



**conexus**  
B A L T I C G R I D

# Natural gas transmission system operator

ANNUAL ASSESSMENT REPORT FOR THE YEAR OF 2023

IN RIGA, 2024

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## ABBREVIATIONS

RES	Renewable energy resources
AST	JSC "Augsprieguma tīkls"
CEF	Connecting Europe Facility
CINEA	European Climate, Infrastructure and Environment Executive Agency
Conexus or the Company	JSC "Conexus Baltic Grid"
CO <sub>2</sub>	Carbon dioxide
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSOG	European Network of Transmission System Operators for Gas
GIPL	Gas Interconnection Poland-Lithuania
Inčukalns UGS	Inčukalns underground gas storage facility
PCI	Project of Common Interest
Cabinet Regulations No. 312	Cabinet Regulations 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 Threat to the State".
Cabinet Regulations No. 503	Cabinet Regulations 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
NECP	National Energy and Climate plan
NO <sub>x</sub>	Nitrogen oxides
TSO	Transmission system operator
LNG	Liquefied natural gas
GHG	Greenhouse gases
PUC	The Public Utilities Commission
TYNDP	Ten-Year Network Development Plan





# GENERAL INFORMATION

Pursuant to Article 43<sup>1</sup> (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 2023 has been prepared in accordance with the requirements of the Cabinet Regulations 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 these Regulations, the transmission system operator shall prepare and submit the Annual Assessment report to the Ministry of the Economy and the PUC by 1st of June each year.

JSC (AS) "Conexus Baltic Grid" (hereinafter referred to as - "Conexus") is an independent unified natural gas transmission and storage system operator in Latvia, managing one of the most advanced natural gas storage facilities in Europe - Inčukalns UGS and the 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 and heat production and manufacturing.

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 services, 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

To ensure reliable gas transmission and storage, contributing to the decarbonization of the energy sector and market development.

#### WHO DO WE WANT TO BE?

## Vision

Sustainable gas transmission and storage system 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




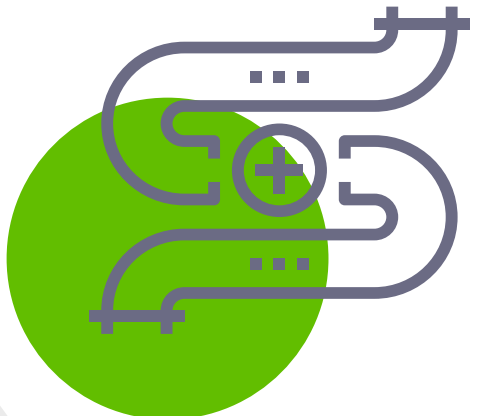

We value the competence, knowledge, professional experience and development of our employees.

### Collaboration

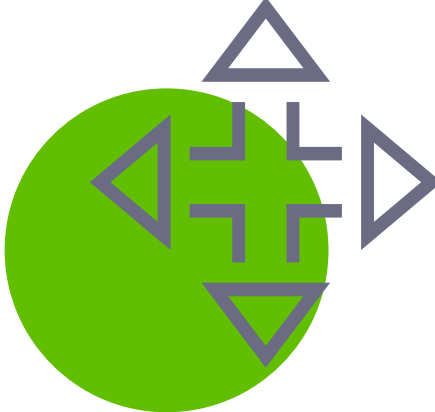




We support each other in our decision-making, we listen and we look for common solutions internally and with our customers, existing and potential partners.

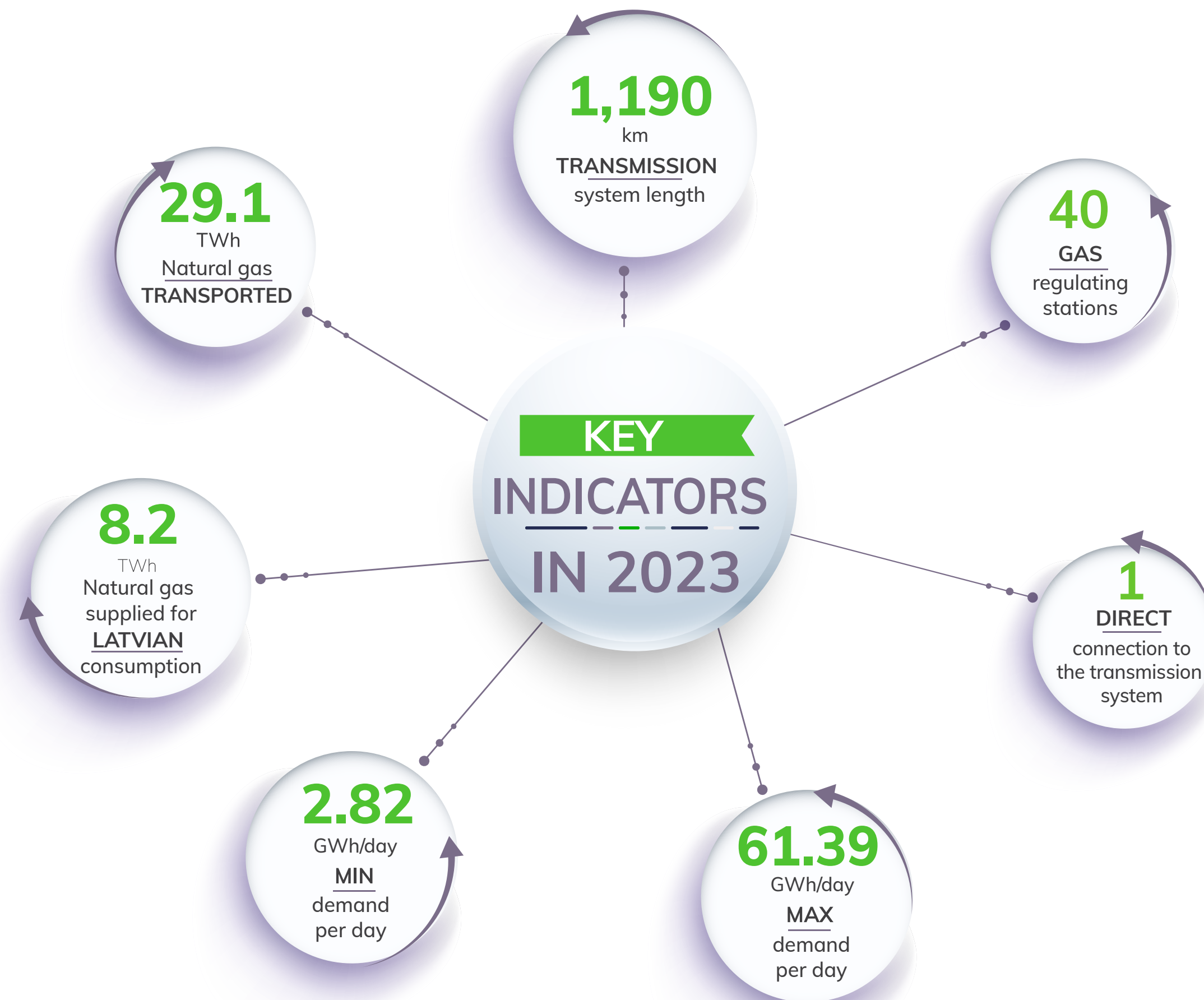
Conexus has identified three strategic objectives for the strategic planning period:

<p><b>MARKET DEVELOPMENT</b></p> 	<p>Promote the development and further integration of the gas market, including hydrogen and other gaseous energy carriers</p>	<ul style="list-style-type: none"> <li>• <b>Facilitate regional market integration</b></li> <li>• <b>Promote cooperation with other regional transmission system operators (TSOs)</b> in developing a common position for the integration of biogas and hydrogen into transmission networks, <b>supporting the injection of biomethane into the transmission system</b></li> <li>• <b>Further development of Inčukalns UGS services</b>, providing greater flexibility, including the possibility of compression withdrawal</li> </ul>
<p><b>INFRASTRUCTURE SAFETY AND SECURITY OF SUPPLY</b></p> 	<p>Ensure accessible and reliable transmission and storage infrastructure, while exploring and promoting adaptation options for the introduction of other gaseous energy carriers</p>	<ul style="list-style-type: none"> <li>• <b>Introduce projects of common interests</b></li> <li>• <b>Undertake research and development projects</b> to identify the technical feasibility and investments required to adapt existing infrastructure to the use of natural gas/hydrogen mixtures or pure hydrogen, including the construction of infrastructure dedicated to hydrogen</li> <li>• <b>Asset management fit for the challenges of the future</b></li> </ul>
<p><b>SUSTAINABILITY</b></p> 	<p>Focus on climate and environmental sustainability</p>	<p>With a focus on sustainability, Conexus will focus on environmental aspects:</p> <ul style="list-style-type: none"> <li>• <b>E</b> – regional market integration promoting the development of renewable gases, secure transmission and storage infrastructure, focusing on reducing NOx and GHG emissions</li> <li>• <b>S</b> – safety-oriented culture, professional and development-oriented team</li> <li>• <b>G</b> – compliance with the Latvian Corporate Governance Code</li> </ul>

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.

	<p><b>Focus on organisational development and efficiency</b></p>	<p>Conexus will facilitate access to finance and increase operational efficiency.</p>
	<p><b>Digitalisation and cybersecurity</b></p>	<p>Conexus will continue digitisation projects focusing on operational technologies, physical security, fire safety and cyber security.</p>
	<p><b>Professional and development-oriented team</b></p>	<p>Conexus value is a professional team, therefore the Company will elaborate a programme enabling employees to develop their skills through individual development plans. 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.</p>

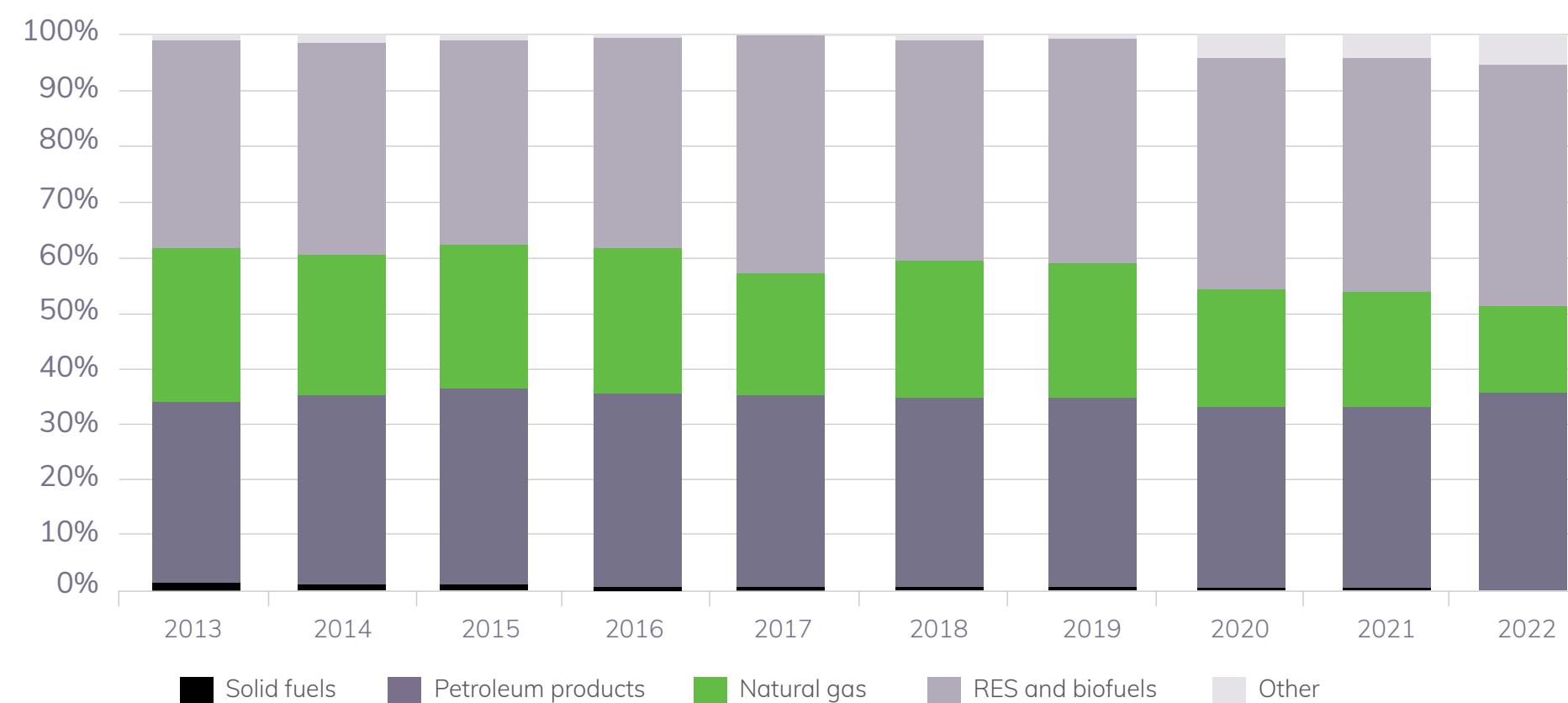
# 1. KEY INDICATORS IN 2023



# 2. NATURAL GAS DEMAND IN LATVIA IN 2023

Latvia has a balanced energy mix, where natural gas is playing a significant role. Most of the demand is from natural gas users which 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<sup>1</sup> (%), 2013 - 2022



<sup>1</sup>European Commission statistics. Available at: [https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets\\_en#country-datasheets](https://energy.ec.europa.eu/data-and-analysis/eu-energy-statistical-pocketbook-and-country-datasheets_en#country-datasheets)



In 2023, the amount of natural gas transported for the needs of Latvian users was 8.2 TWh, which is 7% less compared to 2022. 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, which is 0.9°C above the seasonal norm, furthermore, while in January and in February air temperatures were 2.4°C and 2.3°C above the monthly norm respectively<sup>2</sup>. At the same time,

natural gas consumption for electricity generation increased - the year of 2023 showed a 17% increase in volume of electricity generated by thermal power plants, but this does not offset the 36.9% drop a year earlier<sup>3</sup>. Furthermore, the trend of recent years towards an increasing share of renewable energy sources in the structure of fuels used for heat generation continues.

