Joint-Stock Company

conexus BALTIC GRID

Natural Gas Transmission System Operator

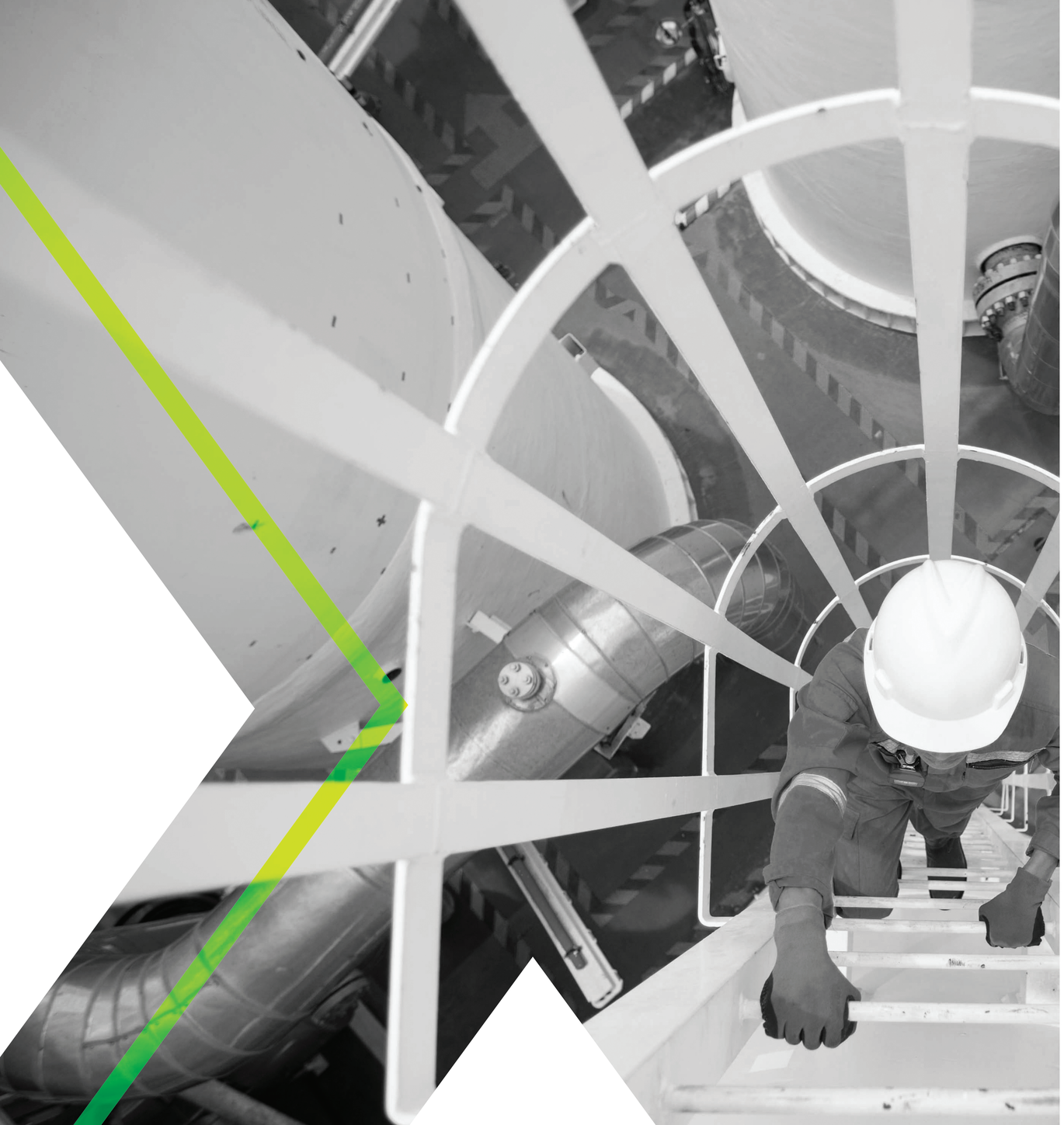
ANNUAL EVALUATION REPORT 2020

Riga 2021

CONTENTS

ABBREVIATED TERMS

RES	Renewable energy sources
UN	United Nations
AST	Joint Stock Company “Augstsprieguma tīkls”
BEMIP	Baltic Energy Market Interconnection Plan
CEF	Connecting Europe Facility
Conexus or the Company	Joint Stock Company “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
GRU	Gas reduction unit
GRS	Gas regulation station
GCP	Gas collection point
Inčukalns UGS	Inčukalns underground gas storage
ITC	Inter-Transmission System Operator Compensation
INEA	Innovation and Networks Executive Agency
PCI	Project of common Interest
CMP	Control measurement point
SLID	Single Largest Infrastructure Disruption
NECP	National Energy and Climate Plan
NIS Directive	Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union
TSO	Transmission system operator
RGMCG	Regional gas market coordination group
GHG	Greenhouse gases
PUC	Public Utilities Commission
TYNDP	Ten-Year Network Development Plan
UMM	Urgent market message



1. GENERAL INFORMATION

In accordance with Section 43.1, Paragraph two of the Energy Law, the natural gas transmission system operator shall, once a year, prepare a transmission system and consumption conformity and State natural gas supply safety evaluation report (hereinafter referred to as the Evaluation Report). The Evaluation Report for 2020 has been prepared in accordance with the requirements of the Regulation of the Cabinet of Ministers No. 482 “Rules on Annual Evaluation Report of Natural Gas Transmission System Operator” of 20 June 2006. In accordance with Paragraph 5 of this Regulation, the transmission system operator shall prepare and submit an Evaluation Report to the Ministry of Economics and PUC by 1 June each year.

Conexus is a unified natural gas transmission and storage operator in Latvia, which manages one of the most modern natural gas storage facilities in Europe – Inčukalns UGS and the main natural gas transmission system, which directly connects the Latvian natural gas market with Lithuania, Estonia, and the northwest region of Russia.

