conexus
BALTIC GRID

Natural gas transmission system operator

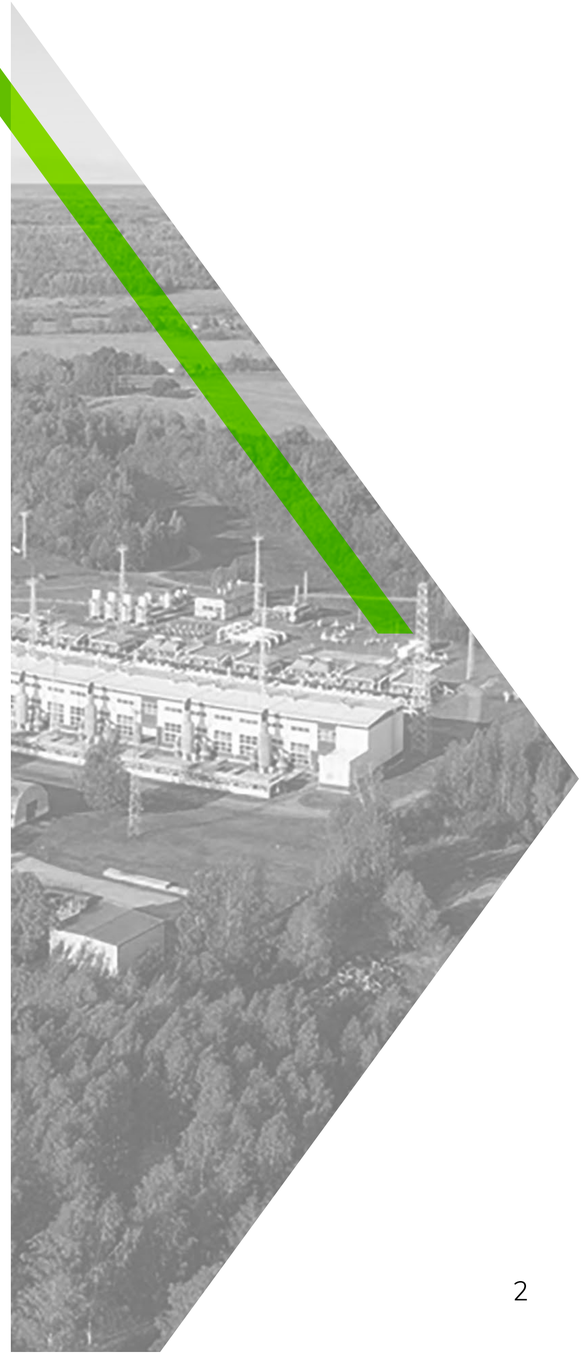
ANNUAL ASSESSMENT REPORT FOR THE YEAR OF 2022

Riga 2023

CONTENTS

ABBREVIATIONS

RES	Renewable energy source
AST	JSC Augstsprieguma tīkls
CEF	Connecting Europe Facility
CINEA	European Climate, Infrastructure and Environment Executive Agency
Conexus or the Company	JSC Conexus Baltic Grid
CO_2	Carbon dioxide
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSOG	European Network of Transmission System Operators for Gas
GIPL	The gas interconnection between Poland and Lithuania
Inčukalns UGSF	Inčukalns underground gas storage facility
PCI	Project of Common Interest
NECP	National energy and climate plan
NOx	Nitrogen oxides
TSO	Transmission system operator
LNG	Liquefied natural gas
GHG	Greenhouse gases
PUC	The Public Utilities Commission
TYNDP	Ten-Year Network Development Plan
Cabinet Regulation No. 312	Cabinet of Ministers Regulation No. 312 of 19 April 2011 "Procedure for the Supply of Energy Users and Sale of Heating Fuel During a Declared Energy Crisis and in the Event of a Thread to the State"
Cabinet Regulation No. 503	Cabinet of Ministers Regulation No. 503 of 9 August 2022 "Regulations Regarding Supply of Energy Users When the Early Warning and Alert Levels are Declared"
NC CAM	Network Code for the Capacity Allocation Mechanism



GENERAL INFORMATION

Pursuant to Article 43[1] (2) of the Energy Law, the natural gas transmission system operator is required to prepare an annual assessment report on the adequacy of supply and consumption and the security of supply of natural gas in the country (hereinafter referred to as the "Annual Assessment Report"). The Evaluation Report for the year of 2022 has been prepared in accordance with the requirements of the Cabinet Regulation No. 482 of 20 June 2006 "Regulations Regarding the Annual Assessment Report of a Natural Gas Transmission System Operator". In accordance with Paragraph 5 of this Regulation, the transmission system operator shall prepare and submit the Annual Assessment report to the Ministry of the Economy and the PUC by 1st June each year.

Conexus Baltic Grid JSC (hereinafter referred to as "Conexus") is an independent unified natural gas transmission and storage system operator in Latvia, managing one of the most modern natural gas storage facilities in Europe – Inčukalns UGSF and a trunk natural gas transmission system connecting the Latvian natural gas market with Lithuania and Estonia.

Conexus customers – users of the natural gas transmission and storage system – represent several countries in the Baltic Sea region – Finland, Estonia, Latvia, Lithuania, and Poland, as well as other European countries – Norway, Czech Republic, Denmark, Austria, Germany and Switzerland. Users range from private domestic companies to state-owned and multinational companies representing different business sectors – natural gas wholesale and retail, energy producers, heating operators and manufacturing companies.

Conexus' natural gas transmission and storage services are regulated by the PUC.

Conexus is committed to infrastructure sustainability and safety, security of natural gas supply and high quality of service, which contribute to market development and provide economic value to customers and society as a whole.

Conexus is a socially responsible company that, by adding economic value, ensures the overall development of the industry, the growth of its employees, sustainable employment, while at the same time ensuring that its technological processes have a minimum impact on the environment.

Conexus' values, mission and vision set the moral compass for the Company's strategic objectives, which will be achieved through strategic initiatives.

WHY DO WE EXIST?

Mission

Ensure reliable operation of gas transmission and storage through promotion of energy sector decarbonization and market development.

WHO DO WE WANT TO BE?

Vision

Sustainable gas transmission and storage operator in a regionally integrated energy market.

WHAT IS IMPORTANT TO US?

Values

Safety and security

It is important for us that gas transmission and storage are safe and reliable.

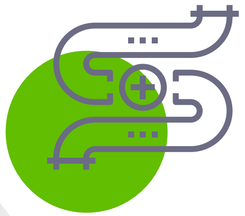
Competence

We value the competence, knowledge, professional experience and development of our employees.

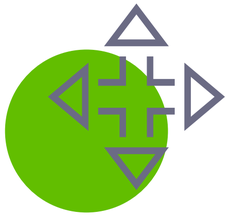
Cooperation

We support each other in our decision-making, we listen and we look for common solutions internally and with our customers, existing and potential partners.

Conexus has identified three strategic objectives for the strategic planning period:

MARKET DEVELOPMENT 	**Promote development and further integration of gas market, including promotion for growth of biomethane, hydrogen and other gaseous energy carriers' markets**	• **Facilitate regional market integration** • **Promote cooperation with other regional transmission system operators (TSOs)** in developing a common position for the integration of biogas and hydrogen into transmission networks, **supporting the injection of biomethane into the transmission system** • **Further development of Inčukalns UGSF services,** providing greater flexibility, including the possibility of compression withdrawal
INFRASTRUCTURE SAFETY AND SECURITY OF SUPPLY 	**Ensure available and secure gas transmission and storage infrastructure, at the same time researching and promoting adaptation options for injection of other gaseous energy carriers**	• **Introduce projects of common interest** • **Undertake research and development projects** to identify the technical feasibility and investment required to adapt existing infrastructure to the use of natural gas/hydrogen mixtures or pure hydrogen, including the construction of infrastructure dedicated to hydrogen • Asset management fit for the challenges of the future
SUSTAINABILITY 	**Focus on climate and environmental sustainability aspects**	With a focus on sustainability, Conexus will focus on environmental aspects: • **E** – regional market integration promoting the development of renewable gases, secure transmission and storage infrastructure, focusing on reducing NOX and GHG (greenhouse gas) emissions • **S** – safety-oriented culture, professional and development-oriented team • **G** – compliance with the Latvian Corporate Governance Code

The strategic objectives are set in line with Conexus' values, vision and mission. In addition to the strategic objectives, Conexus has set horizontal objectives that are closely linked to all planned medium-term activities. The horizontal objectives complement and contribute to the strategic objectives.

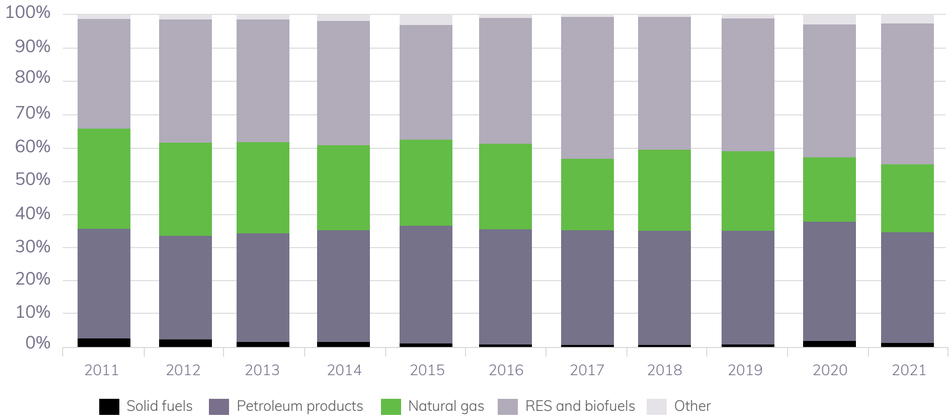
	**Focus on organisational development and efficiency**	Conexus will facilitate access to finance and increase operational efficiency
	**Digitalisation and cybersecurity**	Conexus will continue digitisation projects focusing on operational technologies, physical security, fire safety and cyber security
	**Professional and development-oriented team**	Conexus values a professional team, so the Company will create a programme to enable employees to develop their skills through an individual development plan. The acquisition of new competences to adapt to renewable gas technologies will be promoted, as well as the transfer of knowledge and skills from long-standing employees to new employees. To foster the professional development of the team, Conexus will establish a competitive and flexible remuneration system

1. KEY INDICATORS IN 2022

2. NATURAL GAS DEMAND IN LATVIA IN 2022

Latvia has a balanced energy mix, with natural gas playing a significant role. Most of the demand is from natural gas users who consume natural gas to generate electricity or heat, so natural gas consumption is closely linked to air temperature fluctuations, natural gas prices on the market, and the competitiveness of natural gas-generated electricity on the Baltic and Nordic electricity markets.

Figure 2.1 **Primary energy consumption in Latvia[1] (%), 2011 -2021**



[1]European Commission statistics. Available at: https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets_en#country-datasheets

In 2022, the volume of natural gas transported for the needs of Latvian users was 8.8 TWh, a 30% decrease compared to the year of 2021. The drop in consumption was due to both the high price of natural gas and the winter weather conditions, with the average air temperature dropping to -1.5 °C, 0.9 °C above the seasonal norm, while January and February temperatures were 2.1 °C and 3.5 °C above the monthly norm respectively[2]. At the same time, warm weather and high natural gas prices have significantly reduced the consumption of natural gas for electricity generation, with a 36.9% drop in electricity generation from thermal power plants in 2022[3] .