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

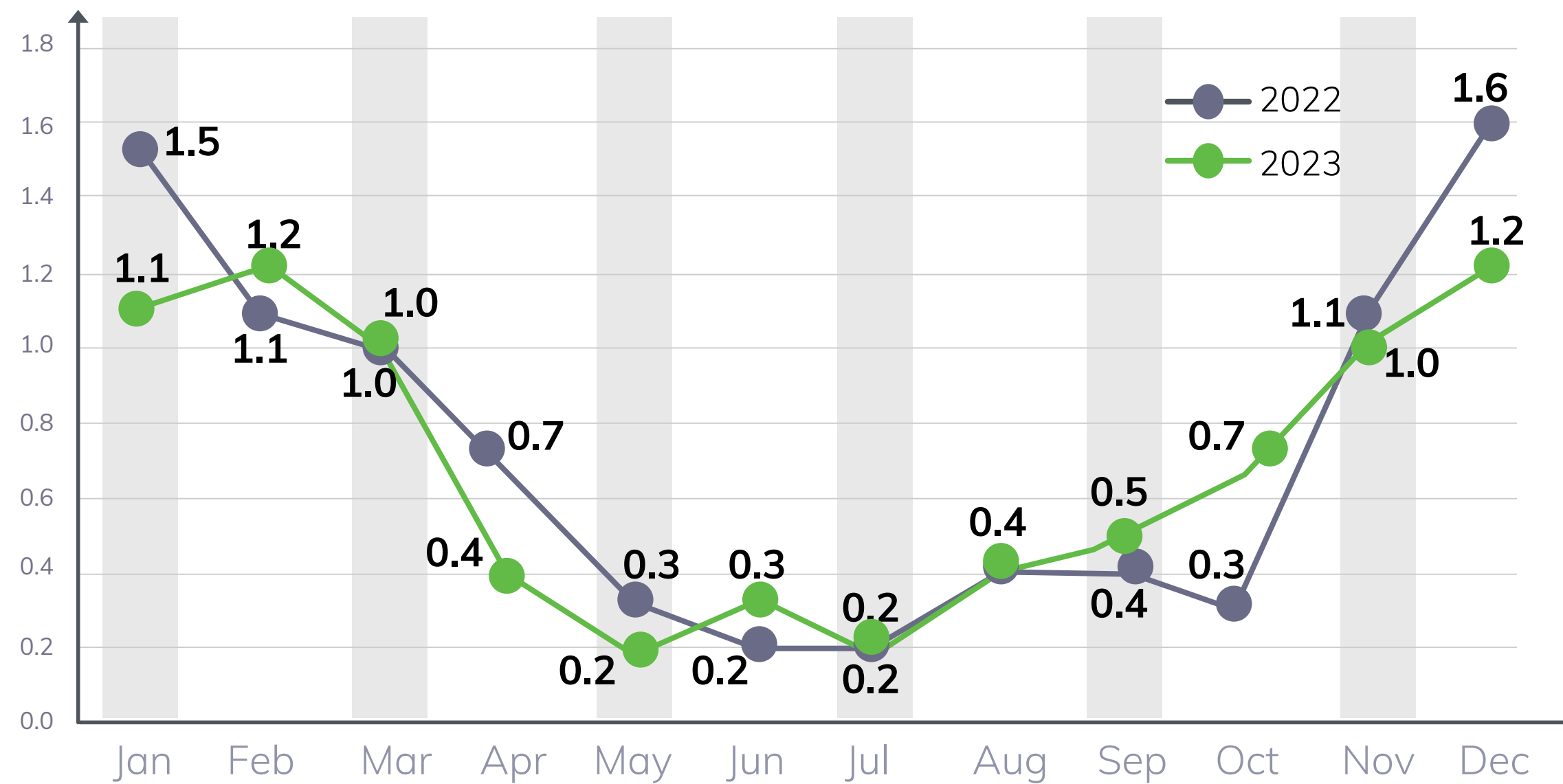
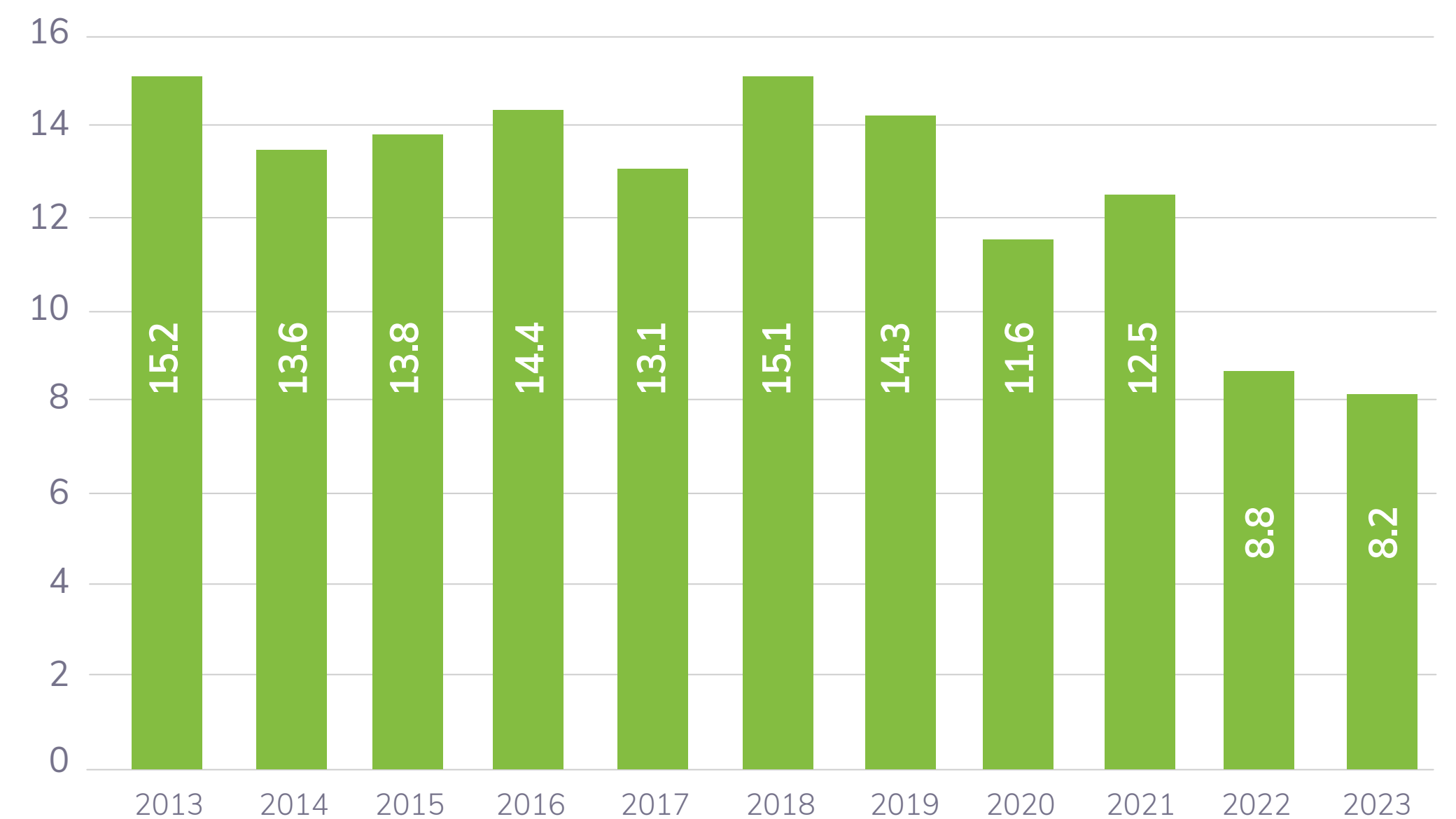


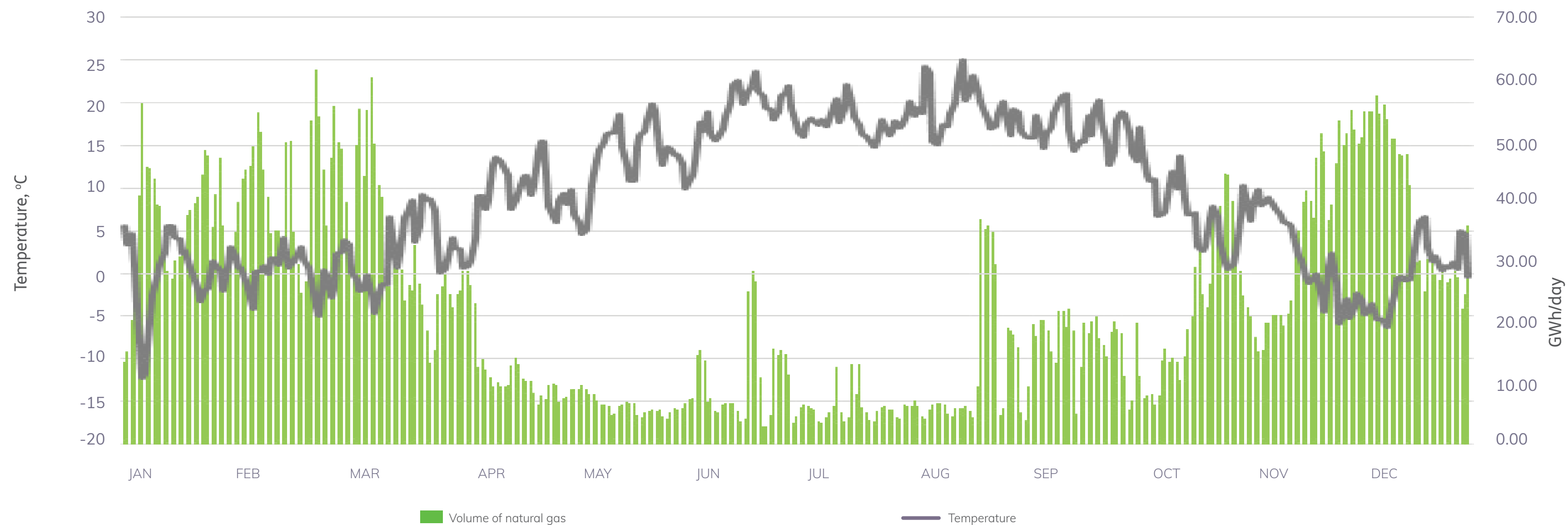
Figure 2.3 Volume of natural gas transported to the natural gas distribution system operator in Latvia (TWh)



<sup>2</sup>Data from the Latvian Environment, Geology and Meteorology Center. Available at: [https://klimats.meteo.lv/operativais\\_klimats/laikapstaklu\\_apskati/2023/gads/](https://klimats.meteo.lv/operativais_klimats/laikapstaklu_apskati/2023/gads/)

<sup>3</sup>AST data. Available at: <https://ast.lv/lv/electricity-market-review?year=2023&month=13>

Figure 2.4 Average daily temperature in Riga (°C) and natural gas delivered per day (GWh) in the Latvian natural gas distribution system<sup>4</sup>, 2023

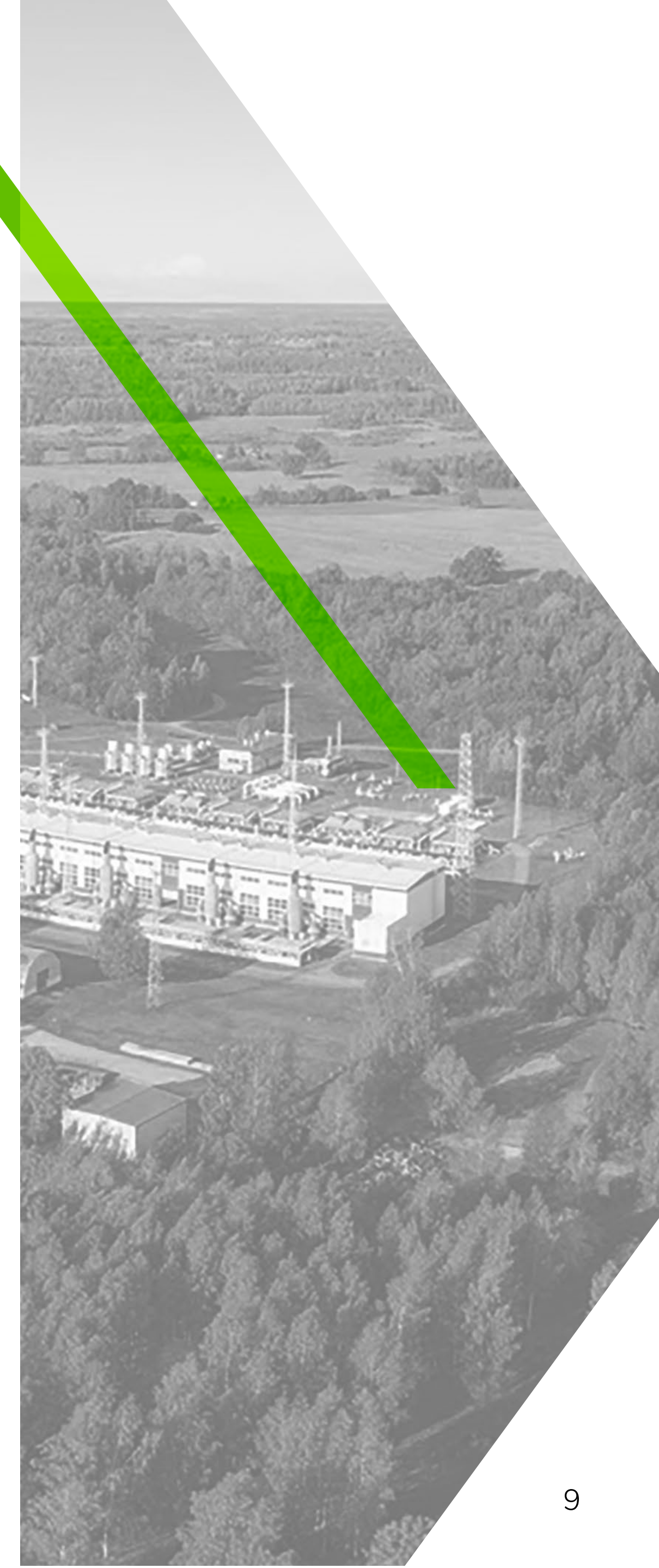


According to the Europe Joint Research Centre's 2016 study "Joint Risk Assessment of the gas system of Estonia, Finland, Latvia and Lithuania", Latvia's natural gas consumption can reach 136 GWh/day on a winter day. In the winter of 2023, the maximum daily consumption of natural gas in Latvia was 61.39 GWh, a decrease of 24.6 GWh/day or 29% compared to 2022, due to higher air temperature in the respective period. The lowest average daily air temperature in Riga was recorded on 6 January, when it dropped below -12 °C. The minimum daily consumption of natural gas on 24 June 2023 was 2.82 GWh/day, which is 0.45 GWh lower compared to the previous year.

### Maximum and minimum daily consumption of natural gas in Latvia in the year of 2023

DATE	Consumption (GWh)	Air temperature (°C)
<b>22 February</b>	<b>61.39</b>	<b>-4</b>
9 March	60.19	-2.4
<b>24 June</b>	<b>2.82</b>	<b>+19.5</b>
23 June	2.98	+20.7

<sup>4</sup>Data from the Latvian Environment, Geology and Meteorology Center. Available at: <https://videscentrs.lv/gmc.lv/hoverojumu-arhivs/meteo/30096/active/4001/2023-01-01/2023-12-31>



# 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<sup>5</sup>, 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**<sup>6</sup> 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<sup>7</sup>. 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<sup>8</sup>, which includes around a hundred different policy measures, with twelve areas for action. 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. Review of the Latvia's

NECP started in 2022 and a draft updated NECP was submitted to the European Commission for assessment in 2023.

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"<sup>9</sup>, which aims to achieve a 55% reduction in greenhouse gas emissions by the year of 2030 and climate neutrality by the year of 2050.

As natural gas prices fall, the competitiveness of gas as an energy source improves, and its use becomes economically beneficial again. At a certain level of natural gas prices, large industrial producers are expected to return to natural gas as a fuel and resume operations. As soon as in the second half of 2023, gas prices returned to a competitive level and were even below EUR 30/MWh at the time of writing this report.

The price level has significant impact on the gas consumption, which could exceed the 10 TWh mark in 2024, however, in the long term, it will maintain constant, but flat decreasing trend which will be mainly related to lower demand of cogeneration plants for natural gas and progress of economy towards renewable energy sources.