Conexus provides natural gas transmission and storage services to its customers in accordance with the tariffs approved by PUC.

Conexus is an independent, competitive company with high social responsibility and quality of services, which opens development opportunities for customers and ensures the growth of employees and the overall development of the industry, creating sustainable employment and adding economic value while taking care of lower environmental impact.

Vision, Mission, and Values of Conexus

WHY DO WE EXIST?

Mission

To promote sustainable energy market in the region, offering reliable operation of natural gas transmission and storage system.

WHO DO WE WANT TO BE?

Vision

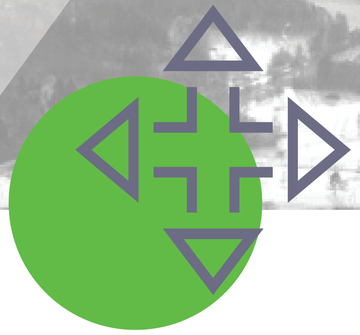
To become the most reliable energy source in the region.

WHAT IS IMPORTANT TO US?

Values

Secure operation of the system

Professional and united team



Flexibility and openness

Sustainable development

Strategic Targets

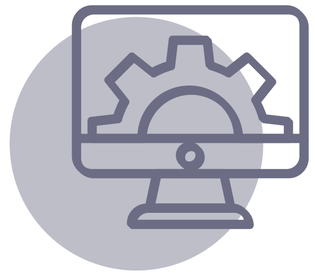
The principal medium-term targets (2019–2023) of Conexus are related to three areas: **market development, infrastructure provision,** and **development of operations.** The strategic targets are set in accordance with the values, vision, and mission of Conexus: **to promote the sustainable operation of the energy market in the region by ensuring the reliable operation of the natural gas transmission and storage system.**

1 Development of regional natural gas market to achieve sustainable operation of Inčukalns UGS in market conditions

2 Provide safe, accessible and marked-based infrastructure

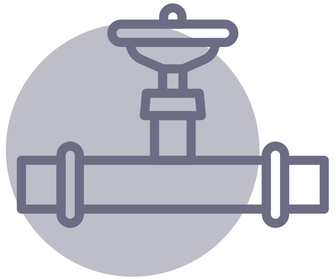
3 Implement sustainable management of the working capacity of internal and external resources

Along with the strategic targets, Conexus has defined three development guidelines that run through all planned medium-term activities, supplement the strategic targets set and contribute to their implementation.