Figure 2.2 **Monthly volumes of natural gas delivered to the natural gas distribution system operator in Latvia (TWh)**

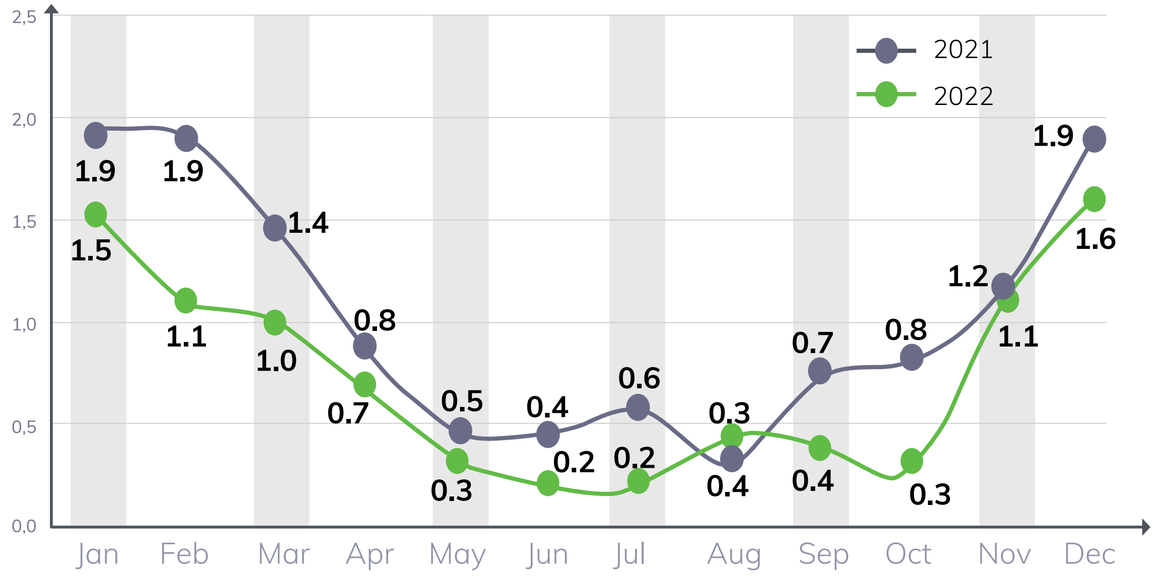
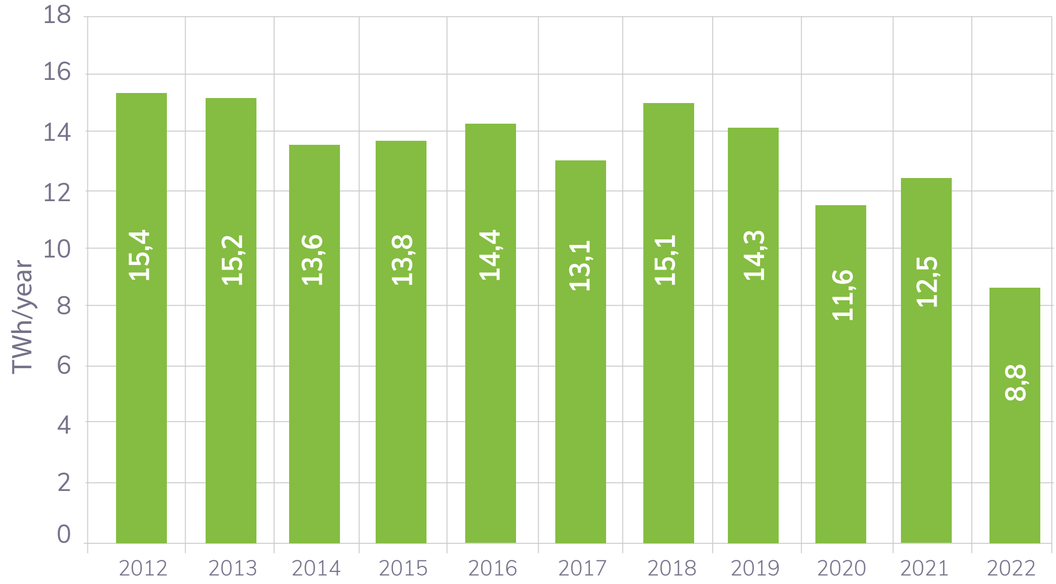
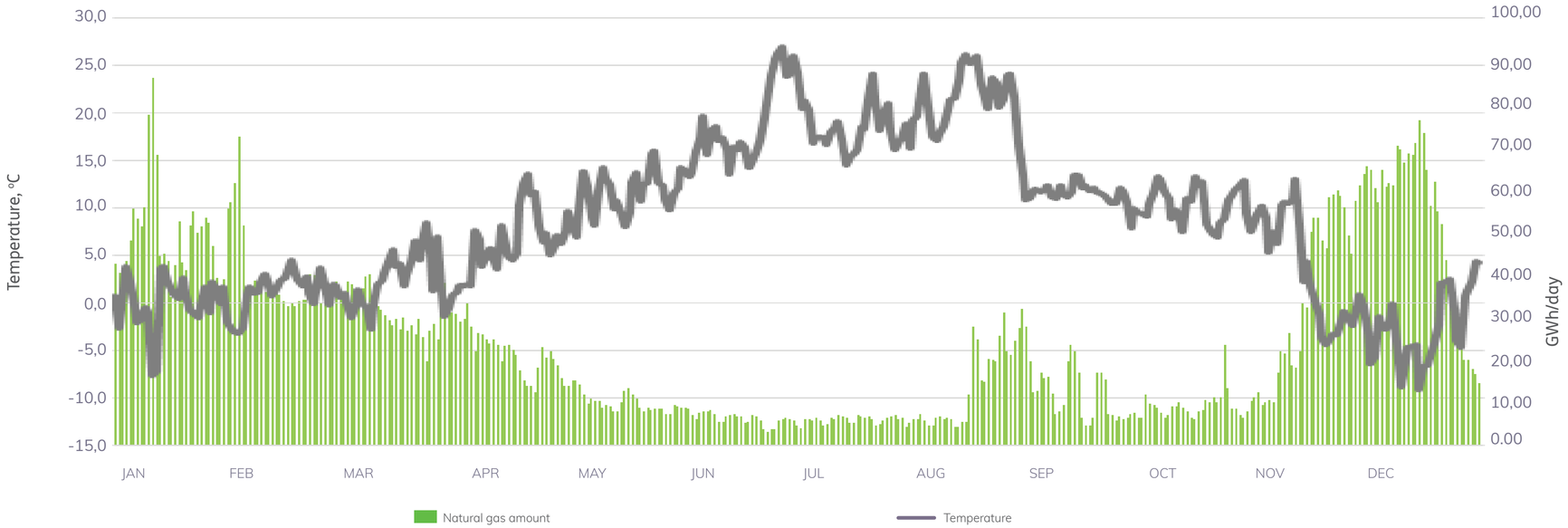


Figure 2.3 **Amount of natural gas transferred to the natural gas distribution system operator in Latvia (TWh)**



[2]Data from the Latvian Environment, Geology and Meteorology Center. Available at: https://klimats.meteo.lv/laika_apstaklu_raksturojums/2022/gads/
[3]AST data. Available at: https://ast.lv/lv/electricity-market-review?year=2022&month=13

Figure 2.4 **Natural gas delivered per day (GWh) and average daily temperature in Riga (°C) in the Latvian natural gas distribution system[4], 2022**



According to the Europe Joint Research Centre's 2016 study "Joint Risk Assessment of the gas system of Estonia, Finland, Latvia and Lithuania", Latvia's natural gas consumption can reach 136 GWh/day on a winter day. In the winter of 2022, the maximum daily consumption of natural gas in Latvia was 85.99 GWh, a decrease of 6.09 GWh/day or 7% compared to 2021, due to the high natural gas price during the period. The lowest average daily air temperature in Riga was recorded on 12 January, when it dropped below -12 °C. The minimum daily consumption of natural gas on 24 June 2022 was 3.27 GWh/day, which is significantly lower than the previous year.

Maximum and minimum daily consumption of natural gas in Latvia in the year of 2022

DATE	Consumption (GWh)	Air temperature (°C)
11 January	**85.99**	**-12.2**
10 January	77.27	-4.1
24 June	**3.27**	**+26.2**
25 June	3.61	+28.4

[4]Data from the Latvian Environment, Geology and Meteorology Center.
Available at: https://www.meteo.lv/meteorologija-datu-meklesana/

3. LATVIA'S 10-YEAR NATURAL GAS CONSUMPTION FORECAST

In April of 2022, ENTSOG and ENTSO-E published an updated joint gas and electricity scenario report – the TYNDP 2022 Scenario Report[5], which describes possible future energy scenarios for the European Union up to the year of 2050. All scenarios are designed with a climate-neutral future in mind and are designed to reduce GHG emissions, to reflect the interactions between gas and electricity systems and to provide an assessment of infrastructure from an integrated system perspective.

National Trends[6] is the central scenario of the report, which reflects the National Energy and Climate Plans of the Member States of the European Union. The plans have been submitted to the European Commission in accordance with the Regulation of the European Parliament and of the Council on governance in the field of energy union and climate action[7]. NECP 2030 is the key document for formulating long-term energy and climate policy, with the vision of a sustainable, competitive, and secure climate-neutral economy. In February of 2020, Latvia's NECP 2030 was approved[8], which includes around a hundred different policy measures, with twelve areas for action. The plan sets a minimum 50% increase in the share of RES, including at least 3.5% of advanced biofuels in the Latvian transport sector. These binding targets will have an impact on final energy consumption and will encourage the market penetration of RES gases. Biomethane has great potential for development in Latvia, both in terms of production and consumption. According to Latvia's NECP 2030 projection, total final energy consumption in 2030 will be about 11% lower than in 2018, while the share of electricity and natural gas in total final energy consumption will increase by more than 5% due to the substitution of oil products by gas in road transport. No significant changes are foreseen in the structure of primary energy types – natural gas and petroleum products will continue to occupy the most important place in the overall structure of Latvia's energy consumption.

In July of 2021, the European Commission launched the European Union's Green Transformation Plan, which includes the energy and climate package "Fit for 55"[9], which aims to achieve a 55% reduction in greenhouse gas emissions by the year of 2030 and climate neutrality by the year of 2050. In the year of 2021, the Ministry of the Economy announced the launch of an impact evaluation of the "Fit for 55" package. The review of Latvia's NECP started in the year of 2022, with the aim of submitting the updated Latvian NECP to the European Commission by June of 2023.

[5]ENTSOs website. Available at: https://2022.entsos-tyndp-scenarios.eu/
[6]from English – National Trends
[7]European Union website. Available at: https://eur-lex.europa.eu/legal-content/LV/TXT/?uri=CELEX:32018R1999
[8]Ministry of Economy website. Available at: https://www.em.gov.lv/lv/nekp-2020gada-redakcija
[9]European Commission website. Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541

As natural gas prices fall, the competitiveness of gas as an energy source improves and use remains economically viable. At a certain level of natural gas prices, large industrial producers are expected to return to natural gas as a fuel and resume operations.

At the time of writing, gas prices have returned to economic levels and natural gas is starting to regain its role as a primary fuel for district heating and industrial companies.

The above has implications for gas consumption, which could approach pre-2022 levels, but will remain on a steady but gentle downward trend in the longer term, mainly due to lower gas demand from CHP plants and the economy's shift towards renewable energy sources.