<sup>5</sup>ENTSOGs website. Available at: <https://2022.entsos-tyndp-scenarios.eu/>

<sup>6</sup>from English - National Trends

<sup>7</sup>European Union website. Available at: <https://eur-lex.europa.eu/legal-content/LV/TXT/?uri=CELEX:32018R1999>

<sup>8</sup>Ministry of Economics website. Available at: <https://www.em.gov.lv/lv/hekp-2020gada-redakcija>

<sup>9</sup>European Commission website. Available at: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_21\\_3541](https://ec.europa.eu/commission/presscorner/detail/en/IP_21_3541)

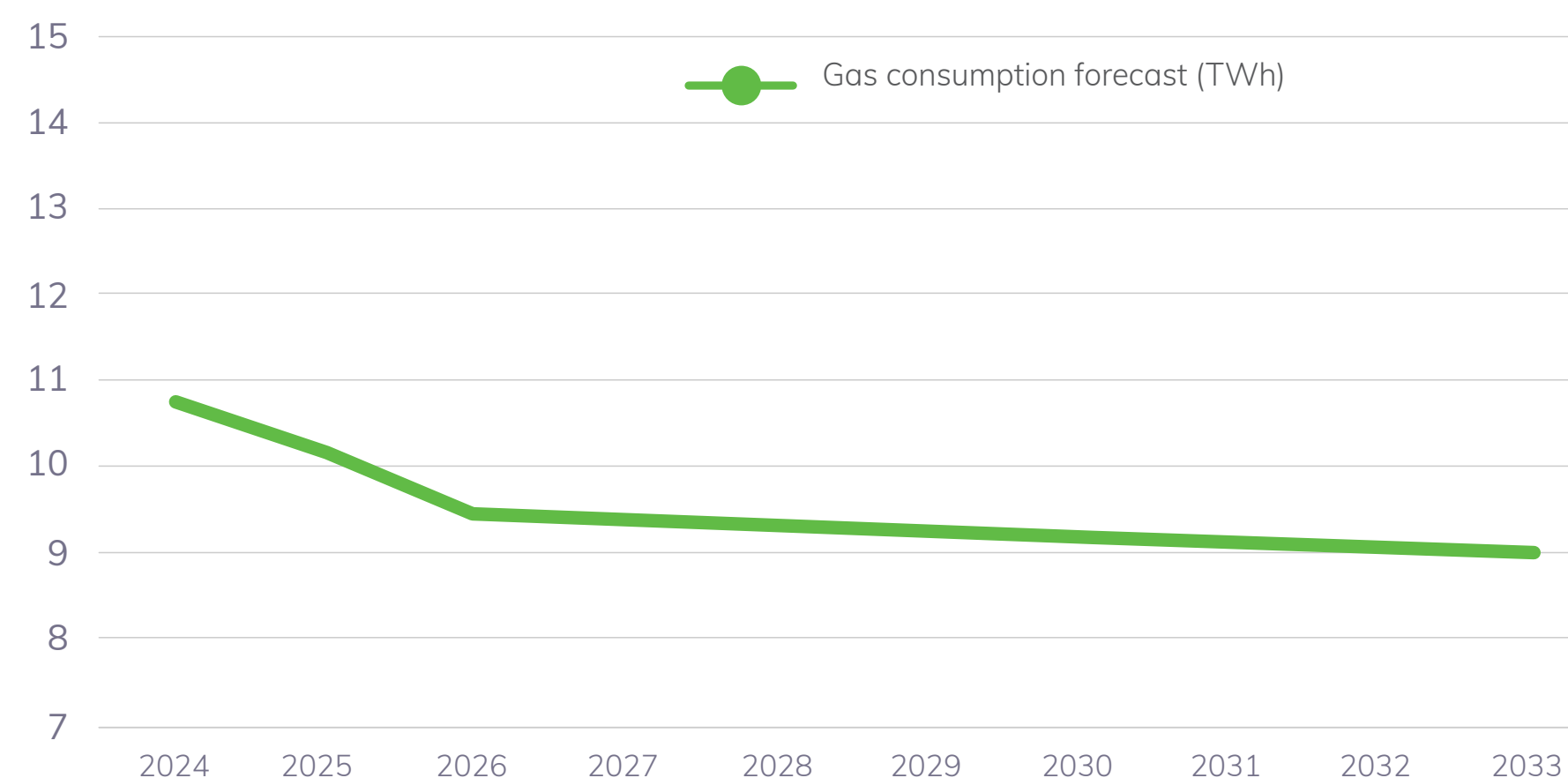
In the household segment, natural gas consumption is expected to be higher in the coming years compared to the year of 2023, but not to return to historical levels, at the same time gradually decreasing. This consideration can be explained by the households' energy efficiency measures and switching or diversification of fuel and heating equipment under the circumstances 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.

Conexus expects natural gas demand to stabilise over a 10-year perspective and for natural gas to play an important role in balancing renewable electricity generation. Although natural gas demand is expected to fall in the long term, the share of renewable gases such as biomethane in total structure of gas consumption will increase significantly. In the long term, natural gas will continue to play its role in providing the large amounts of energy capacity needed for stable electricity generation. Although heat generation from renewable energy

sources is on the rise, natural gas will continue to play an important role as an alternative source of thermal energy in the long term, thus being able to compensate for sharp increases in demand in thermal energy.

Figure 3.1 **Gas consumption forecast for Latvia (TWh)**

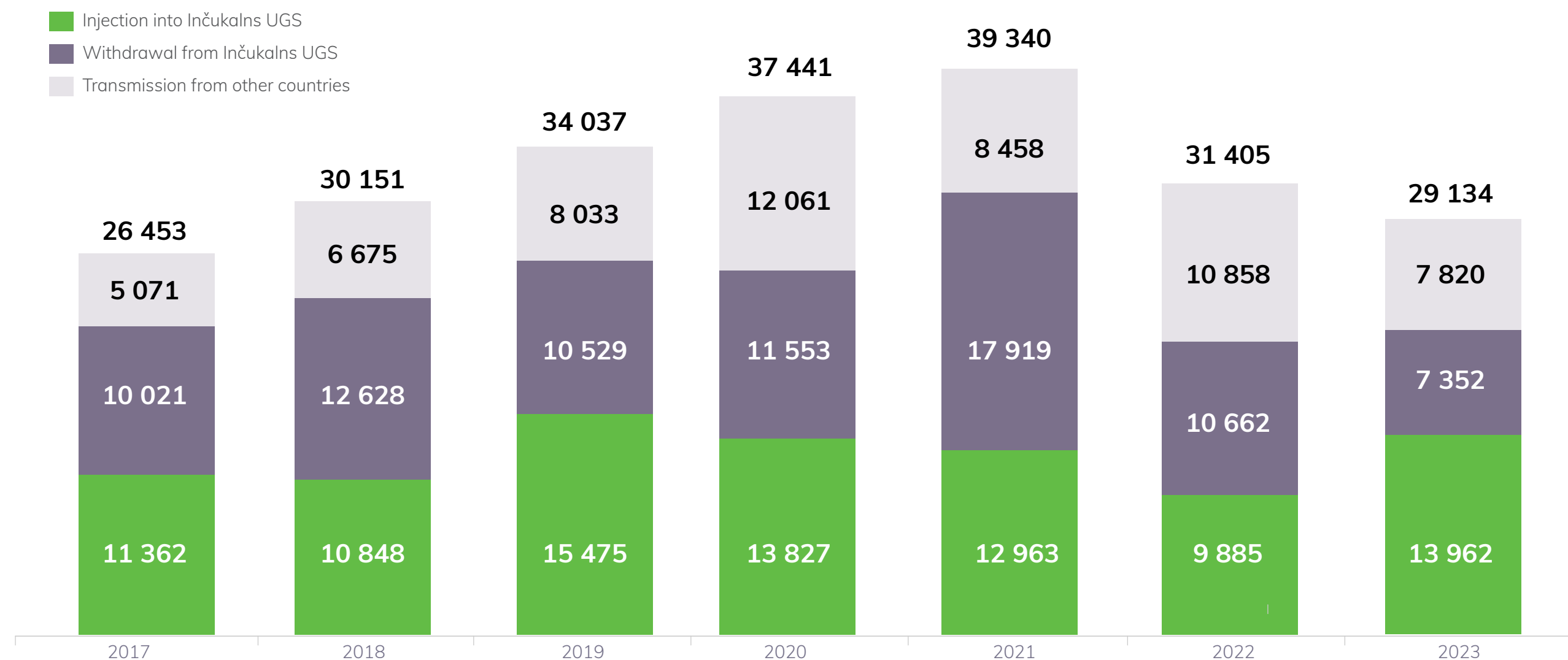


# 4. NATURAL GAS FLOWS IN 2023

## 4.1. Transmission system flow data

The total volume of natural gas transported in the year of 2023 is 29,134 GWh, which is ~7% less than the volume transported in the previous year (see Figure 4.1). Although 2023 saw a significant decrease in natural gas prices (compared to 2022 prices) and a recovery in consumption volumes in the second half of the year, there was still a downward trend in consumption at the beginning of the year, which did not lead to any significant changes in transported volumes on an annual basis.

Figure 4.1 Natural gas transmission in Latvia in 2017-2023 (GWh)



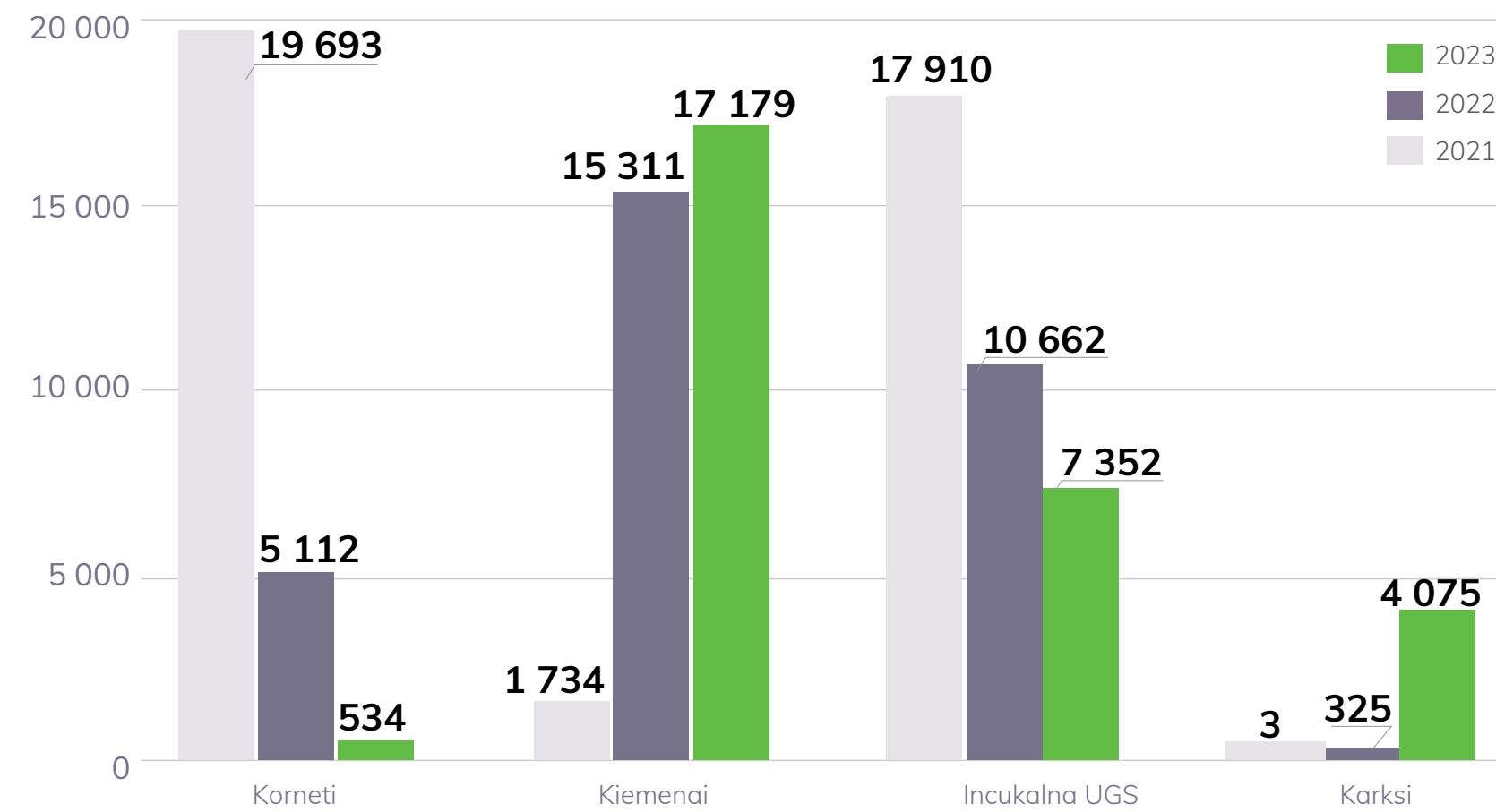
The largest natural gas supplies to Latvia in 2023 came from Lithuania. Compared to the previous year, the volume of natural gas received from Lithuania in 2023 increased by 1,867 GWh. Dynamics of natural gas flows during the Inčukalns UGS injection season 2023 was significantly affected by construction of the Inkoo terminal in Finland - natural gas for injection was also received from Finland in transit via Estonia. The volume of natural gas received in Latvia from Estonia increased by 3,750 GWh in 2023. There were no supplies of natural gas from Russia during the reporting period according to the amendments to the Energy Law, which prohibits the supply of natural gas to Latvia from Russia. In 2023, 534 GWh were transited from Luhamaa point to the region of Kaliningrad.

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 Inčukalns UGS practiced in previous years, taking into account the geopolitical situation in Europe and concerns about a possible shortage of natural gas reserves in the region, all necessary preparations were made to start injecting natural gas into the Inčukalns underground gas storage facility on 25 February 2022 - during the withdrawal season. Also, in the future the possibility of both withdrawal from and injection into the storage is offered simultaneously.