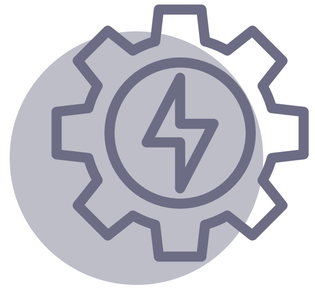
DIGLTISATION

Conexus will focus on modernisation and development of technologies as well as centralized asset, personnel and financial management and implementation of effective resource management



COOPERATION WITH OTHER REGIONAL TSOs

In the medium term, Conexus plans to facilate cooperation with other TSOs in the region by coordinating operational cooperation and introducing a periodic benchmarking system with other regional TSOs



CONEXUS – ENERGY PROVIDER

To become the most reliable energy source in the region and gradually introduce services not only for natural gas users, but also for eletricity users.

For Conexus, the year of 2020 was a year of significant results and new ambitions. On 1 January 2020, the Single Natural Gas Market was launched, which unites gas transmission system operators in Finland, Latvia, and Estonia – Gasgrid Finland, Elering, and Conexus, confirming the cooperation capability of several countries. The year's results show that all participants involved in natural gas supply are significant beneficiaries: for natural gas users, the choice of supplier has significantly increased, thus promoting competition among gas traders and simplifying access to alternative gas sources. In turn, the establishment of the Estonian Latvian Common Balancing zone has had a positive impact on the functioning of the market, reducing bureaucratic burden and ensuring a convenient and transparent balancing process. With the opening of the natural gas market and the integration of the regional market, the role of Inčukalns UGS has expanded, improving competition, flexibility and security of gas supply in the region.

As the Baltic–Finnish regional integration processes continue, the cross-border cooperation between operators and the interaction of technological elements of transmission systems are becoming increasingly important. In 2020, the Latvian, Estonian, and Finnish gas transmission system operators set up a working group whose objectives include raising the awareness of regional infrastructure in market participants and increasing the efficiency of gas transmission systems by creating a unified gas transmission system model for assessing the operation of a system under normal and emergency conditions.

During the reporting period, a closer cross-border technical cooperation has made it possible to ensure the availability of additional capacity of the Balticconnector interconnection point to market participants until the Estonian transmission system operator Elering will have put into service gas compressor stations.