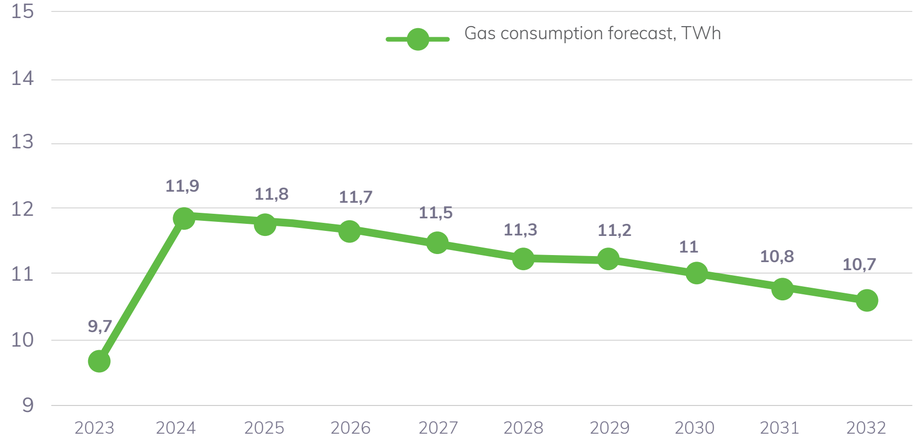
In the household segment, natural gas consumption is expected to be higher in the coming years compared to the year of 2022, but not to return to historical levels. This is due to households' energy efficiency measures and fuel switching or diversification, as well as substituted heating installations in a context of high natural gas prices. The price of energy will be one of the main factors in households' choice between energy sources.

In the Company's view, natural gas consumption in the power generation segment may increase in the next 10 years, based on the expected increase in national generation due to desynchronisation from the BRELL arc. The price of natural gas and meteorological conditions will continue to play an important role in the dynamics of natural gas demand as an energy source for electricity generation.

Assessing the available information in the futures financial instruments markets, gas prices on the European market are likely to decline and reach their historical level by the year of 2026.

Conexus expects natural gas demand to stabilise over a 10-year horizon, approaching but not reaching historical levels in the year of 2024, and gradually declining in the following years, in line with the long-term natural gas consumption projections included in Latvia's NECP.

Figure 3.1 **Gas consumption forecast for Latvia, TWh**

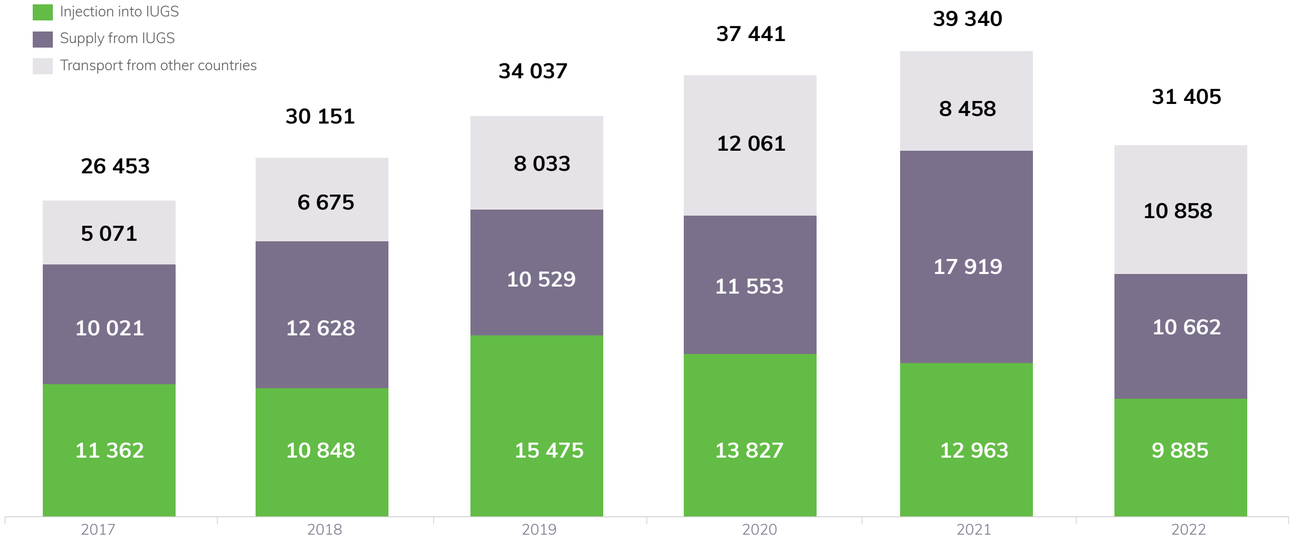


4. NATURAL GAS FLOWS IN 2022

4.1. Transmission system flow data

In the year of 2022, the total volume of natural gas transported was 31,405 GWh, which is 20% less than the volume transported in the year of 2021 (see Figure 4.1). The main reason for the significant drop in transported volumes is the increase in the price of natural gas due to the geopolitical situation, which has further contributed to the general decline in demand for natural gas as an energy source.

4.1. **Natural gas transmission in Latvia in 2017-2022 (GWh)**



In the reporting period of 2022, Inčukalna UGSF injected 9,886 GWh and withdrew 10,646 GWh of natural gas. In the year of 2022, the main natural gas supply route was from Lithuania via the Kiemenai interconnection, amounting to 15,311 GWh. 1,915 GWh of natural gas were delivered to Lithuania.

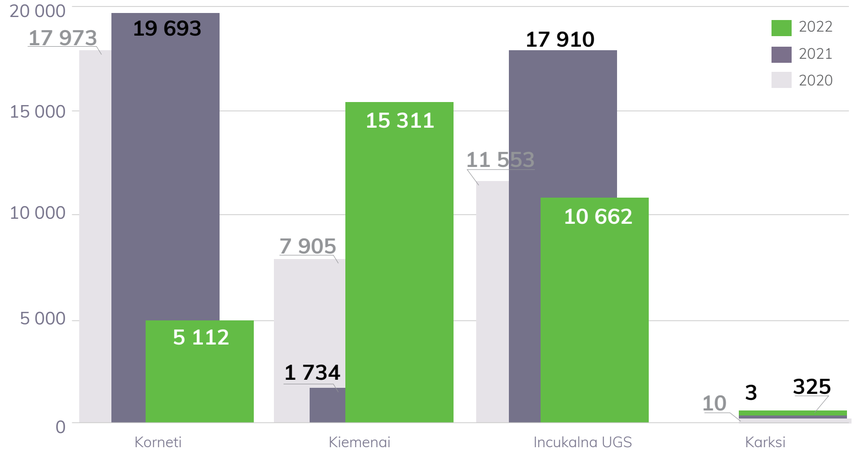
Given the general geopolitical situation, the volume of natural gas delivered from Russia via the Luhamaa entry and exit point decreased significantly during the reporting period and amounted to 5,112 GWh, while the volume of natural gas transported to Russia and Estonia via the Luhamaa entry and exit point amounted to 295 GWh. In the direction of Estonia and Finland, the amount of natural gas transported via GMS Karksi was 10,512 GWh. The amount of natural gas received via GMS Karksi towards Latvia is 325 GWh.

In contrast to previous periods, the period under review saw significant changes in the flexibility of the operating modes of the transmission and storage systems. Contrary to the seasonal operation of Inčukalns UGSF practiced in previous years, and taking into account the geopolitical situation in Europe and concerns about a possible shortage of natural gas reserves in the region, all necessary preparations had already been made to start injection of natural gas into the Inčukalns underground gas storage facility by 25 February 2022 during the withdrawal season. In the future, the possibility of both withdrawals and injections will continue to be offered during the winter of 2022–2023 withdrawal season.

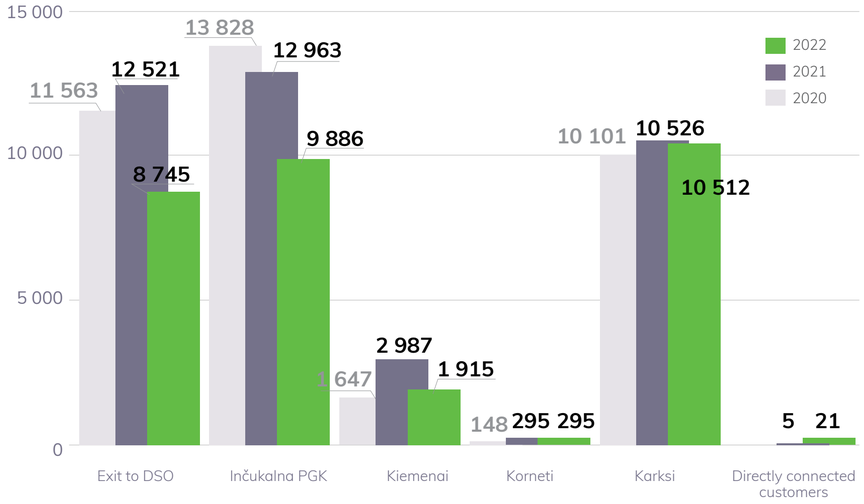
4.2. **Gas transported and gas delivered to DSO**

Year	Month	Gas transported quantity	Gas supplied to DSO quantity
		kWh	kWh
2022	JAN	4,932,487,971	1,532,249,282
	FEB	2,711,450,890	1,093,308,027
	MAR	3,235,732,259	986,033,238
	APR	1,760,458,179	668,373,572
	MAY	2,065,433,757	319,745,544
	JUN	2,114,907,959	192,250,954
	JUL	2,899,076,730	182,051,955
	AUG	1,707,761,513	428,074,240
	SEP	2,002,640,593	365,661,605
	OCT	2,232,509,803	286,652,435
	NOV	2,712,161,520	1,092,607,568
	DEC	3,029,935,336	1,597,669,339

4.3. **Natural gas injected into the transmission system in 2020, 2021, and 2022, GWh**



4.4. **Natural gas discharged from the transmission system in 2020, 2021, and 2022, GWh**



4.2. Balancing operations

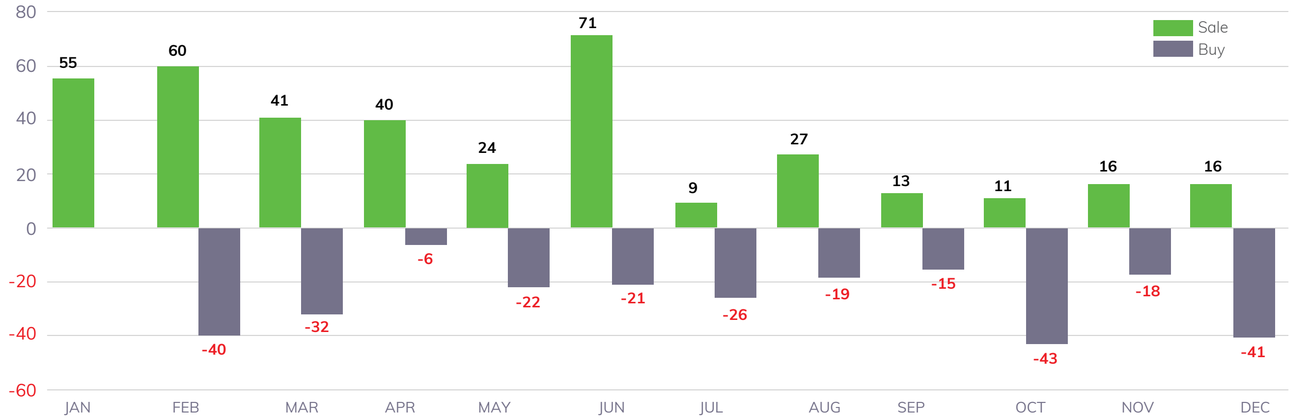
As a part of the Common Market Area balancing coordination, Conexus performs a daily calculation of system users' imbalances, if necessary also clearing accumulated system imbalances through balancing operations.

