company, and in a national and regional aspect, the gas operator will continue to ensure the reliable natural



gas transmission and storage both to the public and the industry, applying the best business practices.

## SOURCES USED

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- EU Hydrogen Strategy
- Energy Systems Integration Strategy
- Ministry of Energy of the Republic of Bulgaria ([www.me.government.bg](http://www.me.government.bg))
- Energy and Water Regulatory Commission ([www.dker.bg](http://www.dker.bg))
- National Statistical Institute - GDP, PEC, EEC and other data ([www.nsi.bg](http://www.nsi.bg))
- Data on natural gas consumption, Eurostat, ([www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu))
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- A list of Projects of Common Interest, website of the European Commission, Directorate-General Energy, ([www.ec.europa.eu](http://www.ec.europa.eu))
- Reports on the State of the Energy Union - (<https://ec.europa.eu>)
- Public information related to the development of the gas market in the region, published on the following web pages:
  - Bulgargaz ([www.bulgargaz.bg](http://www.bulgargaz.bg))
  - Bulgartransgaz EAD ([www.bulgartransgaz.bg](http://www.bulgartransgaz.bg))
  - Bulgarian Energy Holding EAD ([www.bgenh.com](http://www.bgenh.com))
  - Balkan Gas Hub ([www.balkangashub.bg](http://www.balkangashub.bg))
  - IGI Poseidon ([www.igi-poseidon.com](http://www.igi-poseidon.com))
  - DESFA S.A. ([www.desfa.gr](http://www.desfa.gr))
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  - TAP ([www.trans-adriatic-pipeline.com](http://www.trans-adriatic-pipeline.com))
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## BULGARTRANSGAZ

- ANRE - National Energy Regulatory Authority ([www.anre.ro](http://www.anre.ro))
- Transgaz S.A. ([www.transgaz.ro](http://www.transgaz.ro))
- Romgaz ([www.romgaz.ro](http://www.romgaz.ro))
- CEPA - ([www.cepa.org](http://www.cepa.org))
- BOTAS ([www.botas.gov.tr](http://www.botas.gov.tr))
- AIIB – Turkey Gas Storage Expansion Project 2018
- ETKILIMAN – ([www.etkiliman.com.tr](http://www.etkiliman.com.tr))
- ENTSOG ([www.entsog.eu](http://www.entsog.eu))
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- Bulgartransgaz EAD 2022-2026 Business Program, approved by decision under Protocol No. 580/30.12.2021 of Bulgartransgaz EAD Management Board and decision under Protocol No. 59/30.12.2021 of Bulgartransgaz EAD Supervisory Board
- Regional Investment Plan 2019 Central and Eastern Europe ([www.entsog.eu](http://www.entsog.eu))
- Regional Investment Plan 2017-2026 South Corridor ([www.entsog.eu](http://www.entsog.eu))
- 2020 ENTSOG Ten-Year Network Development Plan ([www.entsog.eu](http://www.entsog.eu))
- GIE – Gas Infrastructure Europe
- IEA - International Energy Agency – Report 2020 ([www.iea.org](http://www.iea.org))
- EIA – U.S Energy Information Administration ([www.eia.gov](http://www.eia.gov))
- IENE – Institute of Energy for South–East Europe ([www.iene.eu](http://www.iene.eu))
- BP Statistical Review of World Energy 2020 ([www.bp.com](http://www.bp.com))
- Ministry of Energy and Natural Resources – Republic of Turkey ([www.enerji.gov.tr](http://www.enerji.gov.tr))
- IICEC – Istanbul International Centre for Energy and Climate
- NER JSC Skopje - Macedonian Energy Resources Skopje ([www.mer.com.mk](http://www.mer.com.mk))
- Consilium Europa – ([www.consilium.europa.eu](http://www.consilium.europa.eu))
- Platts ([www.platts.com](http://www.platts.com))
- CESEC Plenary and Working Group
- Information from other corporate documents and correspondence with stakeholders

## ANNEX 1

**Key projects for new gas pipelines, reconstruction of existing gas pipelines and compressor stations and for storage capacity increase on the territory of the country and their connection to the existing gas transmission network**

No.	Project	Final Investment Decision (FID)	Deadline for completion	Contractor	Expected value of the investment (excluding VAT)	Financing	Infrastructure	Capacity
<b>I. Projects contributing to implementation of the Balkan Gas Hub concept</b>								
1	Interconnection Bulgaria-Serbia (IBS)	yes	2023	Bulgartransgaz EAD	~ 81 million €	own and attracted external funding	A total of 170 km; ~ 62 km of which on Bulgarian territory	1.8 bcm/y with a reverse flow option
2	Interconnection Greece-Bulgaria (IGB)	yes	2022	ICGB AD	~ 51 thousand € <sup>1</sup>	Bulgartransgaz EAD own funding for connection to the existing network	A total of 182 km, 151 km of which on Bulgarian territory	3 bcm/y - I stage 5 bcm/y - II stage
3	Rehabilitation, modernization and expansion of the Bulgarian gas transmission system - Phase 2	yes	2022	Bulgartransgaz EAD	~ 340 million €	own and attracted external funding	section replacement - ~ 81 km; modernization of 3 CS - 4 GTCUs;	Total incremental capacity following project implementation - ~ 3 bcm/y
4	Capacity increase of Chiren UGS	no	2024	Bulgartransgaz EAD	~ 308 million €	own and attracted external funding	Above-ground facilities (CS, GMS, etc.); Gas pipeline ~ 45 km; Wells	Increase of the working gas volume up to 1 bcm and increase of the withdrawal and injection capability up to 8-10 mcm/d
5	LNG terminal near Alexandroupolis	yes	2024	Gastrade S.A.	~ 29.6 million € <sup>2</sup>	own and attracted external funding	Floating unit (Floating, storage and regasification units - FSRU) for reception, storage and regasification of LNG	Design capacity for regasification and supply - 5.5 bcm/y; Storage capacity - 170 thousand m <sup>3</sup>

## Notes:

<sup>1</sup> Estimated total value of the project developed by a third party - ICGB AD. The value includes the costs for connection to Bulgartransgaz EAD network.

<sup>2</sup> Bulgartransgaz EAD participates with 20% of the share capital of the project company. The value includes acquisition of a shareholding in the amount of 20% of the capital of the project company Gastrade, 20% of the costs incurred for project development until making FID and additional investment costs. Up-to-date information about the project is available on Gastrade S.A. website.

# GAS INFRASTRUCTURE OF THE REPUBLIC OF BULGARIA



**LEGEND**

**GAS TRANSMISSION NETWORK**

- Gas transmission network of Bulgartransgaz
- Gas pipeline branch
- National gas transmission network branches of third parties
- Gas gathering system
- Planned gas pipelines
- Gas transmission networks of other operators
- Gas transmission networks of other operators - planned
- - IBS Interconnection Bulgaria - Serbia
- - IGB Interconnection Greece - Bulgaria
- Region
- CS - Compressor station
- ◆ Gas storage facility
- ◇ Gas storage facility - planned
- Valve group
- AGRS/ GRS/ GMS: Automatic gas regulation station/ Gas regulation station/ Gas metering station
- ▶ Pigging Facilities
- Interconnection point
- Interconnection point - third parties
- Liquefied natural gas terminal
- Interconnection point - planned
- Liquefied natural gas terminal - planned