GASGRID

elering
GENERATING OPPORTUNITIES

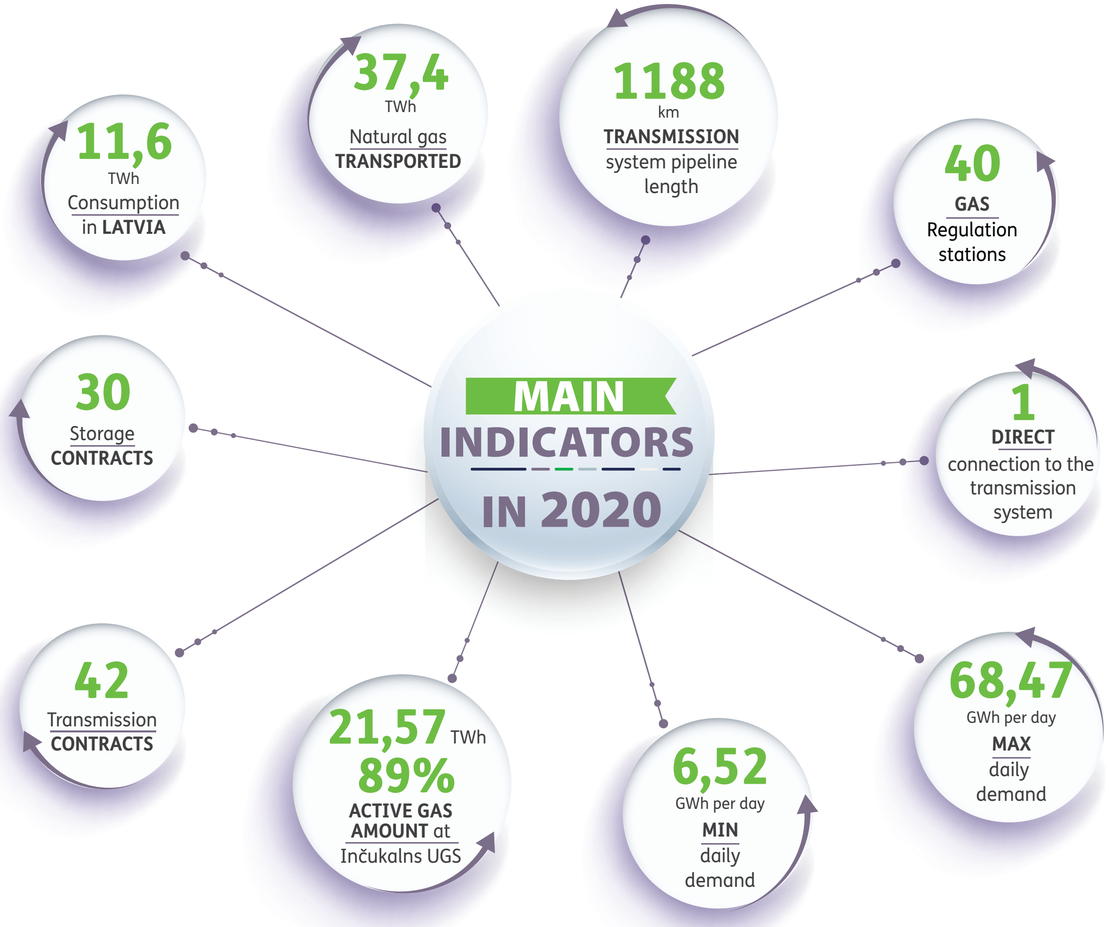
conexus
BALTIC GRID

Work continues on the project for enhancement of the operation of the Inčukalns UGS and the project for enhancement of Latvia–Lithuania interconnection capacity. The goal of the Inčukalns UGS development project is to improve the operation of the storage facility so that it can ensure functionality after increasing the pressure in the Baltic transmission system, as well as to reduce the dependence of the storage capacity on the amount of natural gas reserves in the storage facility. The implementation of the project for enhancement of Latvia–Lithuania interconnection capacity, which envisages increasing the technical capacity of the Kiemenai interconnection point, will facilitate the access to the Klaipeda LNG Terminal, Latvian Inčukalns UGS and Poland–Lithuania gas interconnection in the market.

In 2020, the Cabinet of Ministers approved a strategically important energy policy document: Latvia's National Energy and Climate Plan 2030. The binding targets of the plan will affect the final consumption of energy resources and facilitate the entry of RES gases into the market. Aiming at a sustainable and carbon-neutral future and the role of gas infrastructure in the transition of energy sector to a more environmentally friendly energy industry, in 2020, Conexus, with the cooperation of the University of Latvia, conducted a study "Feasibility study of biogas transmission from production plants to consumer and possible biomethane production options". Within the framework of the study, possible production and transmission business models and scenarios were evaluated, cost estimates of the identified technical and economic models were made and the most economically advantageous options for biogas collection and processing into biomethane with later injection into the transmission system were identified.

During the reporting period, Conexus joined the European Clean Hydrogen Alliance, which aims to deploy hydrogen technologies by 2030 and to establish a sustainable investment program with specific projects aimed at decarbonising various sectors. Given the challenges of building hydrogen infrastructure to promote climate neutrality, it is important to re-profile elements of Europe's existing gas infrastructure, thus providing infrastructure for cross-border hydrogen transportation and expanding the efficient and sustainable use of renewable energy sources in the economy.

2. MAIN INDICATORS IN 2020



3. NATURAL GAS DEMAND IN LATVIA IN 2020

Latvia is one of the countries with a balanced energy resource structure, and natural gas plays an important role in it. Most of the demand for natural gas is for heat and electricity production, thus the consumption is closely related to outside temperature fluctuations and depends on the competitiveness of electricity produced from natural gas in the Baltic and Nordic electricity markets.