For the performance of balancing operations, the transmission system operators of the Estonia-Latvia balancing area have two balancing service agreements with balancing service providers. Balancing operations are primarily carried out on the GET Baltic trading platform, however, in cases where the trading platform does not have sufficient liquidity, or the bids are not economically rational, balancing service contracts are also used.

Offers of balancing services received under balancing service agreements are accumulated daily in a common balancing service register and ranked by system entry-exit point and by direction in order of economic merit.

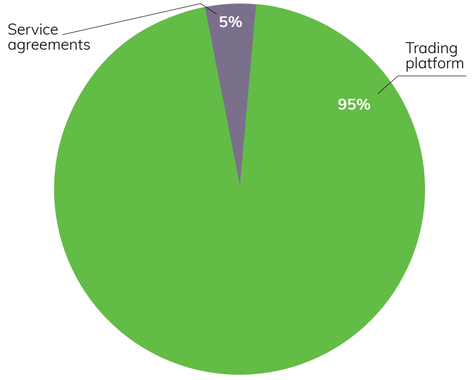
In 2022, the System Control Centre, in its role as the settlement and balancing coordinator for the Estonia-Latvia Common Balancing Area, performed a total of 526 balancing actions, by purchasing missing natural gas for the balancing area if the amount of imbalance created by users was negative, or by selling excess natural gas from the balancing area if the amount of imbalance created by users was positive. During the year, 341 balancing actions were carried out to clear positive imbalances and 185 balancing actions to clear negative imbalances. The total number of balancing actions during the year is lower than the previous year's 383 and 283 balancing operations, respectively, with a more pronounced decrease in the count of system users' negative imbalance clearing actions.

4.5. **Balancing actions in the Estonia-Latvia Common Balancing Area in 2022, (count)**



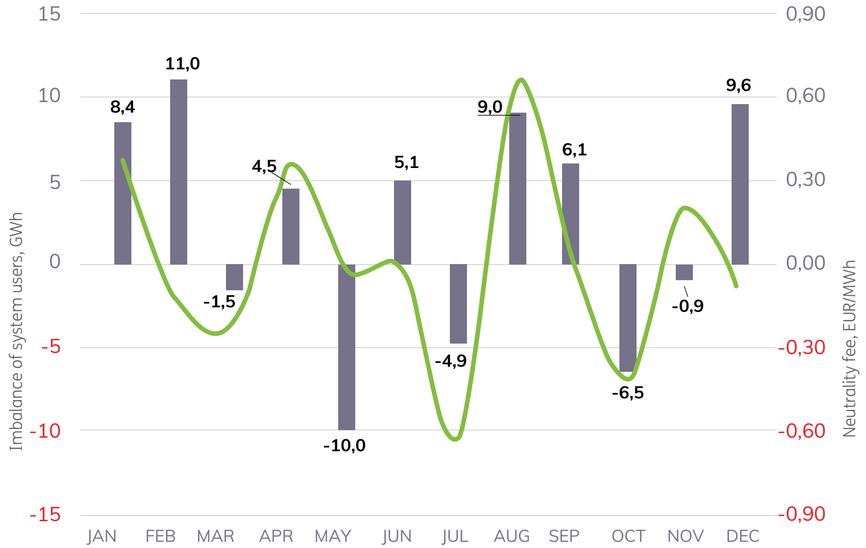
During the reporting period, 95% of all balancing transactions were concluded on the trading platform, while the offers submitted by transmission system balancing service providers were used in 5% of cases. Compared to the previous year, the share of balancing transactions concluded on the trading platform has decreased by one percentage point in 2022, which is positive.

Figure 4.5 **Distribution of the of balancing actions in 2022 (%)**



The total amount of absolute imbalance generated by all system users in the Estonia-Latvia Common Balancing Area in 2022 was 334.9 GWh. Balancing actions were carried out to clear the positive imbalance created by system users, amounting to 150.9 GWh, including 133.7 GWh on the trading platform and 17.2 GWh under balancing service agreements. In turn, balancing actions were carried out to clear the negative imbalance created by system users, amounting to 138.5 GWh, of which 111.6 GWh on the trading platform, and 26.9 GWh through the concluded balancing service agreements. Compared to the previous reporting period, the amount of imbalance created by system users has decreased by ~40%.

4.5. **System users' aggregate imbalance (GWh) and neutrality charge, EUR/MWh in 2022**



The neutrality fee applied in 2022, ranged from minus 0.62 EUR/MWh (July 2022) to plus 0.64 EUR/MWh (August 2022). In billing periods when the neutrality charge was negative, transmission system operators paid it to transmission system users, while in billing periods when the neutrality charge was positive, transmission system operators collected it from transmission system users. The average neutrality charge in 2022 was € 0.01/MWh/month.

Conexus together with Estonian natural gas transmission system operator Elering AS, having assessed the previous experience, concluded that improvements to the balancing rules were necessary and organised a public consultation on changes to the balancing rules for the unified entry-exit natural gas transmission system agreed by the Public Utilities Commission on 25 November 2021 in Council Decision No. 135 and the Estonian Competition Council in Decision No. 7-29/2021-002 between 12 September 2022 and 16 September 2022.

Key changes to the balancing rules of the Unified entry-exit Natural Gas Transmission System:

- change the imbalance sheet pricing algorithm
- include the possibility to use the Dutch TTF (*Title Transfer Facility*) price for referenceksas attiecināšanas princips;
- clarify the principle of attributing the neutrality charge
- a reference to the negative imbalance resolution plan

Conexus has developed and applies on a daily basis a balancing procedure, which defines the conditions of cooperation and conduct of Conexus' responsible entities in balancing the balancing zone of the single entry-exit natural gas transmission system and in applying balancing actions in accordance with non-discriminatory, equal, transparent and market-based rules. The Balancing Procedures also define the rights and obligations of the responsible Conexus entities for collecting, exchanging information and assessing and applying the need for balancing actions in the balancing area.

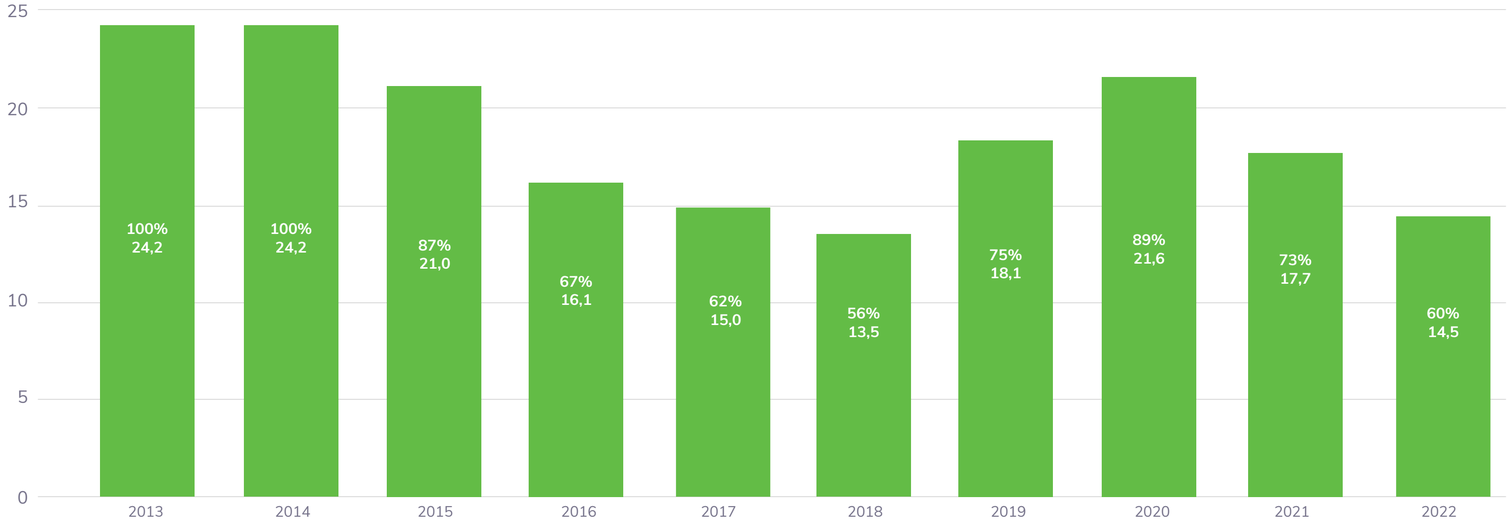
4.6. **Neutrality charge in 2022 (EUR/MWh)**

Month	Applicable neutrality charge, EUR/MWh
January	0.37
February	-0.14
March	-0.21
April	0.35
May	-0.02
June	-0.02
July	-0.62
August	0.64
September	0.04
October	-0.41
November	0.19
December	-0.08
On average	**€ 0.01**

4.3. Storage system flow data

The withdrawal season of the 2021/2022, storage cycle ended on 30 April 2022 and the balance of active natural gas in Inčukalns UGSF before the start of the injection season in May 2022 was 7.5 TWh. The amount of active natural gas in storage after the end of natural gas injection in mid-November 2022 was 14.5 TWh, which represented 60% of the maximum active natural gas volume of 24.2 TWh. Over the past three years, Latvia's average consumption of natural gas during the heating season has been 8.8 TWh, i.e. the total amount of natural gas injected into storage is significantly higher than Latvia's heating season consumption.

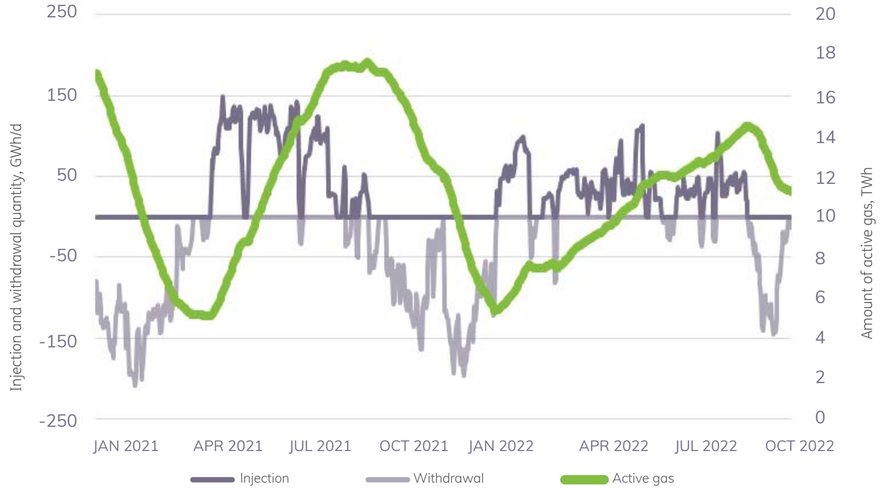
4.7. **Amount of active natural gas in Inčukalns UGSF after the end of the natural gas injection season (% and TWh of the maximum possible volume)**



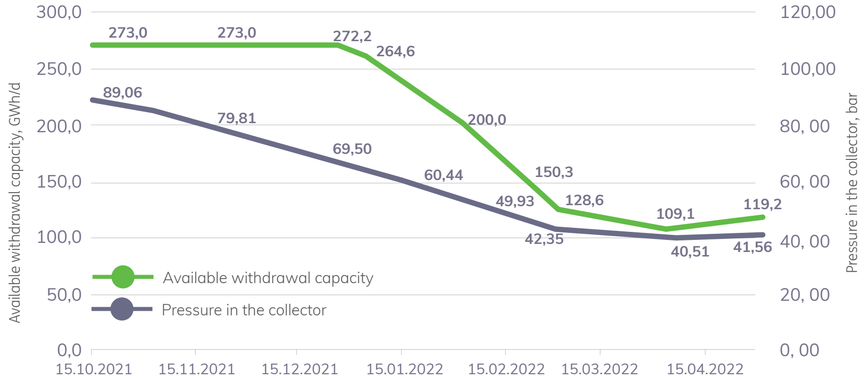
In 2022, the amount of gas withdrawn from Inčukalns UGSF amounted to 10.6 TWh and was 41% lower than the previous year. The decrease in withdrawals is mainly due to an overall drop in natural gas consumption in the year of 2022.