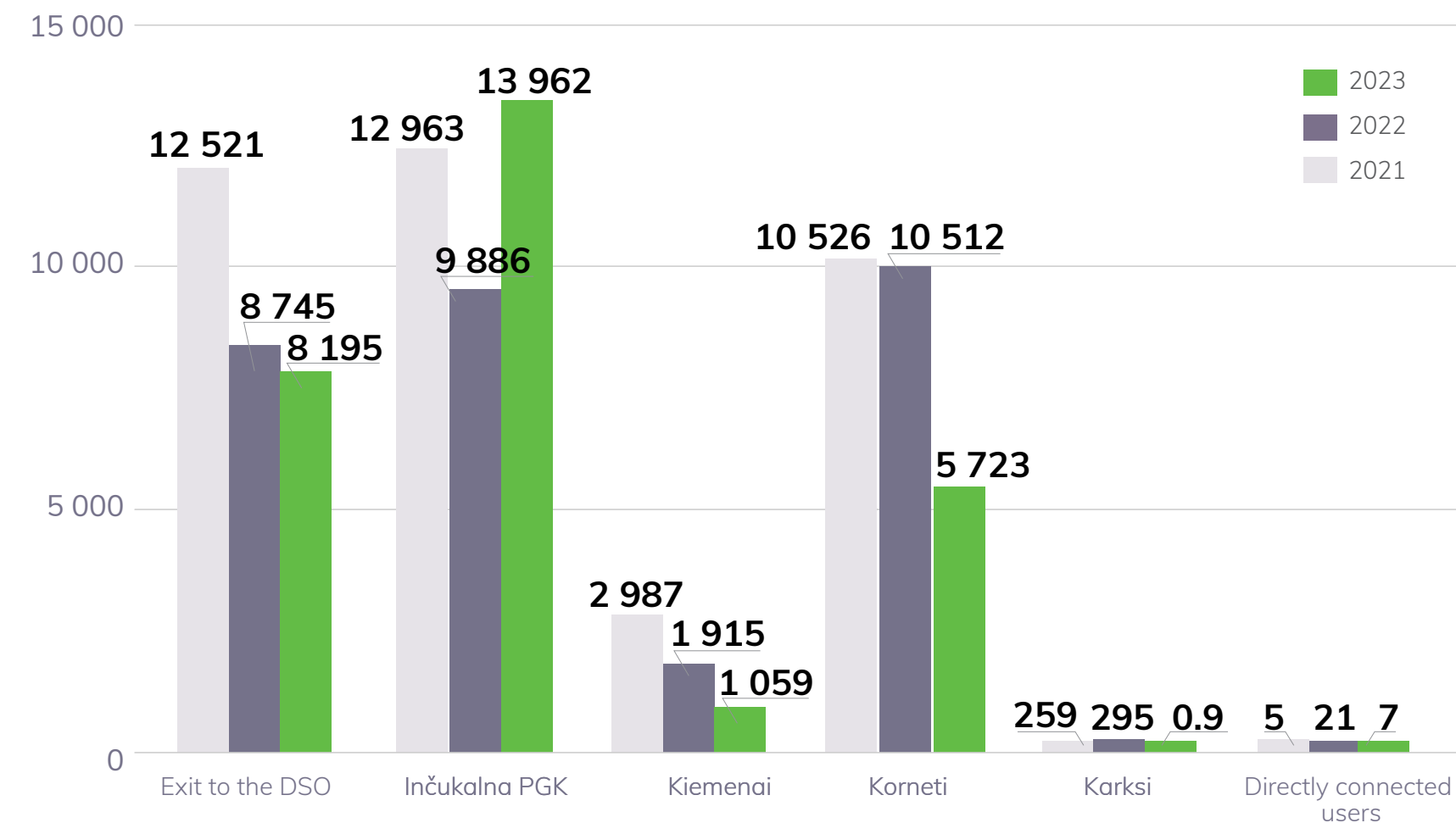
## 4.2 Gas transported and gas supplied to DSO

Year	Month	Transported gas quantity	Quantity of supplied gas to DSO
		MWh	MWh
2023	JAN	2,471,304	1,115,690
	FEB	2,825,637	1,196,926
	MAR	2,456,792	1,026,335
	APR	1,452,678	400,137
	MAY	2,521,432	200,920
	JUN	3,002,086	309,428
	JUL	2,344,216	185,068
	AUG	3,060,765	373,935
	SEP	2,882,364	485,281
	OCT	1,914,474	668,112
	NOV	1,917,856	1,011,713
	DEC	2,284,780	1,221,886

## 4.3 Natural gas injected into the transmission system in 2021, 2022, and 2023, GWh



## 4.4 Natural gas discharged from the transmission system in 2021, 2022, and 2023, GWh



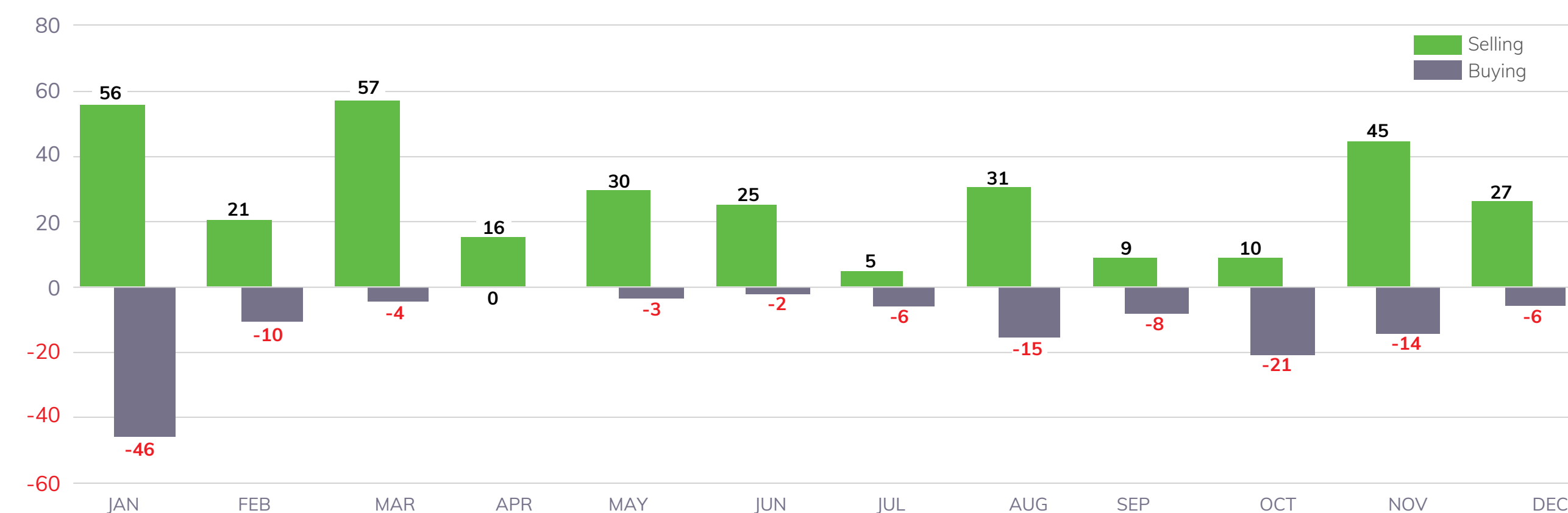
## 4.2. Balancing operations

Conexus has developed and applies on a daily basis a balancing procedure, which defines the conditions of cooperation and conduct of Conexus' structural units in the balancing zone of the single entry-exit natural gas transmission system and for 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 structural units for collecting, exchanging information and assessing and applying the need for balancing actions for balance of the balancing area.

Within the framework of coordination of balancing process of the Single Balancing Area, Conexus performs a daily calculation of system users' imbalances, if necessary, also clearing accumulated system imbalances through balancing operations.

Until 30 September 2023, to ensure the balancing function of the Latvian-Estonian Single Balancing Area, the Estonian natural gas transmission system operator Elering AS had concluded contracts with two transmission system users for the mandatory submission of offers to buy and sell natural gas. In order to continue to receive guaranteed gas purchase and sale offers also after 30 September 2023, Conexus worked together with the Estonian natural gas transmission system operator Elering AS on the process of concluding the new contracts. Updated proposal requirements were developed, and the procurement procedure "Provision of balancing service for the transmission system of the Single Balancing Area" was launched. The procurement resulted in two proposals. Balancing service contracts will be concluded in 2024 with both market participants willing to offer balancing services to the TSO.

## 4.5 Balancing operations in the Estonia-Latvia Single Balancing Area in 2023 (amount)

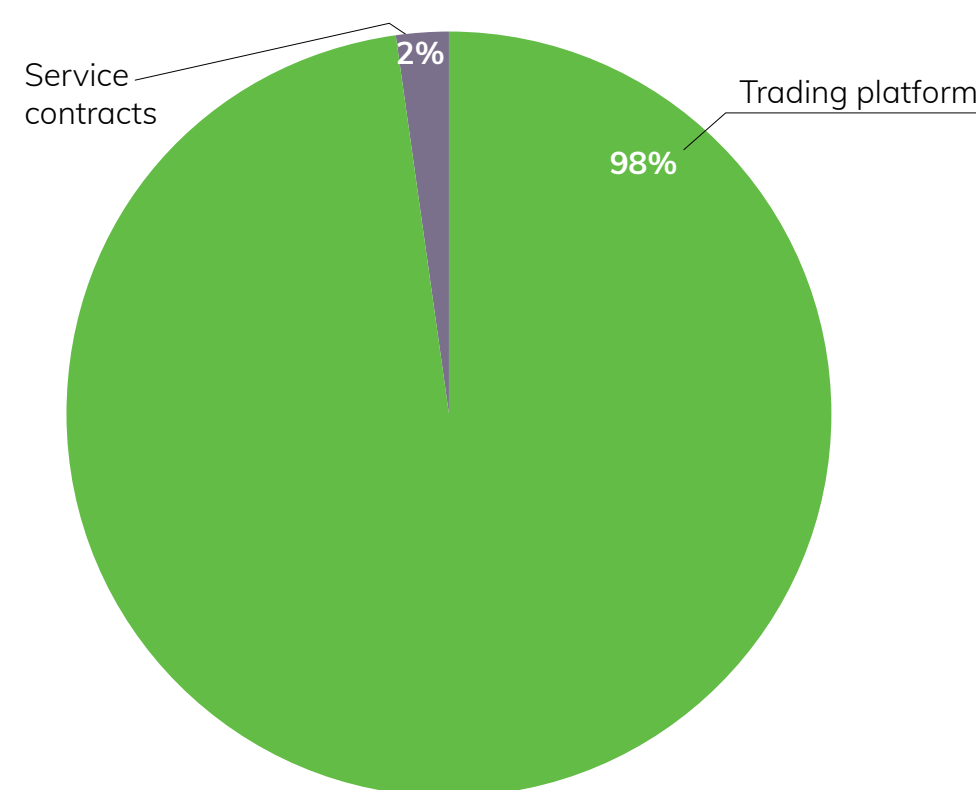


Balancing operations are primarily carried out on the GET Baltic trading platform, however, in cases where the trading platform does not have sufficient liquidity or the proposals are economically disadvantageous, the balancing service contracts concluded with the system users are also used.

Proposals of balancing services received within the framework of the balancing service contracts are accumulated daily in a common balancing service register and ranked by system entry-exit point and by direction in the order of economic benefit.

In 2023, while performing duties of the settlement and balancing coordinator for the Estonia-Latvia Single Balancing Area, Conexus carried out a total of 467 balancing operations, buying the missing natural gas for the balancing area if the amount of imbalance created by users was negative, or selling excess natural gas from the balancing area if the amount of imbalance created by users was positive. 332 balancing operations were carried out to clear positive imbalances and 135 balancing operations - to clear negative imbalances within the framework of the year. The total number of balancing operations during the year is lower than the previous year's, respectively, 526 and 467 balancing operations, with decrease in the number of system users' negative imbalance clearing actions.

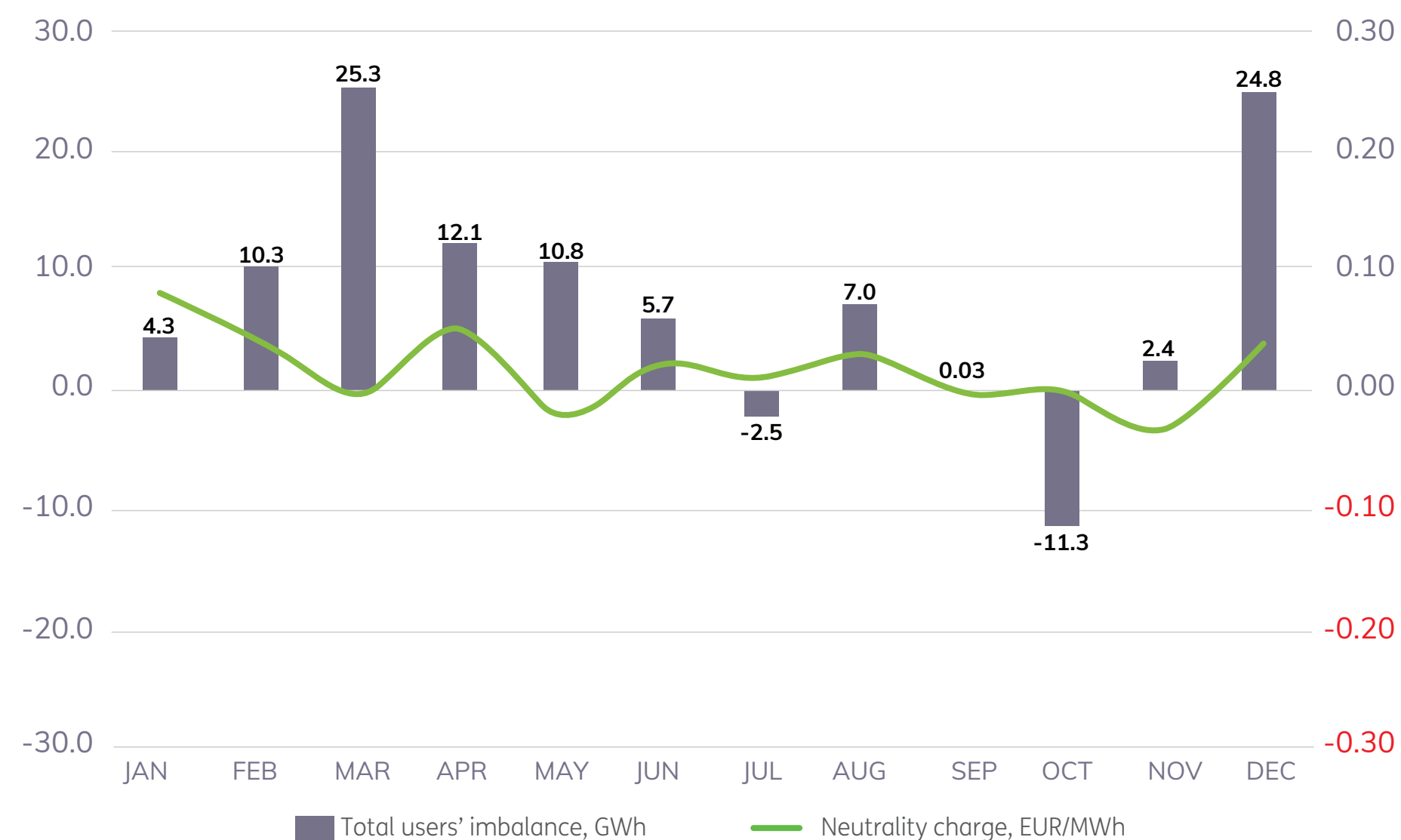
Figure 4.6 Distribution of the number of balancing operations in 2023 (%)



During the reporting period, 98% of all balancing transactions were executed on the trading platform, while the offers submitted by transmission system balancing service providers were used in 2% of cases. Compared to the previous year, the share of balancing transactions executed on the trading platform has increased by three percentage points in 2023, which is to be assessed positively.

The total amount of absolute imbalance generated by all system users in the Estonia-Latvia Single Balancing Area in 2023 was 244.9 GWh. Balancing operations were carried out to clear the positive imbalance created by sys-

Figure 4.7 System users' aggregate imbalance (GWh) and neutrality charge in 2023, EUR/MWh



tem users, amounting to 147.1 GWh, including 141.2 GWh on the trading platform and 5.9 GWh under balancing service contracts. Whereas, balancing operations were carried out to clear the negative imbalance created by system users, amounting to 72.76 GWh, of which 69.86 GWh on the trading platform, and 2.9 GWh through the concluded balancing service contracts. Compared to the previous reporting period, the amount of imbalance created by system users has decreased by ~27%.