Figure 3.1. **Consumption of primary energy resources in Latvia[1] (%), 2009–2019**

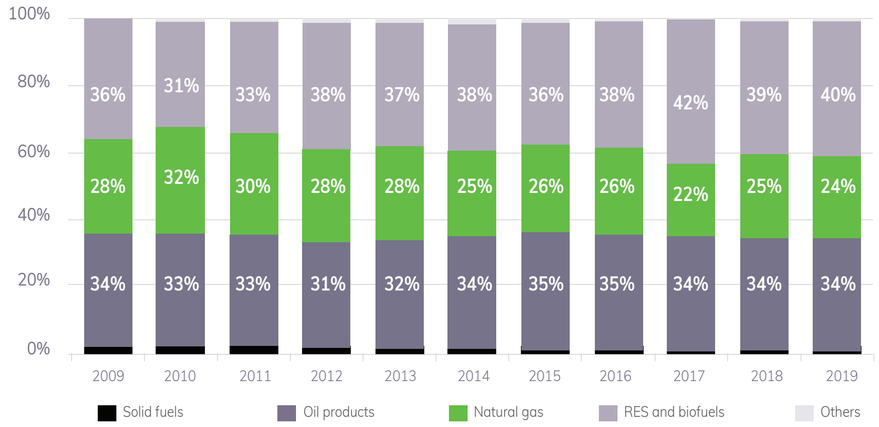
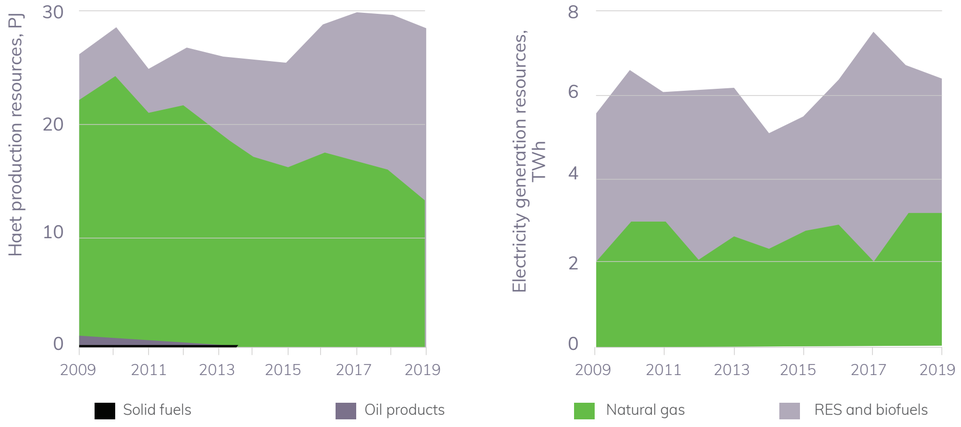


Figure 3.2. **Energy resources production for heat (PJ) and electricity (TWh) in Latvia[1], 2009–2019 gads**



[1]European Commission's statistics: https://ec.europa.eu/energy/data-analysis/energy-statistical-pocketbook_en

In 2020, the volume of gas transmitted for the needs of Latvian users was 11.6 TWh, which is 19% less than in 2019. The decrease in consumption was influenced by unusually warm weather conditions at the beginning of the year, which significantly reduced the natural gas demand for heating. The actual air temperatures in the winter months of 2020 were not only higher than the temperatures in the respective months of 2019, but also higher than normal: in Latvia, the year 2020 became the warmest year on record. At the same time, high precipitation reduced the consumption of natural gas for electricity production: in 2020, the amount of electricity generated by thermal power plants and cogeneration plants decreased[2].

Figure 3.3. **Amount of natural gas supplied to the Latvian natural gas distribution system (GWh) and monthly average air temperature and normal temperature for heating months (°C)[3] in 2019 and 2020**