The daily withdrawal of natural gas from the gas storage with the maximum national gas consumption was fixed on 11 January, 2022 and represents a total amount of 236.3 GWh/d, of which 85.9 GWh/d for consumption in Latvia and 150.4 GWh/d for use in other countries. On this day, the maximum gas consumption was recorded from 10 A.M. to 11 P.M. and represented a total quantity of 8.1 GWh/h, of which 3.9 GWh/h for consumption in Latvia and 4.2 GWh/h for use in other countries.

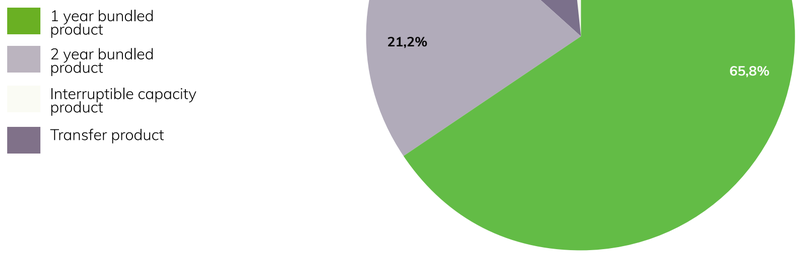
4.8. **Injected and withdrawn volumes (GWh/day) and active natural gas volumes (TWh) at Incukalns UGS in 2021 and 2022**



4.9. **Curve of available natural gas withdrawals from storage in the year of 2021-2022**



4.10. **Booked capacity products 2021/2022 storage cycle of Inčukalns UGS**



In the storage cycle of 2021/2022, the initially available storage capacity was set at 23.2 TWh, but as some market participants postponed injection due to unfavourable gas prices, Conexus reduced the technical storage capacity to 21.8 TWh in order to be able to inject the full amount of reserved natural gas in case of full capacity reservation.

From 21.8 TWh 87% or 18.9 TWh were reserved in the year of 2021/2022 storage cycle. The storage capacity was reserved by users from the Baltic States, Finland and Norway. During the injection season, several market participants transferred their reserved storage capacity to other market participants, as high natural gas prices made it difficult to purchase and fully use the reserved storage capacity.

The technical capacity of the storage facility for the 2022/2023 storage cycle, published in April 2022, is set at 24.074 TWh. With the continued high price of natural gas on world markets and a small winter/summer price differential, user interest in storage services may be lower than in previous years. However, the launch of the gas interconnection between Poland and Lithuania GIPL in 2022 could potentially attract new storage users from European countries.

5. SUPPLY AND CONSUMPTION ADEQUACY ASSESSMENT

Adequacy assessment is based on assumptions about the expected summer-winter season and on the current conditions set out in the scenario profiles. The assessment is not a forecast of the expected gas supply and consumption situation. The actual use of the gas infrastructure, including the amount of active natural gas in Inčukalns UGSF, will be determined by the decisions of market participants, which will be influenced by external factors such as the winter/summer price differential, the progress of new infrastructure projects, as well as political decisions.

Scenario of 2023/2024 in Baltic-Finland region:

from January 2023, gas supplies to all countries in the Baltic-Finland region from the Russian Federation will cease and the following conditions apply:

- The price of gas will remain high
- Users in the Baltic- Finnish region who have easy access to alternative energy sources will replace gas with other energy sources
- The GIPL operates from 1 May 2022
- No entry flows are foreseen at the Luhamaa entry and exit point towards the Estonia-Latvia Single Balancing Zone
- The Hamina LNG terminal is available from 1 October 2022 and will operate at +25% capacity
- The Inkoo LNG terminal is expected to start commercial operation in Q2 2023 and will operate at 2/3 capacity during the initial period
- Latvia and Lithuania will mainly receive gas from Klaipeda LNG terminal and Inčukalns UGSF, Estonia and Finland will mainly receive gas from Inkoo LNG terminal and Inčukalns UGSF
- The combined technical capacity of the Klaipeda LNG terminal, the Inkoo LNG terminal and the Hamina LNG terminal, together with the Inčukalns UGSF, significantly will exceed the projected gas consumption in the Finnish-Baltic region
- After the withdrawal season, the minimum expected active gas balance of Inčukalns UGSF will be at least 4 GWh, which includes the Baltic gas Security reserves for emergency situations and declared energy crisis

5.1. **Potential balance and gas adequacy assessment of entry-exit points in the Finnish-Baltic region**

Exit points (Projected annual consumption), TWh/y		**Years**									
		2023/24	**2024/25**	**2025/26**	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**2031/32**	**2033/33**
including	Latvia	9.7	11.9	11.8	11.7	11.5	11.3	11.2	11	10.8	10.7
	Rest of the region (LT, EE, FIN)	35.6	36.5	36.3	35.5	35.4	35.3	35.2	35.0	34.9	34.7
TOTAL:		**45.3**	**48.4**	**48.1**	**47.2**	**46.9**	**46.6**	**46.4**	**46.0**	**45.7**	**45.4**
Entry points (Annual technical capacity), TWh/y											
including	Inkoo LNG terminal	33.0 - 40.0									
	Hamina LNG terminal	2.2									
	Klaipeda LNG terminal	33.0 – 38.1									
	GIPL	22.5									
TOTAL:		**90.7 - 102.8**									

The table summarises the region's projected gas consumption volumes and potential supplies for the Baltic-Finland region over the next ten years. Gas consumption is expected to recover in the coming years, approaching historical consumption levels. In the long term, gas consumption is expected to decrease. At the projected gas supply and consumption levels, the region's gas supply adequacy is assured both in the short and long term.

5.2. **Incukalns UGS fill in 2023/2024 Baltic-Finnish scenarios % of technical storage capacity**

Conclusions: according to the calculations, the projected Incukalns UGS filling rate could reach up to 79% and in March 2024, the reserves could be depleted to 39–57%, maintaining the countries' strategic reserves. The projected storage capacity by 1 November, which is the regulatory maximum capacity time, significantly exceeds the capacity requirements of Regulation 2301/2022 for the Baltic States. To satisfy heating period demand in the Baltic – Finnish region, market participants should also arrange gas supplies from the new LNG terminal at Inkoo in Finland.

- The technical availability of the gas transmission and Inčukalns Underground Gas Storage Infrastructure ensures the supply of the expected gas consumption. With the current demand for natural gas, the region's supply routes, if operational, are capable of supplying the full amount.
- Inčukalns UGSF ensures the ability to guarantee supplies to customers during the winter period, as well as to other sources in the event of unplanned and prolonged technical outages.
- Inčukalns UGSF has a unique infrastructure that can be adapted and integrated into the future energy system.
- High energy storage capacity and flexible energy storage and supply to customers, effectively supporting the operation of the electricity system with an increasing share of wind and solar generation.

On 23 March 2022, the European Commission presented a proposal for a Regulation of the European Parliament and of the Council amending Regulation (EU) 2017/1938 of the European Parliament and of the Council concerning measures to safeguard the security of gas supply and Regulation (EU) 715/2009 of the European Parliament and of the Council on conditions for access to the natural gas transmission networks[10]. This proposal aims to address the major risks to the security of natural gas supply and the Union's economy posed by radical changes in the geopolitical situation. In particular, the proposal aims to ensure that storage capacities that are essential to guarantee security of supply do not remain unused in the European Union, thus ensuring the possibility of sharing storage facilities across the EU.

N-1 calculation

The functioning of the natural gas system in the event of a single outage has been assessed and prepared according to the Security of Supply Regulation[11], which takes into account the N-1 principle, or the failure of a single major natural gas infrastructure. N-1 is a theoretical calculation describing the technical capability of the natural gas infrastructure to meet the total demand for natural gas in a given area if the largest natural gas supply infrastructure interconnection is not available on the day with the highest statistical demand in 20 years.

N-1 allows to assess the level of protection of natural gas consumers or the adequacy of natural gas infrastructure capacity in a selected area in percentage terms, taking into account the characteristics of the different elements of the natural gas system. The formula for the N-1 calculation and explanations of the elements to be calculated are available in Annex 1, while the results of the N-1 calculations at different Inčukalns UGSF fills are summarised in the table below. The full calculation of N-1 values is available in Annex 2.

5.3. **Results of N-1 calculation depending on the Inčukalns UGSF filling**

Filling level of Inčukalns UGSF	*N-1 value*[12]
30 %	131%
100 %	131%

Thanks to the infrastructure works enhancement, including interconnection improvements, the value of N-1 is no longer dependent on the filling of UGSF. Under the Security of Supply Regulation, the value in both situations exceeds the minimum set by the Regulation. Although the N-1 calculations show that the security of natural gas supply in Latvia is at a high level, it should be noted that the N-1 criterion does not provide information on the overall security of natural gas supply in Latvia as it does not assess the availability of natural gas at the relevant infrastructure entry points. For this purpose, the availability of LNG terminals in Lithuania and Finland and the gas market situation in Estonia, Lithuania and Finland should be assessed.

[10]European Commission website. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1936

[11]Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply

[12]N – 1 ≥ 100 % in accordance with the requirements of the Security of Supply Regulation

6. TRANSMISSION SYSTEM DEVELOPMENT

6.1. Development of the interconnection system

Until 30 May 2022, Regulation (EU) 347/2013 of the European Parliament and of the Council of 17 April 2013 laying down European guidelines for energy infrastructure, repealing Decision 1364/2006/EC, amending Regulation (EC) 713/2009, Regulation (EC) 714/2009 and Regulation (EC) 715/2009 identified the Eastern Baltic region as one of the priority corridors of the European Union to connect the gas supply system of the Eastern Baltic region to the common natural gas transmission network of the European Union. The Regulation identified the European PCI, which are eligible for simplified procedures and for funding from the CEF.

6.1. **Natural gas transmission system interconnection development projects.**

1. Poland-Lithuania Interconnection (GIPL). the project will start on 1 May 2022, connecting the Lithuanian and Polish natural gas transmission systems, thus connecting the Eastern Baltic natural gas transmission systems with the Central European natural gas transmission network, integrating the Baltic region into the European Union's natural gas transmission network. The infrastructure built under the project is put into operation in October 2022. Planned capacity towards Lithuania – 74 GWh per day, towards Poland – 58 GWh per day.

Natural gas infrastructure projects implemented by Conexus according to the fifth PCI list published by the European Commission on 19 November 2021[13]:

2. Inčukalns Underground Gas Storage Improvement[14]. Inčukalns UGSF is the only underground natural gas storage facility in the Baltic region that provides the region with stable natural gas supplies in winter. On 15 May 2019, CINEA signed a contract with Conexus for the implementation of the PCI. The project consists of three main activities: upgrading of surface facilities, rehabilitation of gas wells and upgrading of gas pumping facilities. The project will significantly reduce the dependence between the capacity available for withdrawal and the natural gas stocks in storage, which will significantly improve the reliability of natural gas supply as well as the operational efficiency of the storage facility, which is particularly important for the optimal and maximally efficient operation of the single Baltic-Finnish natural gas market. In addition to the above, the project will implement additional environmental protection measures by reducing CO_2, NOx and other emissions. The deadline of the implementation of the project is December of 2025.