The neutrality fee applied in 2023, ranged from minus 0.03 EUR/MWh (November 2023) to plus 0.08 EUR/MWh (January 2023). In bil-

4.8 Neutrality fee in 2023 (EUR/MWh)

Month	Applicable neutrality charge, EUR/MWh
January	0.08
February	0.04
March	0.00
April	0.05
May	-0.02
June	0.02
July	0.01
August	0.03
September	0.00
October	0.00
November	-0.03
December	0.04
<b>On average</b>	<b>€ 0.02</b>

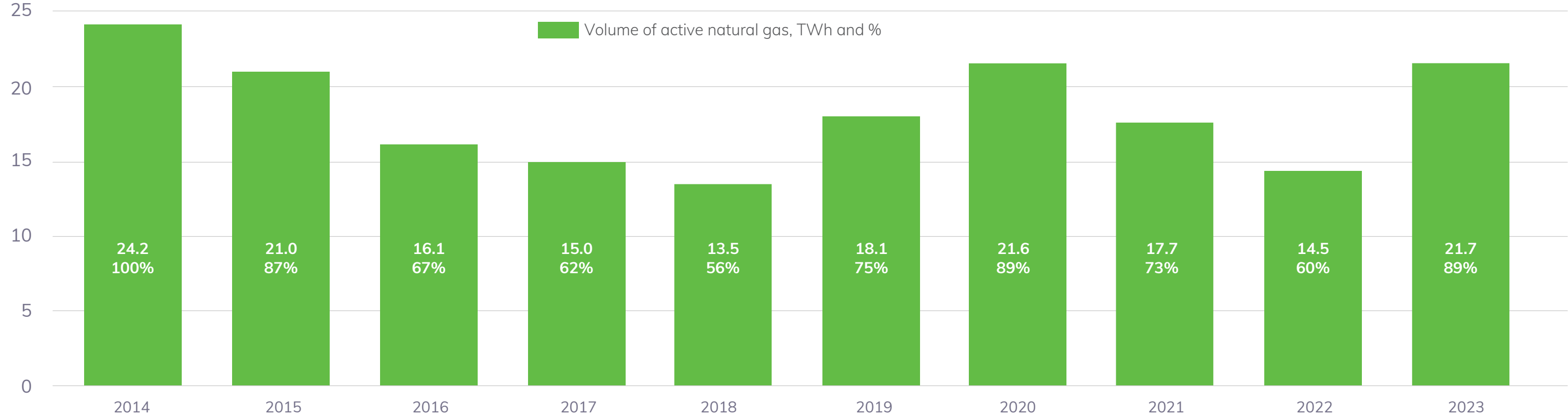
ling periods when the neutrality charge was negative, transmission system operators paid it to transmission system users, while in billing periods when the neutrality charge was positive, transmission system operators collected it from transmission system users. The average neutrality charge in 2023 was 0.02 EUR/MWh per month.



# 4.3. Storage system flow data

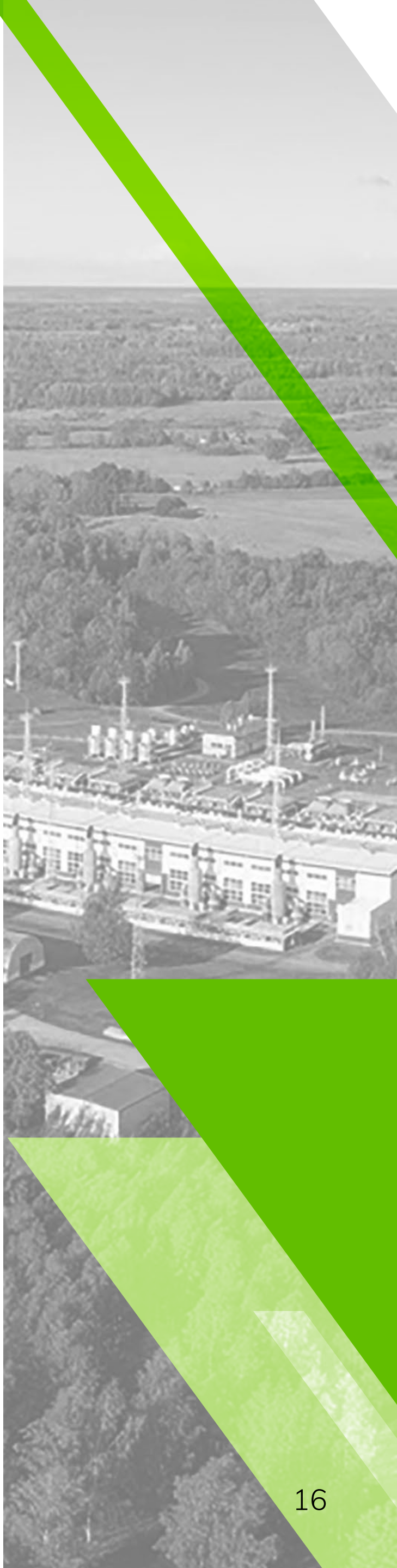
Physical natural gas withdrawal within the 2022/2023 storage cycle ended on 6 April 2023, and the balance of active natural gas in Inčukalns UGS before the beginning of the injection season on 1 May 2023 was 9.1 TWh. The amount of active natural gas in the storage after the end of natural gas injection in October 2023 was 21.7 TWh, which represented 89% of the maximum active natural gas volume. Over the past three years, Latvia's average consumption of natural gas during the heating season has been 6.7-9.8 TWh, and the total amount of natural gas injected into storage is significantly higher than Latvia's heating season consumption.

## 4.9 Volume of active natural gas in Inčukalns UGS after the end of the natural gas injection season (% and TWh of the maximum possible volume)

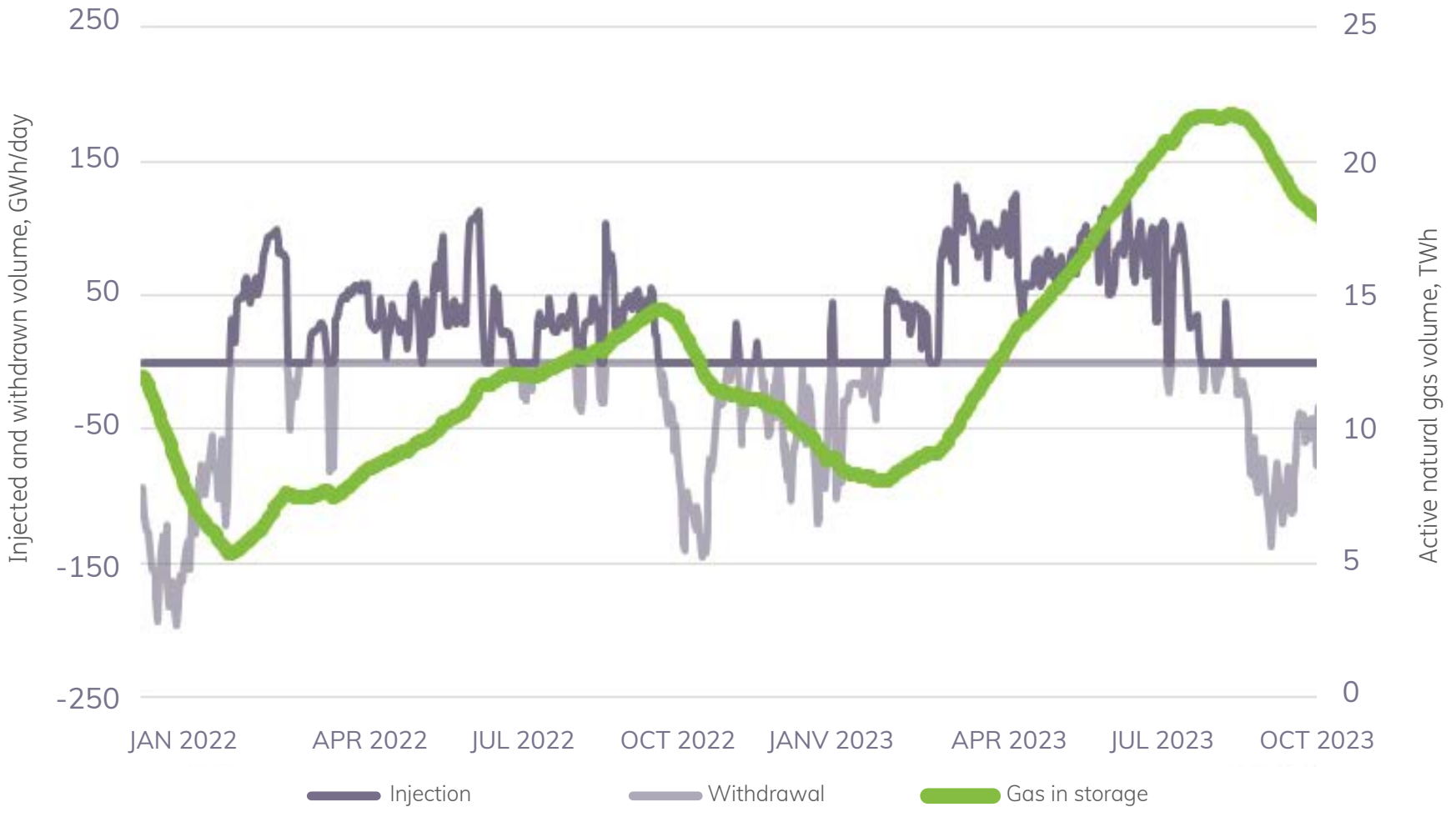


In 2023, 13 942 GWh of natural gas were injected and 7 331 GWh were withdrawn at the Inčukalns UGS. In contrast to the previous year, the Inčukalns UGS had significantly higher reserves at the end of the 2023 injection season amounting to 21.7 TWh, compared to the end of the 2022 injection season. This increase in 2023 was driven by supplies from the recently launched Inkoo LNG terminal in Finland.

The daily withdrawal of natural gas from the Inčukalns underground gas storage with the maximum nationwide gas consumption was fixed on 22.02.2023 and amounts to 120.9 GWh/d, of which 61.4 GWh/d was for consumption in Latvia and 59.5 GWh/d for use in other countries. On this day, the maximum volume of gas withdrawal from the storage was registered during the period from 14:00 to 15:00 amounting to the total volume of gas 5.6 GWh/h, including 2.8 GWh/h for consumption in Latvia and 2.8 GWh/h for use in other countries.



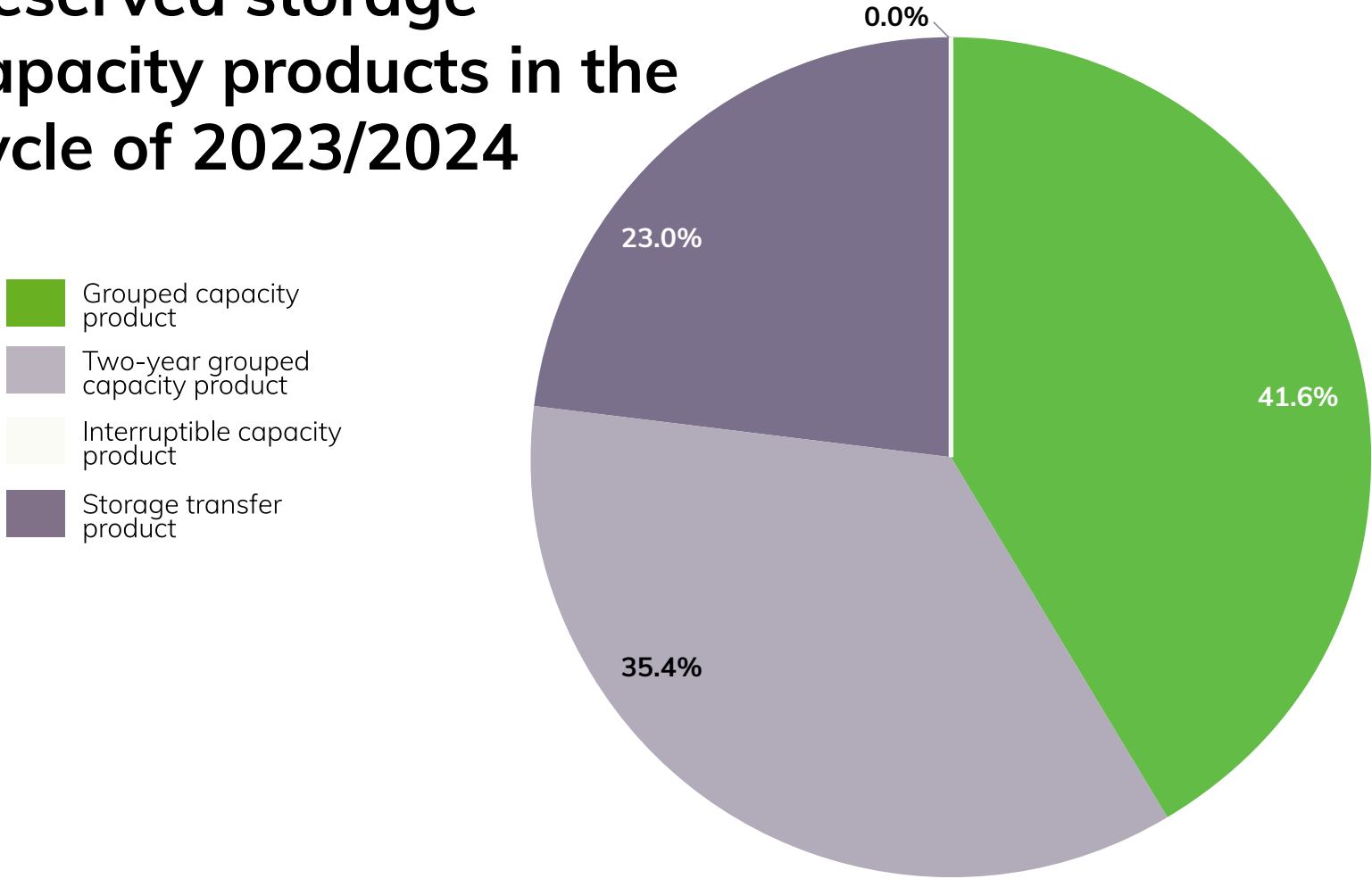
### 4.10 Injection and withdrawal volumes (GWh/day) and active natural gas volumes (TWh) at the Inčukalns UGS in 2022 and 2023



For the 2023/2024 storage cycle, the available storage capacity was set at 22.6 TWh, of which 100% was booked. The storage capacity was reserved by users from the Baltic States, Finland, Germany, Switzerland and Norway.

Technical capacity of the storage facility for the 2024/2025 storage

### Reserved storage capacity products in the cycle of 2023/2024



cycle is set at 22.9 TWh. In determining the technical capacity of the storage facility for the storage cycle, account is taken of the amount of energy security reserves that must be maintained in the Inčukalns UGS in accordance with the Energy Law.

The gas supply situation in the Baltic Sea region has changed significantly in recent years, with several infrastructure projects coming on stream. The existing market conditions create competition between the Inčukalns UGS and LNG terminals, so, in case of a small winter/summer price spread, user interest in storage services may decrease.



# 5. SUPPLY AND CONSUMPTION ADEQUACY ASSESSMENT

The adequacy assessment has been developed based on assumptions about the upcoming summer-winter season and according to the current conditions presented in the description of the scenarios. The assessment is not a forecast of the expected gas supply and consumption situation. Actual use of the gas infrastructure, including the volume of active natural gas in the Inčukalns UGS, will be determined by the decisions of market participants, which will be influenced by external factors such as the winter/summer price spread, progress of new infrastructure projects, as well as political decisions.

## Scenario of 2024/2025 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 natural gas has fallen to a competitive level and stabilised;
- users in the Baltic-Finland region start using natural gas again;
- no input flows are foreseen at the Luhamaa entry and exit point towards the Estonia-Latvia Single Balancing Zone;
- The Hamina LNG terminal is available throughout the year and operates at 45% capacity;
- The Inkoo LNG terminal is available throughout the year and operates at 44% capacity. During the winter period, deliveries of one load per month are foreseen to cover peak consumption;
- Latvia and Lithuania mainly receive gas from Klaipeda LNG terminal and Inčukalns UGS, Estonia and Finland mainly receive gas from Inkoo LNG terminal and Inčukalns UGS;
- the combined technical capacity of the Klaipeda LNG terminal, the Inkoo LNG terminal and the Hamina LNG terminal, together with the Inčukalns UGS, significantly exceeds the projected gas consumption in the Finnish-Baltic region;
- after the gas withdrawal season, the minimum expected active gas balance of the Inčukalns UGS is at least 4 TWh, which includes the Baltic gas safety reserve for emergency situations and energy crisis.
- Significant gas supply (>8 TWh) from the Baltic-Finland region to Poland as a result of traders' exploration of new regions for operation.