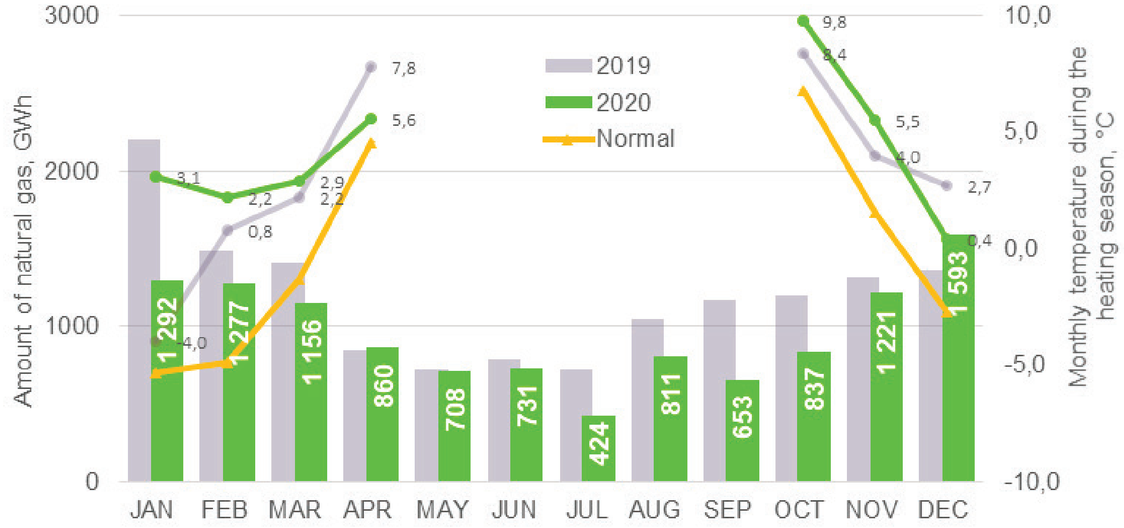
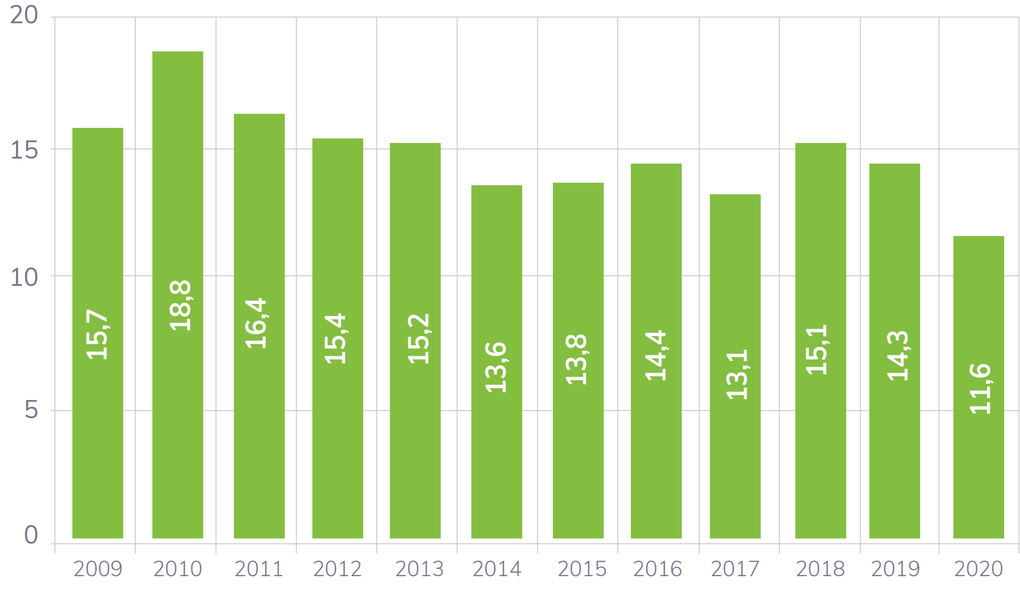
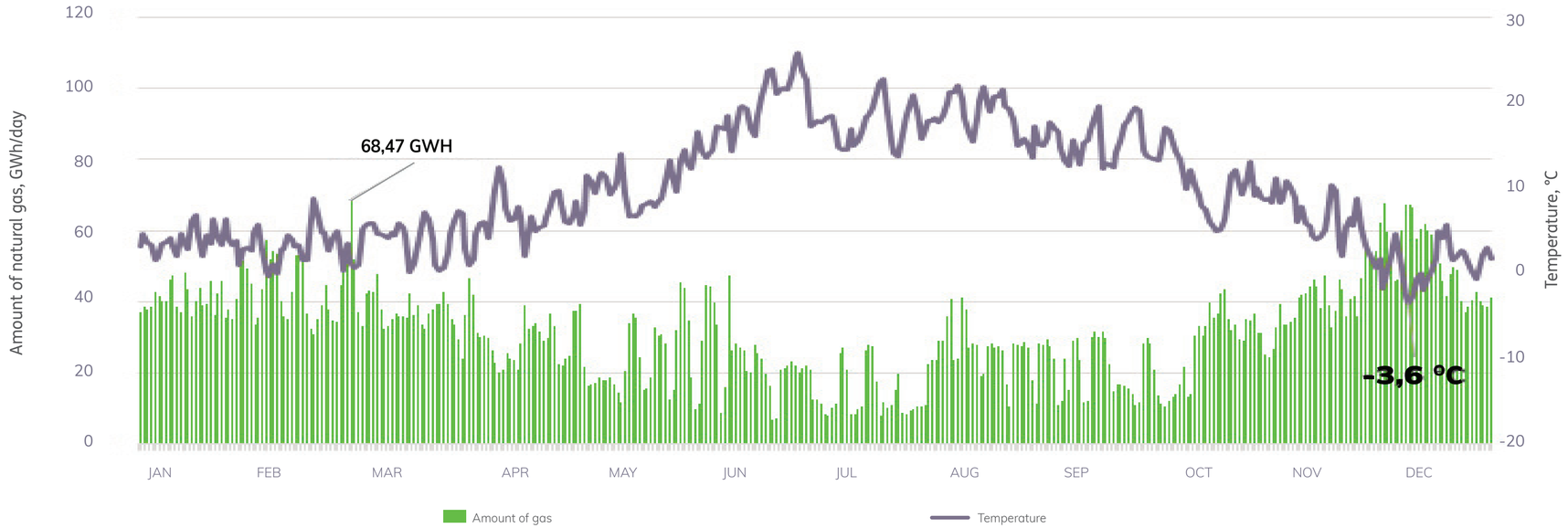