3. Improving the interconnection between Latvia and Lithuania[15]. On 19 December 2019, CINEA signed an agreement with Conexus and the Lithuanian transmission system operator Amber Grid to finance construction works for the Latvia-Lithuania Interconnection Improvement Project to increase the capacity of the interconnection, which will not only allow for more natural gas to be exchanged between Latvia and Lithuania, but will also provide sufficient capacity in the Latvian transmission system for additional natural gas flows, creating a regional natural gas market. The aim of the project is to carry out modifications, pipeline diagnostics and repairs to prepare the system for pressure increase, which will simultaneously increase the capacity of the interconnection from Latvia to Lithuania to 82 GWh per day and from Lithuania to Latvia to 90 GWh per day. The project is scheduled for completion in December 2023. The project, while easing the turmoil of the geopolitical challenges, increased the interconnection capacity from Lithuania to Latvia to 90 GWh per day as of 1 November 2022, as a first step towards strengthening energy security and independence in the whole region by ensuring increased gas flows from Klaipeda LNG terminal to Inčukalns UGSF.

The fifth PCI list is the last PCI list established under Regulation (EU) 347/2013 of the European Parliament and of the Council of 17 April 2013 laying down European guidelines for energy infrastructure, repealing Decision 1364/2006/EC, amending Regulation (EC) 713/2009, Regulation (EC) 714/2009 and Regulation (EC) 715/2009.

[13]List V of European common interests. Available at: https://ec.europa.eu/energy/sites/default/files/fifth_pci_list_19_november_2021_annex.pdf

[14]Project of common interest No. 8.2.4. Improving the Inčukalns underground gas storage

[15]Project of common interest No. 8.2.1. Improving the interconnection between Latvia and Lithuania

On 30 May 2022, a new Regulation (EU) 2022/869 of the European Parliament and of the Council on guidelines for trans-European energy infrastructure and amending Regulation (EC) 715/2009, (EU) 2019/942 and (EU) 2019/943 and Directives 2009/73/EC and (EU) 2019/944 and repealing Regulation (EU) 347/2013, which excludes natural gas projects and establishes new criteria for projects of common interest, focusing on projects in strategic energy infrastructure priority corridors and areas, implementing the development and interoperability of European energy networks and providing connections to such networks, while ensuring climate change mitigation. The Regulation defines priority corridors for electricity, off-grid electricity, hydrogen and electrolysis, as well as smart grids, smart gas grids and cross-border carbon dioxide networks. At the same time, recital 16 of the preamble stresses that the European energy networks policy should include new and reprofiled hydrogen transmission infrastructure and storage complexes.

The European Commission has already prioritised hydrogen production from renewable electricity in its Communication "A Hydrogen Strategy for a Climate Neutral Europe" of 8 July 2020. The phased introduction of hydrogen solutions may also allow the reprofiling or reuse of part of the existing natural gas infrastructure[16].

On 18 May 2022, the European Commission adopted the REPower EU Plan[17], which defines the objective of rapidly reducing dependence on Russian fossil fuels through a rapid transition to a clean economy and is based on the "Fit for 55" proposals.

In line with the Regulation adopted on 30 May 2022, the European Commission plans to approve the new list of PCI – the sixth – at the end of 2023.

[16]European Union website. Available at: https://eur-lex.europa.eu/legal-content/LV/TXT/?uri=CELEX%3A52020DC0301
[17]European Union website. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022DC0230

6.2. National system development

Regulation (EC) 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005 requires ENTSOG to draw up a 10-year Community Network Development Plan – TYNDP – every two years. In 2022, ENTSOG collected information on the projects to be included in the 2022 TYNDP. Conexus, taking into account the European Commission's Communication "A Hydrogen Strategy for a Climate Neutral Europe" as well as the REPower EU Plan, has included the following projects in the 2022 TYNDP in addition to the two natural gas infrastructure projects in the fifth PCI project list:

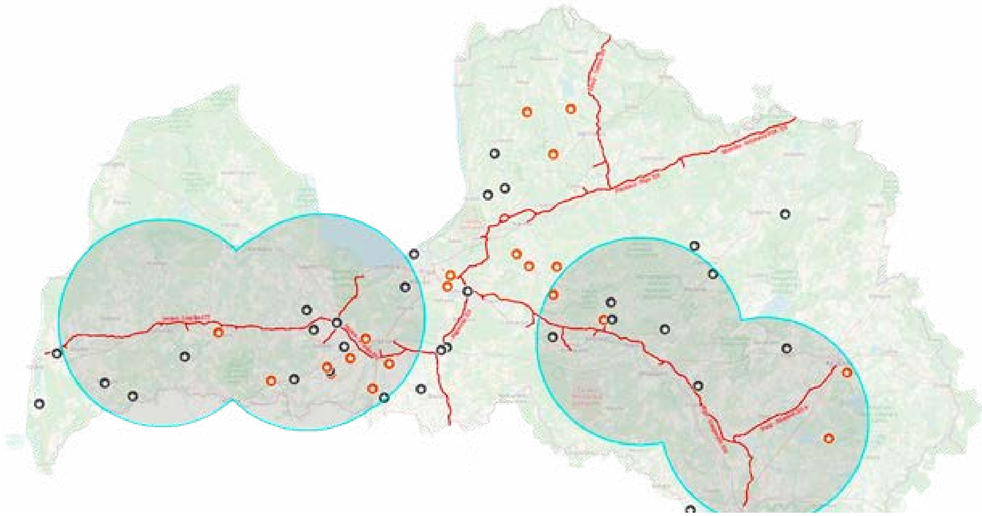
- Skulte LNG terminal with connecting pipeline, subject to further development of the Skulte LNG terminal and taking into account the Law on the Skulte LNG terminal adopted by the Saeima on 29 September 2022[18].

- Smart integrated solutions for injecting renewable gases into the transmission system. The project involves the construction of biomethane injection points that would allow off-grid biomethane producers (producers without a direct connection to the gas infrastructure) to inject the biomethane they produce into the transmission network without having to build connecting pipelines from the biomethane plant to the transmission system.

- Adapting the cross-border gas transmission system to transport hydrogen – transmission system study in the light of the European Commission's 2021 proposals for an internal market for renewable gases and hydrogen, where transmission system operators must accept gas flows with hydrogen content up to 5% from 1 October 2025.

- Seasonal hydrogen storage in Latvia – with the growing importance of hydrogen gas in the region and the need for flexibility, a study is needed on the feasibility of a hydrogen storage facility based on the Inčukalns UGSF.

6.2. **The location of biogas producers around the natural gas transmission system and the potential service radius of biomethane entry points.**



- Nordic-Baltic Hydrogen Corridor – Latvia's part. The Nordic-Baltic Hydrogen Corridor is a joint project of six national transmission system operators (Finland, Estonia, Latvia, Lithuania, Poland, and Germany) – Gasgrid Finland Oy, Elering AS, Conexus, Amber Grid AB, GAZ SYSTEM S.A. and ONTRAS Gastransport GmbH – aiming to establish a cross-border 100% hydrogen gas transmission corridor from Finland to Germany via the Baltic States and Poland. The project builds on the RePower EU Roadmap published by the European Commission on 18 May 2022, as well as the proposals for hydrogen infrastructure development developed by the European Hydrogen Backbone[19].

[18]Latvijas Vēstnesis / Official Journal. Available at: https://www.vestnesis.lv/op/2022/192A.3
[19]European Hydrogen Backbone. Available at: https://ehb.eu/

To prepare for the development of the renewable gas market, Estonia, Finland, Latvia and Lithuania in 2021, the transmission system operators Elering AS, Gasgrid Finland Oy, Conexus and Amber Grid AB signed a Memorandum of Understanding to promote the development of green or renewable gas, including the establishment of a regionally harmonised proof of origin system. Also in 2022, operators continued their cooperation and coordination on both biomethane and hydrogen. In addition to its membership of several organisations (int.al. ENTSOG, Association of Issuing Bodies, European Hydrogen Backbone etc.), where issues related to the development of renewable gases are addressed, Conexus also joined the Biomethane Industrial Partnership[20] as an associate member, and participates in working groups related to gas system connections, research, development and innovation.

As the injection of hydrogen into natural gas transmission networks can pose various technical challenges, the four national operators are jointly implementing a development and study project in 2022 on the possibility of injecting hydrogen into the gas transmission systems of Latvia, Lithuania, Estonia and Finland, the first part of which – a desk study – is scheduled to be completed in 2023.

Connections to the transmission system

On 13 September 2022, the Cabinet adopted Regulation No. 567 "Regulations on Requirements for Injection and Transport of Biomethane and Gaseous Liquefied Natural Gas into the Natural Gas Transmission and Distribution System", which establishes technical and safety requirements for the injection and transport of biomethane and gaseous liquefied natural gas into the natural gas transmission and distribution system, as well as the quality characteristics of the gas to be injected into the system in order to ensure sustainable and safe gas injection and transport in the natural gas transmission and distribution system[21]. The Regulation specify different oxygen and hydrogen concentrations when gas is injected into a transmission system directly connected to supplies to other countries or the Inčukalns Underground Gas Storage Facility or when gas is injected into a natural gas distribution or transmission system not directly connected to supplies to other countries or the Inčukalns Underground Gas Storage Facility. Section 84 (1) of the Energy Law states that "The regulator shall approve the natural gas transmission system connection regulations developed by the natural gas transmission system operator for natural gas distribution system operators, biomethane producers, liquefied natural gas terminal operators, and natural gas users, and the natural gas distribution system connection regulations developed by the natural gas distribution system operator for biomethane producers, liquefied natural gas terminal operators, and natural gas users. Conexus applications for connections in 2022 were assessed in accordance with the rules approved by the PUC on 18 April 2019 "Rules for connection to the natural gas transmission system for biomethane producers, LNG system operators and natural gas users".

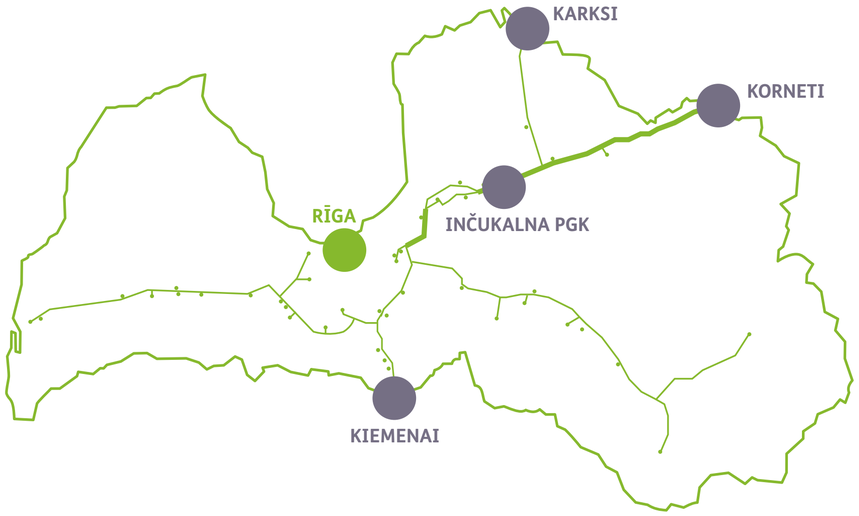
Users show interest in establishing a direct connection to the transmission system. In 2022, two technical permits for direct connections to the transmission system were issued. Conexus has created a map of potential connection points with potentially the lowest connection costs to the natural gas transmission system pipeline, where 18 potential connection points are marked on the map. A map of the Latvian natural gas transmission system with connection points is available on the Conexus website[22].