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

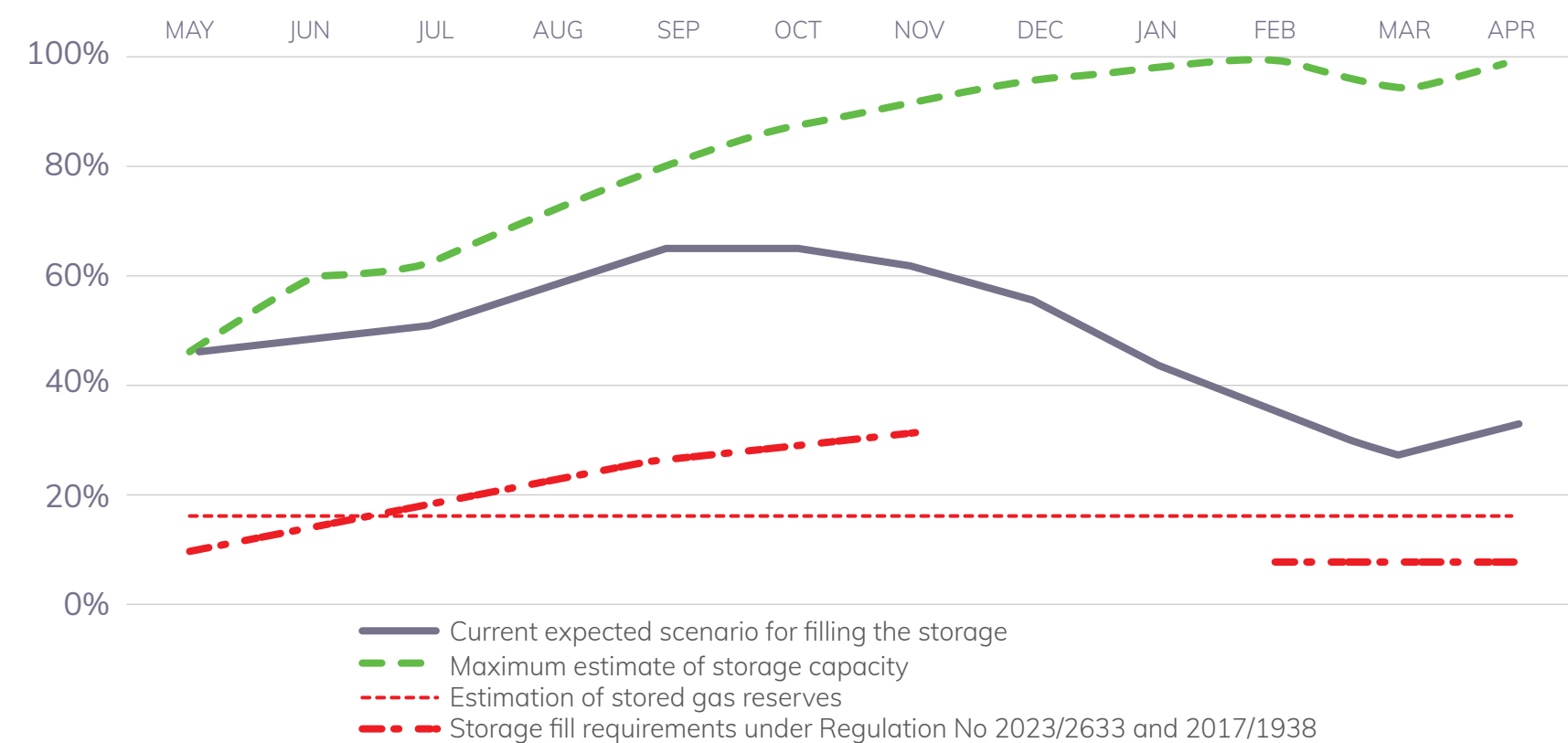
Exit points (Projected annual consumption), TWh/year		Years									
		2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Including	Latvia	10.8	10.2	9.4	9.3	9.3	9.2	9.2	9.1	9.1	9.0
	Rest of region (LT, EE, FIN)	36.5	36.3	35.5	35.4	35.3	35.2	35.0	34.9	34.7	34.7
<b>TOTAL:</b>		<b>47.3</b>	<b>46.5</b>	<b>44.9</b>	<b>44.7</b>	<b>44.6</b>	<b>44.4</b>	<b>44.2</b>	<b>44</b>	<b>43.8</b>	<b>43.7</b>
Entry points (Annual technical capacity), TWh/year											
Including	Inkoo LNG terminal	17.5-40									
	Hamina LNG terminal	1-2.2									
	Klaipeda LNG terminal	31.3-39									
	GIPL	22.5									
<b>TOTAL:</b>		<b>72.3-103.7</b>									

The table summarises the region's projected gas consumption volumes and potential supplies for the Baltic-Finland region over the next ten years. In the coming years, gas consumption is expected to recover due to the synchronisation of the Baltic electricity grids with central Europe. Whereas, in the long

term, gas consumption is expected to decrease, but natural gas will continue to play an important role in balancing renewable electricity generation and the share of renewable gases in total gas consumption will increase. At the projected gas supply and consumption levels, the region's gas supply adequacy is assured both in the short and long term.

Regulation (EU) 2022/1032 of the European Parliament and of the Council of 29 June 2022 amending Regulations (EU) 2017/1938 and (EC) No. 715/2009 with regard to gas storage, which aims to address the major risks to the security of natural gas supply and the Union economy posed by radical changes in the geopolitical situation, entered into force in 2022. 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. Commission Implementing Regulation (EU) 2023/2633 of 20 November 2023 setting the filling trajectory with intermediary targets for 2024 for each Member State with underground gas storage facilities on its territory and directly interconnected to its market area ("Regulation 2633/2023") requires Latvia and neighbouring countries to store in the Inčukalns UGS a volume of natural gas representing a certain share of the 5-year historical average natural gas consumption.

## 5.2. Inčukalns UGS filling scenarios, in % of max. technical capacity of the storage Baltic-Finland scenario 2024/2025



According to the calculations, the projected Inčukalns UGS filling rate could reach up to 65% (with the possibility to fill the storage to maximum level), and, in March 2025, the reserves could be depleted to 33%, maintaining the countries' strategic reserves. The projected filling rate by 1 November, which is the regulatory maximum capacity time, significantly exceeds the capacity requirements of Regulation 2023/2633 set for the Baltic States. For the satisfaction of the demand forecast during the heating period in the Baltic-Finland region, market participants should also arrange gas supplies from the new LNG terminal at Inkoo in Finland.

<sup>10</sup>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

<sup>11</sup>N - 1 ≥ 100 % in accordance with the requirements of the Security of Supply Regulation

## N-1 calculation

Functioning of the natural gas system in the event of shortage of a single system object has been assessed and prepared according to the Regulation (EU) 2017/1938 of the European Parliament and of the Council<sup>10</sup>, 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 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 UGS filling levels 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 UGS filling level

Filling level of Inčukalns UGS	N-1 value <sup>11</sup>
30 %	248%
100 %	258%

Under Regulation (EU) 2017/1938 of the European Parliament and of the Council, 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.

Conexus points out that compressor station No. 1 and compressor station No. 2 of the Inčukalns UGS can be considered as two different infrastructure units, as each compressor station is an individual, complete technological unit, which operates independently of the other. This is made possible by the variations in technological circuits, the individual geographical locations and the possibilities of managing technological units. Conexus concludes that, in the event of a malfunction or outage of one of the technological units of the Inčukalns UGS, the other technological unit will be able to fully meet Latvia's national demand for natural gas.

# 6. TRANSMISSION SYSTEM DEVELOPMENT

## 6.1. Development of the interconnection system

Until 30 May 2022, Regulation (EU) No. 347/2013 of the European Parliament and of the Council of 17 April 2013 laying down European guidelines for energy infrastructure, repealing Decision No. 1364/2006/EC, amending Regulation (EC) No. 713/2009, Regulation (EC) No. 714/2009 and Regulation (EC) No. 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. In accordance with the aforementioned Regulation, European PCIs were identified, which are eligible for relieved procedures and for funding from the CEF.

### 6.1 Natural gas transmission system interconnection development projects



Natural gas infrastructure projects implemented by Conexus according to the fifth PCI list published by the European Commission on 19 November 2021<sup>12</sup>:

◆ **1.** Inčukalns Underground Gas Storage improvement<sup>13</sup>. The Inčukalns UGS is the only underground natural gas storage facility in the Baltics 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 compression facilities. The project will significantly reduce the dependency between the capacity available for withdrawal and the natural gas stocks in storage facility, which will significantly improve the reliability of natural gas supply as well as the operational efficiency of the storage facility. This is particularly important for optimal and efficient functioning of the single Baltic-Finnish natural gas market. Realisation of the project will implement also additional environmental protection measures reducing CO<sub>2</sub>, NO<sub>x</sub> and other emissions. The deadline for the implementation of the project is on December of 2025.

◆ **2.** Improving the interconnection between Latvia and Lithuania<sup>14</sup>. The project was completed in December 2023. As a result of the project, the technical capacity of the Kiemeni interconnection point from 13 November 2023 is set at 90 GWh/d in the direction from Lithuania to Latvia, with a possible dynamic increase to around 100 GWh/d, whereas, in the direction from Latvia to Lithuania, it has been set at 82 GWh/d, with a possible dynamic increase to around 100 GWh/d. System operators assessing the need to apply congestion management measures under specific transmission system operating conditions, such as when natural gas is received in Lithuania from both the LNG terminal and the Lithuania-Poland interconnection at almost full capacity, both compressor stations (the Panevėžys compressor station and the Jauniūnai compressor station) operate simultaneously close to their maximum capacity, as well as

taking into account other transmission system conditions, technical capacities of up to 130 GWh/d in the direction from Lithuania to Latvia, and up to 119 GWh/d in the direction from Latvia to Lithuania can be provided within a limited period of time. Implementation of the project is an important step towards strengthening energy security in the whole region by ensuring increased gas flow from Klaipėda LNG terminal to the Inčukalns UGS.

The fifth PCI list is the last PCI list established under Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009.

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,

<sup>12</sup>List V of European common interests.

Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R0564&qid=1663087079030>

<sup>13</sup>Project of common interest No 8.2.4. Improving the Inčukalns underground gas storage

<sup>14</sup>Project of common interest No 8.2.1. Improving the interconnection between Latvia and Lithuania

smart gas grids and cross-border carbon dioxide networks. At the same time, recital 16 of the preamble stresses that the European energy networks action 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 provide an opportunity to reprofile part of the existing natural gas infrastructure<sup>15</sup>.

On 18 May 2022, the European Commission adopted the REPower EU Plan<sup>16</sup>, 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% target score" proposals.

In line with the Regulation adopted on 30 May 2022, the European Commission plans to approve the new, the sixth, list of PCI<sup>17</sup> with projects to be implemented according to the Regulation on 18 November 2023. According to this list, the Baltic Energy Market Interconnection Plan for Hydrogen (BEMIP Hydrogen) contains project 11.2 Hydrogen Interconnector between Finland, Estonia, Latvia, Lithuania, Poland and Germany (*in English - Nordic-Baltic Hydrogen Corridor*).

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<sup>15</sup>European Union website. Available at: <https://eur-lex.europa.eu/legal-content/LV/TXT/?uri=CELEX%3A52020DC0301>

<sup>16</sup>European Union website. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022DC0230>

<sup>17</sup>European Union website. Available at: [https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=PI\\_COM%3AC%282023%297930&qid=1704358152782](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=PI_COM%3AC%282023%297930&qid=1704358152782)

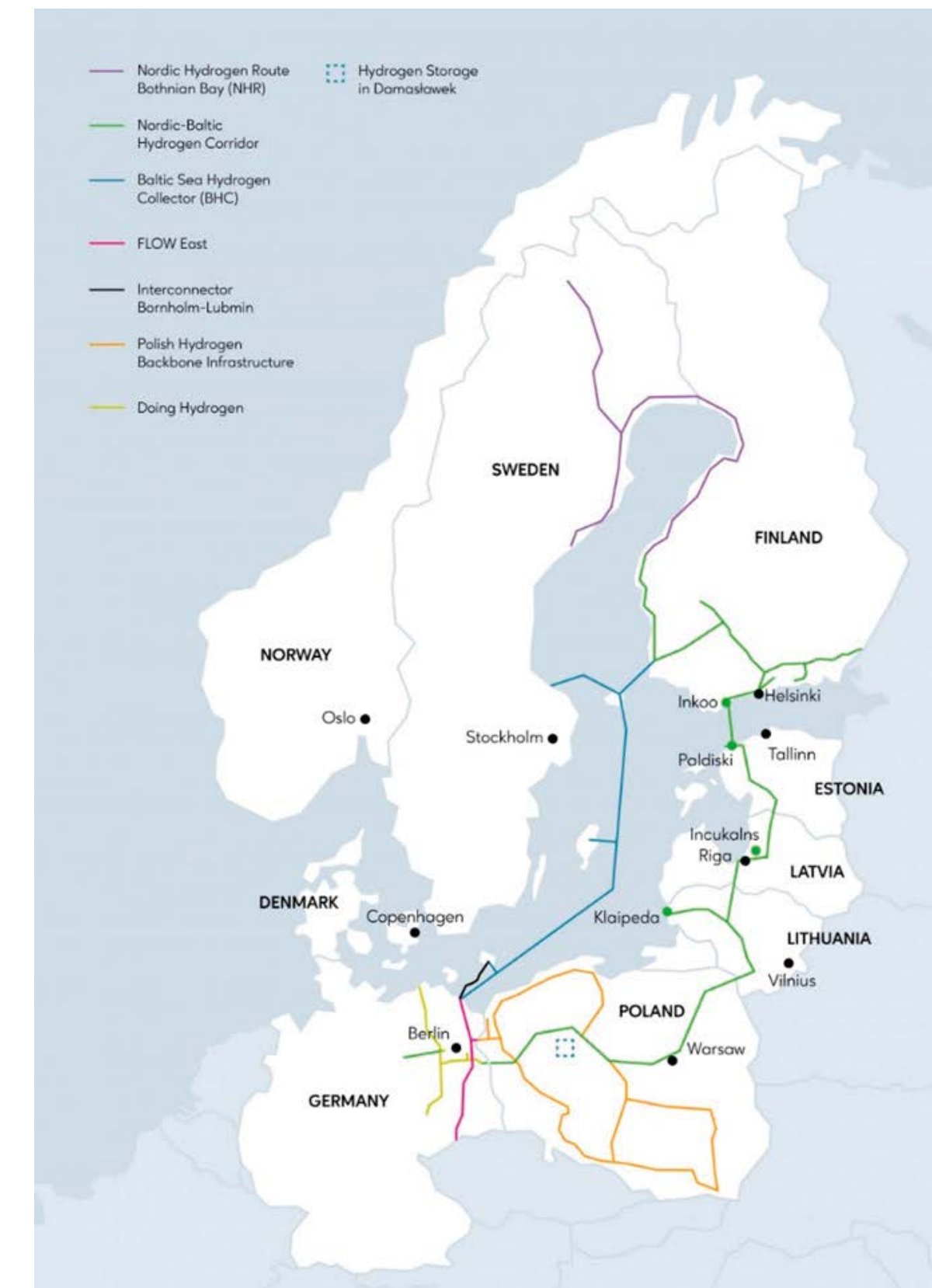


## 6.2. National system development

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 2023, ENTSOG started collecting information on the projects to be included in the 2024 TYNDP. Conexus is promoting to the 2024 TYNDP, in addition to the natural gas infrastructure project "Inčukalns Underground Gas Storage Improvement", already included in the fifth PCI project list, the project "Nordic-Baltic Hydrogen Corridor" - Latvian section, already included in the 2022 TYNDP list and promoted to the PCI, as well as approved by the European Commission on 29 November 2023.