Figure 3.4. **Amount of natural gas supplied to the natural gas distribution system operator in Latvia (TWh)**



[2]AST's data. Available at: https://www.ast.lv/lv/electricity-market-review?year=2020&month=13
[3]Central Statistical Bureau's data. Available at: https://www.csb.gov.lv/lv/statistika

Figure 3.5. **Amount of natural gas supplied to the Latvian natural gas distribution system per day (GWh) and average daily air temperature in Riga (°C) in 2020[4]**



According to the 2016 research "Joint Risk Assessment of the gas system of Estonia, Finland, Latvia and Lithuania" conducted by the European Commission's Joint Research Centre, Latvia's natural gas consumption on a winter day may reach 136 GWh/day. In the winter of 2020, the maximum daily natural gas consumption in Latvia was 68,47 GWh; in comparison with 2019, it decreased by 20 GWh/day, or 23%, which can be explained by the above-mentioned conditions. The lowest daily average air temperature in Riga was registered on 9 December, which was the middle of a 3-day high consumption period, from 8 to 10 December 2020.

The minimum daily natural gas consumption was on 20 June 2020 – 6.52 GWh/day, comparable to previous years.

Maximum daily natural gas consumption in Latvia in 2020

DATE	Consumption (GWh)	Air temperature (°C)[4]
27 February	**68,47**	**+1,5**
8 December	67,25	-2,8
9 December	67,36	-3,6
10 December	66,42	-2,8

[4]Latvian Environment, Geology and Meteorology Centre's data.
Available at: https://www.meteo.lv/meteorologija-datu-meklesana/?nid=461

4. 10-YEAR FORECAST OF NATURAL GAS CONSUMPTION IN LATVIA

In June 2020, ENTSOG and ENTSO-E published the TYNDP 2020 Final Scenario Report[5], which describes possible future energy scenarios for the European Union up to 2050. All the scenarios are aimed for a climate-neutral future and are designed with the purpose to reduce greenhouse gas emissions in accordance with the European Union's 2030 Climate Target Plan and the Paris Agreement goals of limiting temperature increase to 1.5 °C.

National Trends[6] are 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 the Governance of the Energy Union and Climate Action. The NECP 2030 is the main document for the formulation of a long-term energy and climate policy with a vision of sustainable, competitive and secure development of a climate-neutral economy.

In February 2020, Latvia's NECP 2030[7] entered into force and includes about a hundred different policy measures and envisages 12 action lines. The plan provides for an increase of at least 50% in the share of RES, including at least 3,5% in the share of modern biofuels in the Latvian transport sector. These binding targets will affect final energy consumption and facilitate the market penetration of RES. In Latvia, biomethane has great development potential in terms of both production and consumption.