Conexus has finalised the minimum construction design for four biomethane injection points as part of the project "Smart Integrated Solutions for Renewable Gas Injection into the Transmission System". The most promising location for further development and implementation of the pilot project has been identified as a point in the municipality of Džūkste, which is planned to be built by the end of 2024.

[20] Biomethane Industrial Partnership. Available at: https://bip-europe.eu/
[21] Latvijas Vēstnesis / Official Journal. Available at: https://www.vestnesis.lv/op/2022/179.4
[22] Conexus website. Available at: https://www.conexus.lv/interaktiva-karte

6.3. Assessment of transmission system security at interconnection points

6.3. **Latvia's natural gas transmission system.**



Latvia's natural gas transmission system is connected to the transmission systems of Estonia and Lithuania. The Latvian natural gas transmission system is connected to the Estonian transmission system at two independent points, Karksi and Korneti, and to the Lithuanian transmission system at one point, Kiemenai.

Karksi interconnection

The interconnection provides gas transmission from Inčukalns UGSF and Lithuania to Estonian and Finnish consumers, as well as natural gas supplies to Latvian consumers and Lithuania from the Estonian transmission system. In 2023, it is expected that gas from the Inkoo LNG terminal could be supplied via the interconnection for injection into the Inčukalns UGSF, national consumption and onward transmission to Lithuania.

The interconnection is a single pipeline corridor with a nominal diameter of 700 mm, with a single pipeline section of 85.85 km to the interconnection with the dual pipeline system in Latvia. The calculated mathematical probability of an accident for this section is 0.064 times/year. The most significant technical risk of the interconnection is that any repair work will result in the interruption of its operation. Given that the pipeline insulation for this interconnection consists of a polymeric tape with a manufacturer and industry-approved effective life of 15 years, and that the pipeline was completed in 1994, the operator should consider replacing the insulation to prevent degradation of the overall pipeline throughout its length. The repairs are technically difficult to implement and may lead to significant restrictions on the use of the interconnection.

At the end of 2022, the maximum technical capacity in both directions of the interconnection was 105 GWh/d. Maximum capacities are provided at a pressure of 50 barg, while the design maximum allowable pressure in the pipeline is set at 55 barg. In the last two years, 21,038 GWh of energy were transported via the interconnection in the direction of Estonia, with the interconnection operating 653 days or 89% of the time, while 328 GWh of energy were transported via the interconnection in the direction from Estonia to Latvia, with the interconnection operating 34 days or 5% of the time in the last two years. In total, the transmission capacity of the interconnection was

not used for 40 days or 5% of the time in the last two years. Gas flow interruptions in the Latvia-Estonia interconnection are related to the execution of planned repair works to restore the corrosion insulation of the Vireši-Tallinn gas pipeline and to repair pipeline defects detected during internal diagnostics of the pipeline. An analysis of the daily permissible capacities of the interconnection shows that

- the interconnection with its maximum technical capacity of 105 GWh/d was not used
- maximum daily capacity reached – 80 GWh/d
- average interconnection load over two years – 29 GWh/d
- average load from Latvia to Estonia – 32 GWh/d
- average load from Estonia to Latvia – 10 GWh/d.

Thus, taking into account that over the last two years the interconnection has been operating at 80% of its maximum technical capacity only on certain days, with an average capacity of 30%, and based on national and regional natural gas demand forecasts, Conexus has no reason to plan measures to increase the technical capacity of the interconnection or to build new interconnection points in the next five years at this time.

Natural gas quality requirements in Estonia and Latvia are harmonised at the time of writing, but changes are needed to allow renewable gases such as biomethane to be transported through the interconnection. Conexus is currently actively working on harmonising the requirements with Estonian transmission operator Elering JSC. In the future, it will also be necessary to set requirements for the amount of hydrogen allowed in the gas to be transported. The operators are currently working on a joint study that will determine, with the same technical approach, the scope of work and investment required to prepare the transmission system for the injection of a certain amount of hydrogen and the safe transmission of the hydrogen-methane mixture.

Kiemenai interconnection point

The interconnection point ensures gas transmission from Inčukalns UGSF and Finland/Estonia towards Lithuania, as well as natural gas supply to Latvian consumers for pumping to Inčukalns UGSF and to Estonia and Finland from the Lithuanian transmission system, which receives natural gas supplies from GIPL (Polish-Lithuanian interconnection) or from Klaipeda LNG terminal.

The interconnection is a single pipeline corridor with a nominal diameter of 700 mm, with a single pipeline section of 83.79 km to the connection to the dual pipeline system. The calculated, mathematical probability of an accident for the section is 0.062 times/year. The most significant technical risk of the interconnection is that any repair work will result in the interruption of its operation. Given that the pipeline insulation for this interconnection consists of a polymeric tape with a manufacturer and industry-approved effective life of 15 years, and that the pipeline was completed in 1983, the operator should consider replacing the insulation to prevent degradation of the overall pipeline throughout its length. The repairs are technically difficult to implement and may lead to significant restrictions on the use of the interconnection. This interconnection is considered to be the main natural gas supply route for Latvian consumers and Inčukalns UGSF from the beginning of 2022.

By the end of 2021, the interconnection had a capacity of 65.1 GWh/d in both directions. Taking into account the work started in the framework of the Latvia-Lithuania Interconnection Improvement Project, the technical capacity from Lithuania to Latvia was increased to 90 GWh/d in 2022. The daily fixed technical capacities will be set at 90 GWh/d from Lithuania to Latvia and 82 GWh/d from Latvia to Lithuania, which can be dynamically increased up to 100 GWh/d in both directions.[23] For maximum capacity, the operator plans to set the operating pressure in the

[23] GetBaltic. Pieejams: https://umm.getbaltic.com/public-umm/3544

relevant interconnection at 50 barg, while the design maximum allowable pressure for the system is 55 barg.

In the last two years, 4,902 GWh of energy was transported to Lithuania via the interconnection point, and the interconnection point operated 185 days in this direction, or 25% of the time. In the direction from Lithuania to Latvia, 17,045 GWh of energy were transported through the point in the last two years, in which direction the point operated for 425 days or 59% of the time. So, in the last two years, 120 days or 16% of the total time, no capacity was used through the interconnection. The significant gas flows towards Latvia are mainly due to the fact that the Klaipeda LNG terminal was the most important source of gas supplies for consumption in the Baltic-Finland region during this period, as well as the choice of system users to store gas in the Inčukalns underground gas storage facility during the gas injection season. An analysis of the daily permissible capacities of the interconnection point shows that:

- the capacity towards Latvia was set at 90 GWh/d
- from Latvia to Lithuania, the maximum capacity reached is 68 GWh/d
- two-year average load – 30 GWh/d
- average load from Latvia to Lithuania – 26 GWh/d
- average load from Lithuania to Latvia 40 GWh/d.

Conexus concludes that the average load of the interconnection point was 46% of the specified technical capacity. As of March 2022, the average load at the interconnection point towards Latvia was 69%. Conexus has no reason to plan measures to increase the interconnection capacity in 2023, which is also confirmed by the surveys jointly organised by Conexus and AB Amber Grid on the need for incremental capacity in line with the NC CAM requirements.[24] Taking into account national and regional natural gas consumption forecasts for the next decade, Conexus concludes that there is no reason to build a new interconnection point between Latvia and Lithuania, while the existing one fully meets the market demand. Conexus is also considering the possibility of conducting a re-survey on the need for incremental capacity in 2023.

Gas quality requirements in Lithuania and Latvia are equivalent for both natural gas and biomethane. In the future, equivalent requirements should be set for the amount of hydrogen allowed in the gas to be transported. Transmission system operators in both countries are currently working on a joint study that will determine the scope of work and the investment required to prepare the transmission system for the injection of a certain amount of hydrogen, using the same technical approach.

Korneti interconnection

The interconnection is a corridor of two parallel pipelines with a nominal diameter of 700 mm. The interconnection plays a key role in ensuring the storage capacity of the entire Latvian transmission system. The risk of accidents occurring simultaneously in both pipelines is negligible, so there is no need to calculate the mathematical probability of an interconnection accident. Conexus considers that the interconnection from the Vireši – Tallinn gas pipeline branch to the Kornetu interconnection is an integral part of the transmission system, which ensures the storage capacity of the Latvian natural gas transmission system in order to efficiently organise the technological cycles at the Inčukalns UGSF. The interconnection will provide natural gas to connected consumers in Latvia and gas supplies to Estonia. Conexus does not plan to invest significantly in the interconnection in the coming years.

Until 24 February 2022, the interconnection served as the main supply route for natural gas supplies to Latvia and Estonia. After the Russian invasion of Ukraine on 24 February 2022, the use of the interconnection decreased significantly. According to

[24] Conexus website. Available at: : https://conexus.lv/uploads/filedir/Pieprasijuma_novertejama_zi__ojums_ICA_LVL-2021.pdf

Section 106(4) of the Energy Law, natural gas supplies from the Russian Federation are prohibited, therefore the future use of the interconnection is linked to the provision of natural gas supplies to Estonian consumers. At the end of 2022, the maximum technical capacity in the direction of Latvia was 178.5 GWh/d, and in the direction from Latvia to Estonia – 105 GWh/d. Maximum capacities are provided at a pressure of 40 barg. In the last two years, 24,806 GWh of energy was transported to Latvia via the interconnection, and the interconnection operated in this direction for 403 days, or 55% of the time. In the direction from Latvia to Estonia, 554 GWh of energy was transported through the point in the last two years, and the point operated in this direction for 46 days or 6% of the time. The interconnection was not used for 281 days, or 39% of the total time, which is broadly in line with historical interconnection use. An analysis of the daily permissible capacities of the interconnection point shows that:

- maximum daily capacity reached – 166 GWh/d
- average load from Estonia to Latvia – 62 GWh/d
- average load from Latvia to Estonia – 12 GWh/d.

It can be concluded that over the last two years, the interconnection point has only on some days been 93% of its technical capacity, with an average load of less than 30% in both directions. At the moment, Conexus has no reason to plan measures to increase the technical capacity of the interconnection. Given the uncertain geopolitical situation and the ban on natural gas imports from Russia, Conexus does not plan to build a new interconnection point within the corridor in the future.

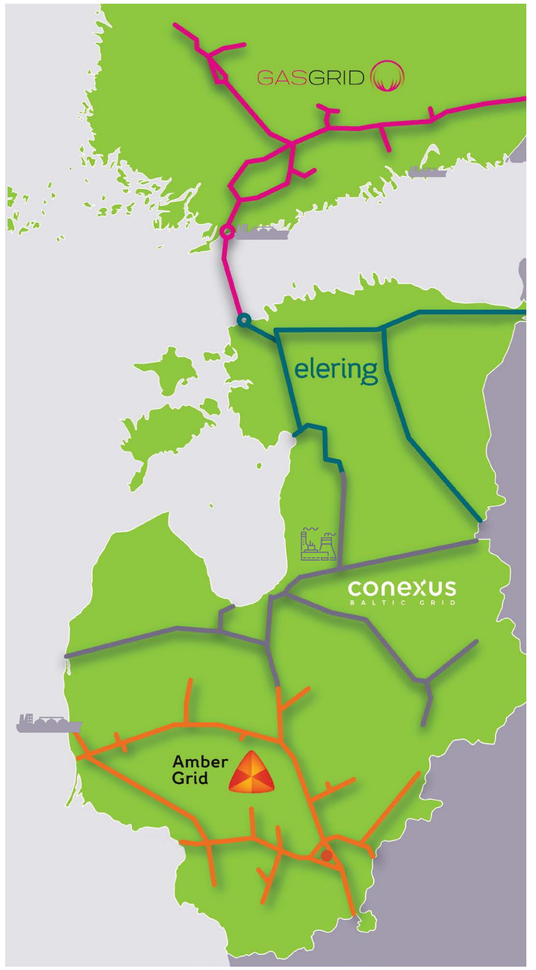
7. REGIONAL GAS MARKET

In 2019, the Regional Gas Market Coordination Group (hereinafter referred to as "RGMCG"), consisting of transmission system operators from the Baltic States and Finland, regulators and relevant ministries, reached an agreement on the establishment of an inter-operator compensation mechanism (hereinafter referred to as "ITC"). The ITC mechanism provided for uniform tariffs at the external entry points of the Common Market and the abolition of commercial borders between Common Market Member States, including the Estonia-Finland interconnection – Balticconnector. The ITC principles include:

- Revenue pooling, excluding the operator's eligible variable costs of providing the gas flow;
- *Ex ante* revenue distribution among transmission system operators based on forecasted national gas demand, which is *ex post* redistributed based on actual national natural gas consumption.