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 hydrogen gas transmission corridor from Finland to Germany via the Baltic States and Poland. The project is based on the RePower EU Roadmap published by the European Commission on 18 May 2022, as well as the proposals for hydrogen infrastructure development elaborated by the European Hydrogen Backbone<sup>18</sup>. The project was included in the PCI list in 2023, and the transmission operators involved in the project started the first phase of the project development - the pre-feasibility study, which will be completed by the end of Q2 of 2024. Based on the results of the feasibility study and the recommendations made, a decision will be taken on further progress of the project.

### 6.2 Hydrogen infrastructure development projects in the Baltic Sea region.



<sup>18</sup>European Hydrogen Backbone. Available at: <https://ehb.eu/>

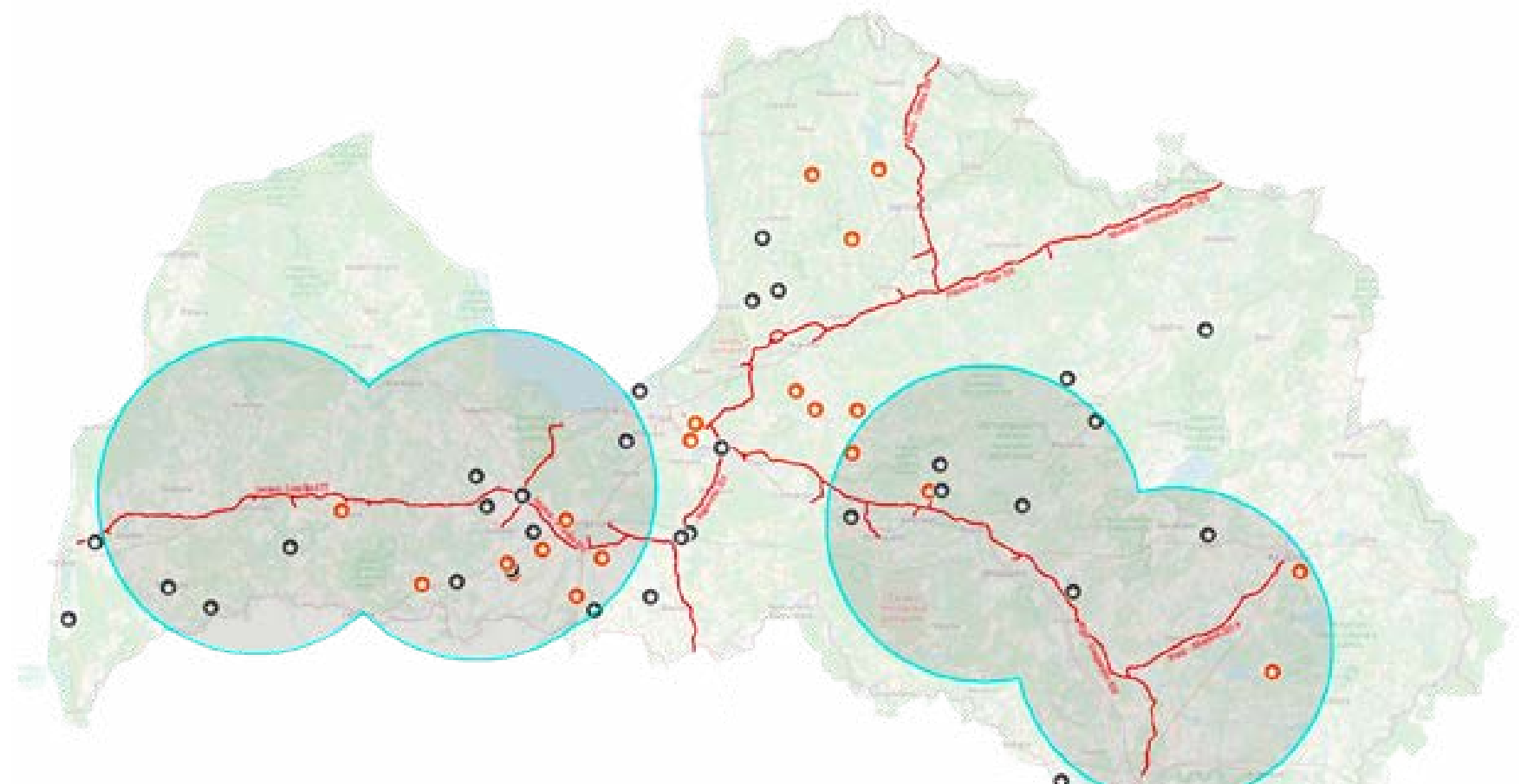
In 2023, operators of four countries completed the first part of a jointly implemented research and development project on hydrogen injection into the gas transmission systems of Latvia, Lithuania, Estonia and Finland - a desk study. The study concluded that it was theoretically possible to transport natural gas with a hydrogen content of 2%-5% with relatively low investment requirements in the transmission system. For higher hydrogen inputs into the natural gas network, e.g. 10% or more, the amount of retrofitting measures and costs required will increase significantly. According to ASME B 31.12, material tests and integrity assessments are required if the hydrogen content of natural gas is to exceed 10%. In addition, several components of the transmission system would need to be modified, which would have a significant cost impact.

In order to facilitate the integration of biomethane into the system and to enable biomethane producers without a direct connection to the gas infrastructure to inject their biomethane into the natural gas transmission network without having to build connecting pipelines from the biomethane plant to the transmission system, Conexus is implementing the project "Smart Integrated Solutions for Injecting Renewable Gases into the Transmission System".

Conexus, as a part of the project "Smart Integrated Solutions for Renewable Gas Injection into the Transmission System", completed in 2023 the building design in the minimum composition for four biomethane injection points. The most promising location for the pilot project has been identified as a point in Džūkste parish. In 2023, implementation of the project of a point in Džūkste parish was commenced, as well as the development of IT solutions necessary for the point's operation. Completion of the Džūkste point is scheduled by mid-2025. Location of other input points may be specified in cooperation with industry.

<sup>19</sup>Biomethane Industrial Partnership. Available at: <https://bip-europe.eu/>

### 6.3 The location of biogas producers around the natural gas transmission system and the potential service radius of biomethane injection points.



In 2021, the transmission system operators Elering AS, Gasgrid Finland Oy, Conexus, and Amber Grid AB from Estonia, Finland, Latvia, and Lithuania signed a Memorandum of Understanding to promote the development of green or renewable gas, including the establishment of a regionally harmonized Guarantees of Origin system. Also in 2023, 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.), which address issues related to the development of renewable gases, Conexus also joined the Biomethane Industrial Partnership (in English - *Biomethane Industrial Partnership*<sup>19</sup>), obtaining status of an associate member, and participating in task forces related to gas system connections, as well as research, development and innovation.

In 2023, Conexus has established a system for issue, circulation and control of Guarantees of Origin for gas produced from renewable energy sources in accordance with the requirements of the Energy Law, complying with the requirements of the European Energy Certificate System (EECS) developed by the "European Association of Issuing Bodies of Guarantees of Origin" during the implementation of the system. The approval of the domain protocol ensures that the registry is recognized internationally – in the member countries of the European Association of Issuing Bodies.

Conexus ensured both the implementation of the electronic gas guarantee of origin registry and the development of the circulation procedures, which, when approved, gave Conexus full-fledged membership of the European Association of Issuing Bodies gas scheme. Membership of the Gas Scheme group gives a voice in decision-making in the development of the European Energy Certificate System and will enable Conexus to issue European Standard Gas Guarantees of Origin - EECS GO. Alongside Conexus, the Gas Scheme group also includes the Spanish gas guarantee of origin issuing body "ENAGAS GTS" and the Austrian electricity and gas market regulator "E-Control", Gasgrid Finland, as well as the official gas guarantees of origin issuing bodies of several other European countries, which are actively participating in this group and are also gradually implementing the EECS requirements for the harmonised circulation of guarantees of origin in Europe.

## 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 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<sup>20</sup>. The Regulation specifies 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<sup>1</sup>(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. In 2023, applications for arrangement of connections were assessed in accordance with the Regulation approved by PUC on 18 April 2019 "Regulations for connection to the natural gas transmission system for biomethane producers, LNG system operators and natural gas users", and, starting from 15 March 2023, in accordance with Regulation No. 1/4 "Rules for Connection to the Natural Gas Transmission System for Natural Gas Distribution System Operators, Biomethane Producers, LNG Terminal Operators and Natural Gas Users" approved by the PUC on 9 March 2023.

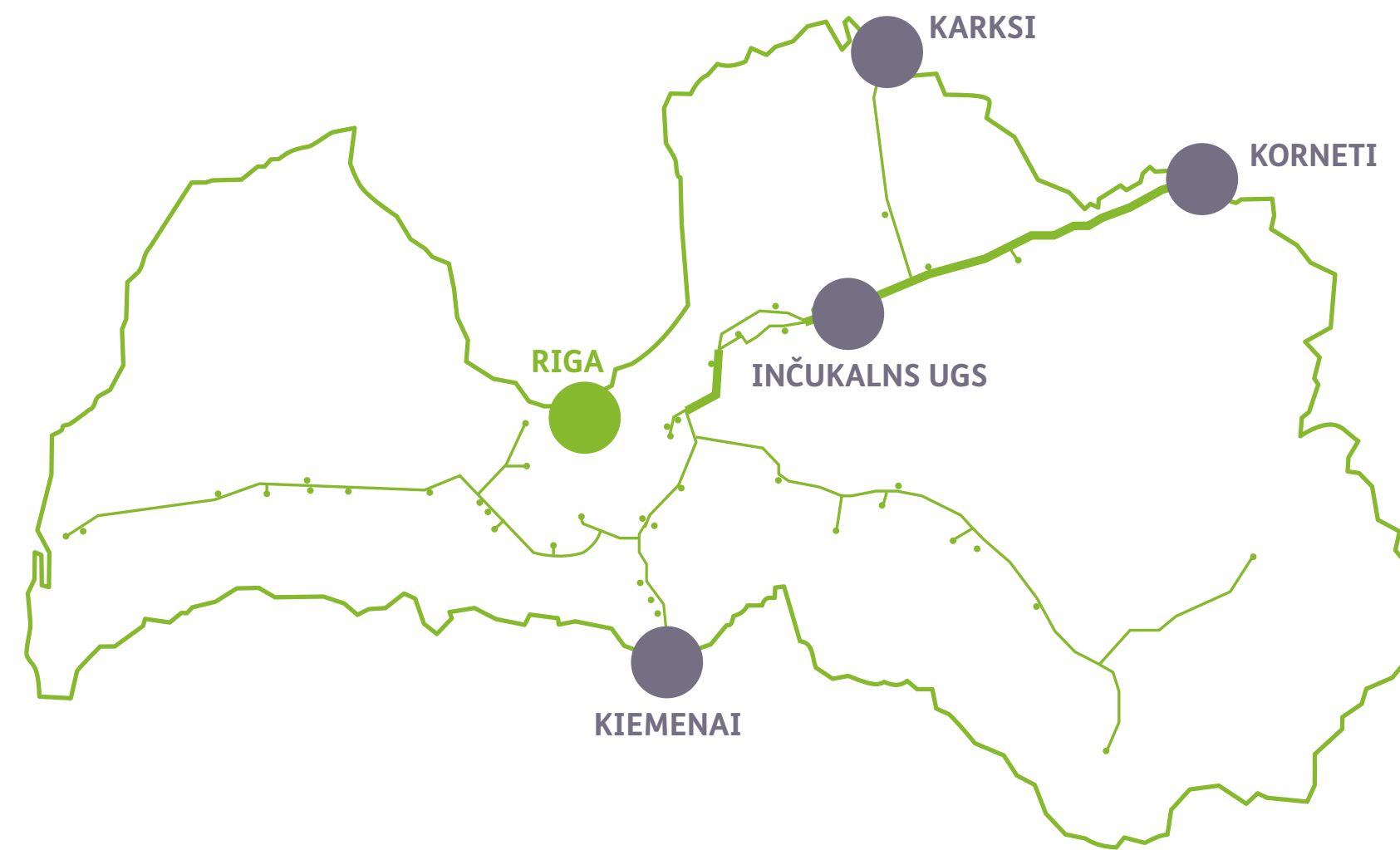
Users show interest in establishing a connection to the transmission system. In 2023, three technical requirements for establishment of direct connections to the transmission system were issued. Conexus has created a map of potential connection points with potentially the lowest connection costs to the natural gas transmission system pipeline, where 18 potential connection points are marked. A map of the Latvian natural gas transmission system with connection points is available on the Conexus website<sup>21</sup>.

<sup>20</sup>Latvijas Vēstnesis / Official Journal. Available at: <https://www.vestnesis.lv/op/2022/179.4>

<sup>21</sup>Conexus website. Available at: <https://www.conexus.lv/interaktiva-karte>

## 6.3. Assessment of transmission system security at interconnection points

### 6.4 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, "Kiemeni".

### "Karksi" interconnection

The interconnector provides gas transmission from Inčukalns UGS 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, gas was supplied via interconnection from the Inkoo LNG terminal for injection at the Inčukalns UGS, national consumption and onward transmission to Lithuania, as well as in the opposite direction for Estonian gas supply from the Inčukalns UGS.

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 interconnector is that any repair work will result in the interruption of its operation.

At the end of 2023, the maximum technical capacity in both directions of the interconnection at the "Karksi" point was 105 GWh/d. Maximum capacities are provided at a pressure of 50 barg, while the designed maximum pressure in the pipeline is set at 55 barg. In the last two years, 16 235 GWh of energy were transported via the interconnector in the direction of Estonia, with the interconnector operating 508 days or 70% of the time, while 4 400 GWh of energy were transported via the interconnector in the direction of Estonia to Latvia, with the interconnector operating 181 days or 25% of the time

in the last two years. In total, the transmission capacity of the interconnector was not used for 41 days or 6% 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 leads to a conclusion that:

- ◆ the interconnector with its maximum technical capacity of 105 GWh/d was not used;
- ◆ maximum daily capacity reached - 80 GWh/d;
- ◆ average interconnector load over two years - 30 GWh/d;
- ◆ average load from Latvia to Estonia - 32 GWh/d;
- ◆ average load from Estonia to Latvia - 24 GWh/d.

Thus, taking into account the fact 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 are harmonised in Estonia and Latvia, including for renewable gases such as biomethane.

## "Kiemenu" interconnection point

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

<sup>22</sup>GetBaltic. Available at: <https://umm.getbaltic.com/public-umm/3544>

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 interconnector is that any repair work will result in the interruption of its operation. This interconnector is considered to be the main natural gas supply route for Latvian consumers and Inčukalns UGS from the beginning of 2022.

After the enhancement of the Latvia-Lithuania interconnection, in 2023, technical capacities in the direction from Lithuania to Latvia has been set at 90 GWh/d, and in the direction from Latvia to Lithuania - 82 GWh/d, which can be dynamically increased up to 100 GWh/d in both directions<sup>22</sup>. Maximum capacities are provided at a pressure of 50 barg, while the designed maximum permissible pressure in the pipeline is set at 55 barg.