On 1 January 2020, the Common Market for Natural Gas was launched, bringing together gas transmission system operators in Finland, Latvia and Estonia to create a single-entry tariff area (FinEstLat) with two balancing areas – one for Finland and one for Latvia and Estonia. The uniform tariff structure provides for:

- On the external interconnection points of the market – the entry tariff is equal;
- At the internal borders of the Common Market – tariffs are abolished;
- Tariffs at the interconnection point with Inčukalns UGSF are discounted by 100%;
- Tariffs for national exit points and interconnection points with other TSO are set at national level;
- The tariff-setting process is coordinated regionally.



Key regional market developments and challenges

The global geopolitical situation in 2022 has led to drastic changes in many areas, including the economy and energy, which have directly affected Conexus Baltic Grid and have also had an impact on our daily work processes. Following Russia's invasion of Ukraine in February 2022, there were serious concerns in Europe about the possibility of an energy crisis in the region over the availability of natural gas for the 2022/2023 winter season.

On 8 March 2022, the Cabinet of Ministers of the Republic of Latvia adopted a decision to approve the early warning in the natural gas supply sector, assigning Conexus, as the unified operator of the natural gas transmission and storage system, a number of tasks in this regard. One of these tasks, which involved the development of an additional natural gas market mechanism, was a measure not foreseen in Latvia's contingency plan for the natural gas supply sector. It provided that Conexus has the right to determine the allocation of natural gas transmission system capacity and the injection capacity of the Inčukalns underground gas storage facility, which ensures the injection of gas transported from the Klaipeda LNG terminal and the Lithuanian-Polish natural gas interconnection to the Inčukalns UGSF to the maximum extent possible. Accordingly, in the framework of the above task, priority was given to natural gas flows received from the Klaipeda LNG terminal and the GIPL gas interconnection in the Republic of Lithuania.

The amendment of 14 July 2022 to Section 106 (4) of the Energy Law introduced a ban on the supply of natural gas from the Russian Federation, which entered into force on 1 January 2023. The Energy Act also provides that, if the Energy Act does not provide for the following 117 (1) of the Treaty on the Functioning of the European Union, the natural gas transmission system operators have agreed on the establishment of a unified natural gas transmission entry-exit system, the unified natural gas transmission and storage system operator or the natural gas transmission system operator in cooperation with the natural gas transmission system operators involved in the unified natural gas transmission entry-exit system shall develop and submit to the regulator and the regulator shall, in agreement with the regulatory authorities of the relevant European Union Member States, coordinate the procedure for ensuring the prohibition of natural gas supplies from the Russian Federation. In order to implement the obligation under Section 106 (4) of the Energy Law, changes were made to the Unified Rules for the Use of the Natural Gas Transmission System, which detail the principles for the implementation of the ban and help implement the ban on natural gas supplies from the Russian Federation as of 1 January 2023.

A summary of the most important natural gas supply developments in the Baltic-Finland region during the reporting period:

- From 26 February (during the withdrawal season), natural gas injection is available at Inčukalns UGSF;
- On 8 March 2022, the Cabinet of Ministers of the Republic of Latvia adopted a decision to approve the declaration of an early warning in the natural gas supply sector;
- Transmission capacity allocation arrangements are in place to ensure that gas transported from the Klaipeda LNG terminal and GIPL is injected into the Inčukalns UGSF as much as possible;
- Lithuania stopped importing natural gas from the Russian Federation from 1 April;
- GIPL started commercial operations on 1 May;
- Natural gas supplies from the Russian Federation to Finland via the Imatra point are interrupted, as of 21 May;
- On 14 July 2022, Saeima of the Republic of Latvia amended the Energy Law, banning the supply of natural gas from the Russian Federation as of 1 January 2023;
- From 1 November, the technical capacity of the Latvian-Lithuanian interconnection point Kiemenai from Lithuania to Latvia will be increased by one third.

Conexus, in cooperation with transmission system and LNG terminal operators in neighbouring countries, was able to quickly step in and address critical gas supply issues in the region. Since the introduction of the regular meetings, the cooperation between the Baltic-Finland gas supply actors and the exchange of information has significantly improved, reinforced both by joint planning of maintenance works at regional level and by the creation and maintenance of regional gas supply scenarios.

On 8 June 2022, the transmission system in cooperation with Inčukalns UGSF carried out a pilot test of the Inčukalns UGSF compressor in line packing mode. During the test, the necessary circuitry was established, and the compressor was started, which received gas from the Riga – Inčukalns transmission pipeline for pumping, while the compressed gas was transferred to the Pskov – Riga pipeline. The analysis of the test results shows that the operation of the Inčukalns UGSF compressors in pumping mode can ensure gas supplies from Lithuania to Estonia and Finland, as well as in the opposite direction from Finland and Estonia to Lithuania

In the second quarter of 2022, a repair plan was developed for Conexus and neighbouring transmission system operators for the next 15-month period. Conexus gathered information and assessed the technical capacity constraints. This was followed by the coordination of the development of a regional inter-operator repair plan in order to assess and agree on the most optimal timing of the repairs, acceptable to all parties involved, with the least impact on the natural gas market.

Over the next decade, the regional market is expected to continue to integrate, with operators cooperating with each other both to address technical challenges and to develop market mechanisms. Negotiations on Lithuania's accession to the Common Market Area are not expected to resume until 2025 at the earliest. Operators in the region will continue joint research and development projects to identify the necessary system improvements, including the construction of new infrastructure and associated costs, to safely inject and transport gaseous renewables, developing the regional renewable energy market. In the short term, operators are expected to cooperate with each other to harmonise the quality requirements for biomethane fed into the system, facilitating the development of the biomethane market at regional level.

Natural gas consumption in the region is expected to stabilise towards pre-2022 levels, but no increase in natural gas consumption is foreseen in the long term.

8. CONCLUSIONS OF THE UNIFIED OPERATOR

- **1.** The existing interconnection infrastructure has sufficient capacity to meet the region's demand for natural gas, while the enhancement projects for the interconnections with Estonia and Lithuania provide the necessary infrastructure capacity. The Company concludes that the infrastructure capacity on the interconnections will remain at a sufficient level in the future to meet the long-term demand for natural gas.
- **2.** In 2022, natural gas consumption in the region decreased significantly, with Latvia seeing a 30% decrease compared to 2021. Natural gas consumption is expected to recover in the medium term as energy supply conditions change. Natural gas is expected to play an important role in balancing renewable electricity generation over the next decade.
- **3.** The region has successfully switched to natural gas supplies from LNG terminals and the Lithuania-Poland gas interconnection, completely moving away from third-country supplies. LNG terminals are expected to meet the region's long-term natural gas demand.
- **4.** Strategic natural gas reserves of 1.8 TWh have been established, injected and stored in Inčukalns UGSF, strengthening national energy security. The natural gas compression withdrawal option developed by Conexus from Inčukalns UGSF, together with the strategic reserves, effectively replaces the amount of natural gas that previously had to be provided in accordance with the requirements of paragraphs 12^1 and 34^4 of Cabinet Regulation No. 312, thus reducing the burden on the transmission system tariffs.
- **5.** The negative imbalance mitigation instrument introduced by Cabinet Regulation No. 503 in 2022 contributed to a decrease of imbalances generated by system users, on average generating a surplus for system users in the natural gas transmission system.
- **6.** At the end of the injection season of 2022, the users of Inčukalns UGSF had built up natural gas stocks of 12.8 TWh, filling the storage facility to 53%. Inčukalns UGSF serves as a large-scale energy storage and flexible natural gas supply source, and is an important infrastructure asset for the region's energy security. Conexus concludes that Inčukalns UGSF will remain a key element of the region's energy security in the long term, maintaining high demand for natural gas storage services.
- **7.** There is a need to promote biomethane production in Latvia by encouraging the efficient use of local energy resources. The biomethane market is expected to grow both in the short and long term, so it is essential to continue existing and introduce new instruments to stimulate market development. Conexus is actively pursuing measures that both promote market development and provide affordable and reliable gas transmission and storage infrastructure, while also exploring and promoting adaptation options for the introduction of other gaseous energy carriers. Conexus concludes that the introduction of hydrogen into the transmission and storage infrastructure requires appropriate research and development activities.

9. ANNEXES

Annex 1

$$N\text{-}1\ [\%] = \frac{EPm + Pm + Sm + LNGm - Im}{Dmax} \times 100, \quad N\text{-}1 \geq 100\%$$

where:

EP_m – Entry Point Technical Capacity (GWh/d), excluding production, storage and LNG capacity (P_m, S_m, and LNG_m, respectively), means the aggregate technical capacity of all entry points at the border that can supply gas to the calculation area;

P_m – the aggregated maximum technical daily production capacity (GWh/d) of all gas production facilities that can be supplied to the entry points of the calculation area;

S_m – means the aggregated maximum technical daily withdrawal capacity (GWh/d) of all storage facilities that can be delivered to the entry points of the calculation area, taking into account their respective physical characteristics;

LNG_m – the cumulative daily maximum technical regasification capacity (GWh/d) of all LNG plants in the calculation area;

I_m – Technical capacity (GWh/d) of one of the largest gas infrastructures with the highest supply capacity in the calculation area. Where several infrastructures are connected to a common upstream or downstream gas infrastructure and cannot operate separately (e.g. biomethane producers injecting gas into an interconnected system), they are considered as a single gas infrastructure;

D_{max} – total daily gas demand (GWh/d) calculated in the area of a particularly high gas demand day, which statistically occurs once every twenty years.

Annex 2

N-1 calculation data at 30% Inčukalns UGSF

Indicator	Value (GWh/d)
EP_m Pipeline interconnections – entry capacity: • From Estonia 84 GWh/day • From Lithuania 90 GWh/day	174
P_m	0
S_m	158*
LNG_m	0
I_m	158*
D_{max}	132.55

Note
*Indicator value at 30% Inčukalns UGSF fill according to the updated storage curve.

$$N\text{-}1 = \frac{174+0+158+0-158}{132,55} \times 100 = 131\,\%$$

N-1 calculation data at 100% Inčukalns UGSF

Indicator	Value (GWh/d)
EP_m Pipeline interconnections – entry capacity: • From Estonia 84 GWh/day • From Lithuania 90 GWh/day	174
P_m	0
S_m	315*
LNG_m	0
I_m	315*
D_{max}	132.55

Note
*Indicator value at 100% Inčukalns UGSF filling.

$$N\text{-}1 = \frac{174+0+315+0-315}{132,55} \times 100 = 131\,\%$$