During the last two years, 2 973 GWh of energy was transported to Lithuania via the interconnection point, and the interconnection point operated for 98 days or 13% of the total time in this direction. In the direction from Lithuania to Latvia, 32 489 GWh of energy were transported through the point in the last two years, and the point operated for 607 days or 83% of the total time in this direction. So, in the last two years, 25 days or 3% of the total time, no capacity was used through the interconnector. 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 UGS 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;
- ◆ the capacity towards Lithuania was set at 82 GWh/d;
- ◆ from Latvia to Lithuania, the maximum capacity reached is 65 GWh/d;
- ◆ from Lithuania to Latvia, the maximum capacity reached is 93 GWh/d;
- ◆ two-year average load - 49 GWh/d;
- ◆ average load from Latvia to Lithuania - 30 GWh/d;
- ◆ average load from Lithuania to Latvia 54 GWh/d.

Conexus concludes that the average load of the interconnection point was 48% of the specified technical capacity. Conexus has no reason to plan measures to increase the interconnection capacity in relation to the capacity set in 2023, as confirmed also by the surveys jointly organised by Conexus and AB Amber Grid on the need for incremental capacity according to the requirements of NC CAM<sup>23</sup>. Taking into account the forecasts of national and regional natural gas consumption for the next decade, Conexus concludes that there is no reason to build a new interconnection between Latvia and Lithuania, while the existing one fully meets the market demand.

Gas quality requirements in Lithuania and Latvia are equivalent for both natural gas and biomethane.

## "Korneti" interconnection

The interconnection is a corridor of two parallel pipelines with a nominal diameter of 700 mm. The interconnector 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 "Korneti" interconnector 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 UGS. The interconnector will provide natural gas to connected consumers in Latvia and gas supplies to Estonia. Conexus does not plan major investments in this interconnection in the coming years.

Until 24 February 2022, the interconnector 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 interconnector decreased significantly. According to Section 106(4) of the Energy Law, natural gas supplies from the Russian Federation are prohibited, therefore the future use of the interconnector 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. During the previous two years, the interconnection was not in the direction to Latvia. In the direction from Latvia to Estonia, 1.6 GWh of energy was transported through the point in the last two years, and the point operated in this direction for 2 days or 0.3% of the total time. Capacity of the interconnection was not used for 728 days, or 99.7% of the total time, which is the minimum value compared to previous periods. An analysis of the daily permissible capacities of the interconnection point shows that:

- ◆ maximum daily capacity reached - 0.9 GWh/d;
- ◆ average load from Estonia to Latvia - 0 GWh/d;
- ◆ average load from Latvia to Estonia - 0.8 GWh/d.

It can be concluded that, over the past two years, the interconnection has only been busy for two days. At the moment, Conexus has no reason to plan measures to increase the technical capacity of the interconnector. Given the uncertain geopolitical situation and the ban on natural gas supplies from Russia, Conexus does not plan to build a new interconnection within the corridor in the future.

<sup>23</sup>Conexus website. Available at: [https://conexus.lv/uploads/filedir/Pieprasijuma\\_novertejama\\_zi\\_ojums\\_ICA\\_LVL-2021.pdf](https://conexus.lv/uploads/filedir/Pieprasijuma_novertejama_zi_ojums_ICA_LVL-2021.pdf)

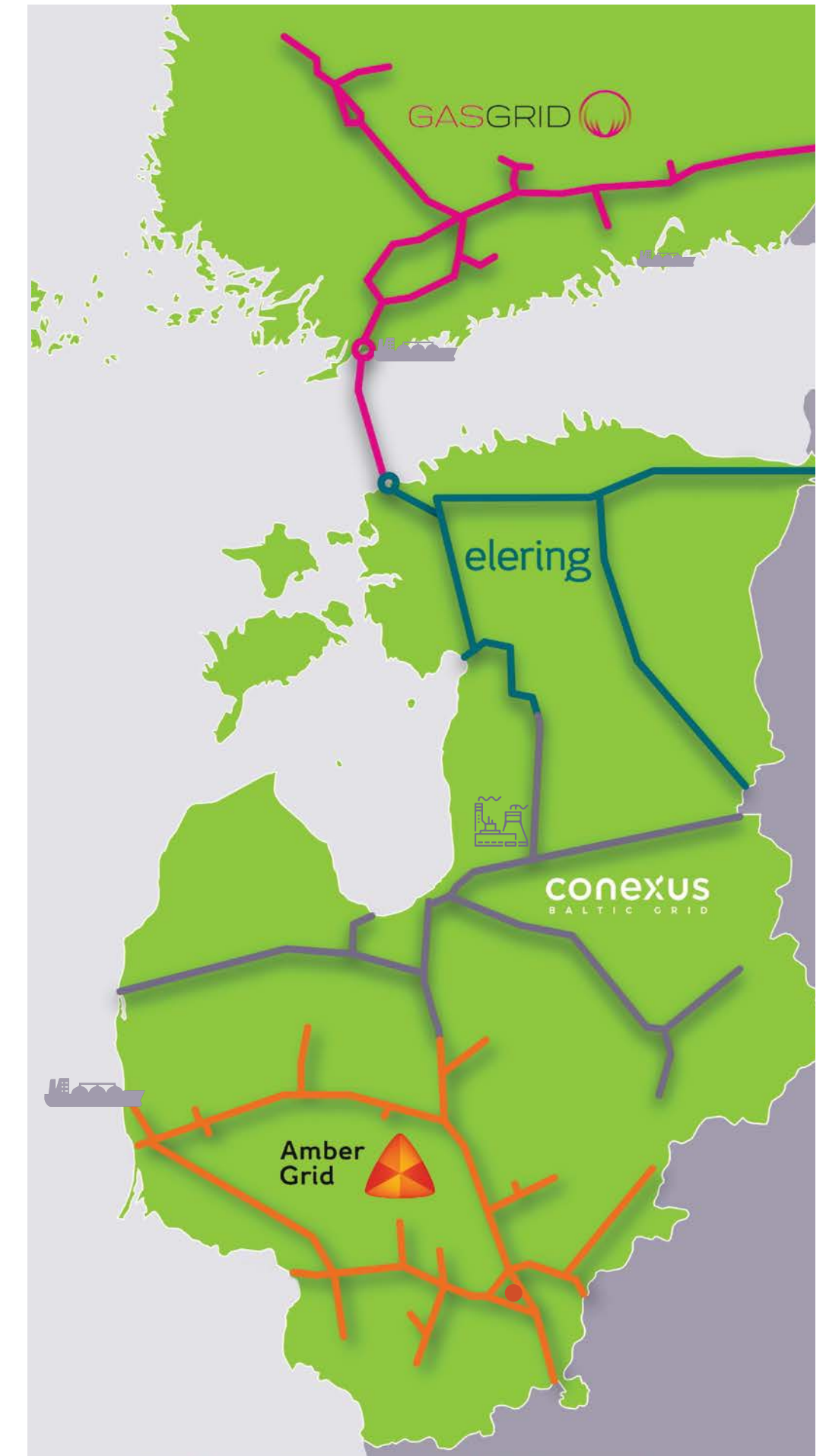
# 7. REGIONAL GAS MARKET

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 Single Market and the abolition of commercial borders between Single Market Member States, including the Estonia-Finland interconnector - 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 Single Market for Natural Gas was launched, bringing together gas transmission system operators in Finland, Latvia and Estonia to create a single tariff entry 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 the same;
- ◆ At the internal borders of the Single Market - tariffs are abolished;
- ◆ Tariffs at the interconnection point with Inčukalna UGS 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

In 2023, the Russian invasion in Ukraine continued. Geopolitical developments in the Middle East had a significant impact on the economy, including the energy sector. In 2023, the decision of the Cabinet of Ministers of the Republic of Latvia on announcement of early warning in the natural gas supply sector and the 2022 amendments to Section 106(4) of the Energy Law, which banned natural gas supplies from the Russian Federation, were still in effect. Although the gas supply situation was challenging at the beginning of the year, in the following period, the natural gas market participants in the Baltic-Finland region successfully coped with the difficulties and ensured availability of the required volumes of natural gas in the region.

In 2023, Conexus continued its practice, commenced in 2022, of planning and chairing regional operational meetings, which are attended on a weekly basis by representatives of the Lithuanian, Estonian and Finnish natural gas transmission system operators, representatives of the Lithuanian and Finnish LNG terminal operators, and on a monthly basis - by representatives of the Polish transmission system operator. The purpose of the meetings is to promote regional cooperation, improve regional coordination and resolution of issues, enhance the understanding of the parties involved on the gas supply infrastructure in the region, the technical and natural gas market solutions required, and maximise the efficient use of each country's gas supply infrastructure for the common benefit of the region for a secure and reliable gas supply.

In order to promote transparency in the planning process for infrastructure maintenance and repair works, to minimise the impact of the works on market participants to the extent possible, and at the same time to ensure security and continuity of gas

supply, Conexus continues to coordinate and manage the planning process for consolidated repair works in the Baltic-Finland region. Taking into account the existing practice of coordinating repair works and with the aim to further promote regional cooperation and transparency in the operation of the gas supply system, the Baltic and Finnish natural gas transmission system operators, together with the LNG terminal operators of Lithuania and Finland, have started work on the development of a joint regional cooperation agreement.

A major change in the Baltic-Finland gas supply took place in March 2023, when the Inkoo LNG terminal started commercial operations. Together with Finnish and Estonian counterparts, Conexus participated in the coordination of the first commercial cargo delivery, as the volume of gas to be regasified exceeded the volume of Finnish natural gas consumption, requiring additional flexibility in the Estonian and Latvian transmission system infrastructure to be used for regasification.

As a result of faster implementation of the ELLI project, the requirements for the certification of higher maximum allowable operating pressure of the transmission system were met at the end of 2023, contributing to the increase of natural gas transmission capacities in the region.

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

- ◆ On 13 January 2023, an accident occurred in Lithuania on the Riga-Panevėžys transmission pipeline, which reduced technical capacity of the "Kiemenai" interconnection point for 3 days;
- ◆ From December 2022, natural gas market participants are offered the possibility to deliver natural gas to the Inkoo LNG terminal in the second and third quarters of 2023. In fact, full deliveries started on 27 March 2023;



- ◆ In February 2023, AB Amber Grid carried out internal diagnostics of the Vilnius-Panevėžys-Riga gas pipeline in Lithuania, during which the technical capacity of the "Kiemenai" interconnection point was reduced;
- ◆ On 8 October 2023, the Balticconnector subsea pipeline was damaged, and natural gas can only be supplied to Estonia from Latvia until 22 April 2024;
- ◆ From 13 November 2023, capacity of the "Kiemenai" interconnection point in the direction from Latvia to Lithuania has been increased to 82 GWh/d.

In 2023, the impact of biomethane quality parameters on gas flow was assessed. This was followed by the drafting and signing of amendments to the technical cooperation agreement with Elering AS, including detailed requirements for natural gas quality parameters potentially affected by biomethane producers connected to the transmission pipeline.

By December 2023, the Baltic-Finnish natural gas transmission system operators UAB GET Baltic (hereinafter referred to as - GET Baltic) moved its urgent market messages functionality to the European Energy Exchange insider information platform following the change of ownership of GET Baltic. The natural gas operators in the region agreed that, as of 27 December 2023, urgent market messages will henceforth be published on the ENTSO-G website, which is also considered an insider information platform.

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 Single Market Area were postponed to 2025. 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.

Natural gas consumption in the region is expected to stabilise, but a gradual decrease is forecast in the long term.

# 8. CONCLUSIONS OF THE UNIFIED OPERATOR

- ◆ **1.** In 2023, natural gas consumption in Latvia continued to decrease - by 7% compared to 2022, affected by both relatively high natural gas prices and climatic conditions. Natural gas consumption is expected to recover partly in the coming years, as gas will play an increasing role in balancing electricity generation. Although natural gas consumption is expected to fall over the next decade, the share of renewable gases in total gas consumption structure will increase.
- ◆ **2.** The region's natural gas sources are fully capable of meeting the region's natural gas demand in both short and long-term. It can be concluded that the regional natural gas market is able to function also in challenging periods, but further development of instruments to facilitate the functioning of the regional market is required. LNG terminals and GIPL are expected to meet the region's long-term natural gas demand.
- ◆ **3.** The Inčukalns UGS reached 89% capacity at the end of the 2023 injection season, up 29 percentage points on year-by-year basis, confirming the high demand for storage services on the market in the year under review. The significant increase in stocks was driven by the start-up of the LNG terminal in Finland.
- ◆ **4.** The total number of balancing activities and the amount of imbalances decreased compared to the previous year. However, in order to ensure more efficient operational planning for market participants, it is necessary to align the terms of access to the Inčukalns UGS with the long-term reserved capacities at LNG terminals by introducing storage capacity products with appropriate term.
- ◆ **5.** Conexus concludes that the existing transmission and storage infrastructure capacity is sufficient to meet the region's natural gas demand even in situations where supply from the natural gas source is limited or interrupted for part of the region. The Inčukalns UGS plays a particularly important role, as its technology ensures that the storage facility cannot lose its full natural gas withdrawal capacity in the event of an outage in one of its technological units.
- ◆ **6.** The system for issuing, circulating and controlling gas guarantees of origin from renewable energy sources has been successfully established and implemented. Conexus became a full-fledged member of the "European Association of Issuing Bodies of Guarantees of Origin" gas scheme, which will significantly contribute to the development of the biomethane market in Latvia.
- ◆ **7.** Transmission system operators in the region have developed close cooperation with the aim of developing a regional market for renewable energy. A study to investigate the adaptability for injection of hydrogen into existing transmission infrastructure has been successfully completed. Conexus, in cooperation with other transmission operators, launched a study to develop transmission infrastructure for hydrogen.

# 9. ANNEXES

## Annex 1

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

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 UGS

Indicator	Value (GWh/d)
EP <sub>m</sub> Pipeline interconnections – entry capacity: <ul style="list-style-type: none"> <li>From Estonia 105 GWh/day</li> <li>From Lithuania 90 GWh/day</li> </ul>	195
P <sub>m</sub>	0
S <sub>m</sub> <ul style="list-style-type: none"> <li>The Inčukalns UGS compressor station No. 1 147 GWh/day</li> <li>The Inčukalns UGS compressor station No. 2 252 GWh/day</li> </ul>	133*
LNG <sub>m</sub>	0
I <sub>m</sub>	0**
D <sub>max</sub>	132.55

**Note**

\* Maximum combined capacity limited by the gas collector layer's withdrawal capacity

\*\* Actual loss of supply capacity, taking into account the technological capacity the storage operates at the most productive compressor station's outage

$$N-1 = \frac{195+0+133+0-0}{132.55} \times 100 = 248\%$$

## N-1 calculation data at 100% Inčukalns UGS

Indicator	Value (GWh/d)
EP <sub>m</sub> Pipeline interconnections - entry capacity: <ul style="list-style-type: none"> <li>From Estonia 105 GWh/day</li> <li>From Lithuania 90 GWh/day</li> </ul>	195
P <sub>m</sub>	0
S <sub>m</sub> <ul style="list-style-type: none"> <li>The Inčukalns UGS compressor station No. 1 147 Wh/day</li> <li>The Inčukalns UGS compressor station No. 2 252 Wh/day</li> </ul>	279*
LNG <sub>m</sub>	0
I <sub>m</sub>	132**
D <sub>max</sub>	132.55

**Note**

\* Maximum combined capacity limited by the gas collector layer's withdrawal capacity

\*\* Actual loss of supply capacity, taking into account the technological capacity the storage operates at the most productive compressor station's outage

$$N-1 = \frac{195+0+279+0-132}{132.55} \times 100 = 258\%$$