According to the forecast data in Latvia's NECP 2030, the total final energy consumption in 2030 will be about 11% lower than in 2018, but the share of electricity and natural gas in the total final energy consumption will increase by more than 5% due to the replacement of oil products with gas in road transport. No significant changes in the primary energy structure are envisaged: natural gas and oil products will continue taking up the biggest share in the overall primary consumption of energy resources in Latvia.

The Global Ambition[8] and Distributed Energy[9] scenarios compliant with the target of the Paris Agreement to reduce the emissions of greenhouse gases, to prevent the global temperature from rising by more than 2°C compared to the average temperature of the preindustrial age, and keeping temperature rise below 1.5°C

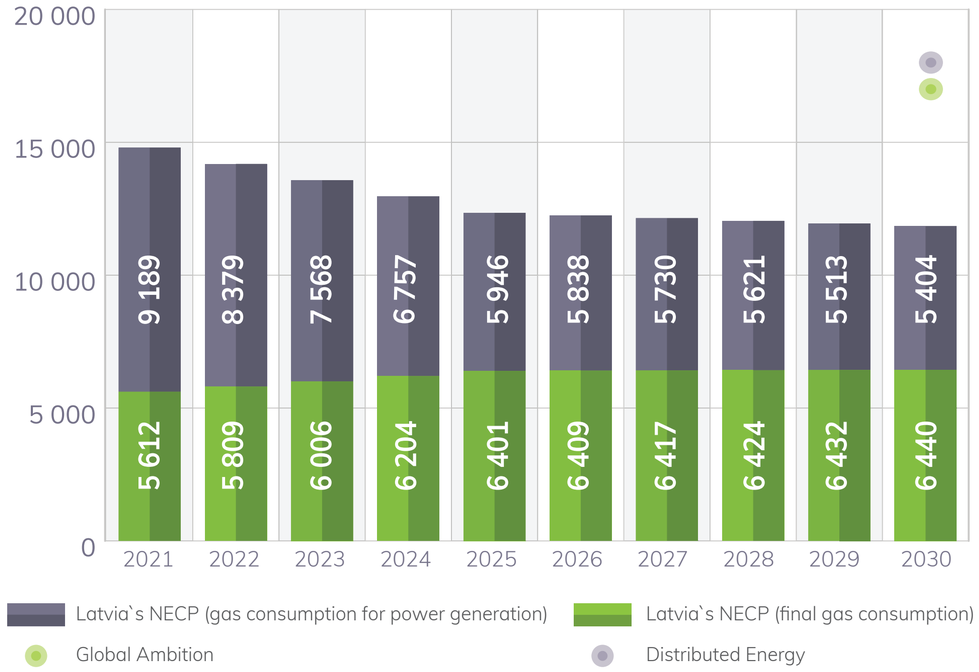
The Global Ambition scenario looks at a future that is led by economic development in centralised generation. Economies of scale lead to significant cost reductions in emerging technologies such as offshore wind, but also imports of energy from cheaper sources are considered as a viable option.

[5]ENTSOG website. Available at: https://2020.entsos-tyndp-scenarios.eu/
[6]From English - National Trends
[7]Ministry of Economics website. Available at: https://www.em.gov.lv/lv/nekp-2030
[8]From English - Global Ambition
[9]From English - Distributed Energy

Distributed Energy scenario embraces a de-centralised approach to the energy transition. A key feature of this scenario is the role of the energy consumer, who actively participates in the energy market and helps to drive the system's climate neutrality by investing in small scale solutions and circular approaches.

In the Global Ambition and Distributed Energy scenarios, the total gas consumption until 2030 is higher than in the National Trends (Latvia's NECP 2030) scenario. This is due to the fact that the energy system achieves a higher level of decarbonisation with a higher amount of gas in the system, which in turn is associated with a faster transition from carbon-intensive fuels (oil and coal) to gas, and also higher shares of renewable and decarbonised gases in the gas mix.

Figure 4.1. **Gas consumption forecast according to NEKP[10], Global Ambition and Distributed Energy scenarios through 2030 (GWh)**



The ENTSOG and ENTSO-E scenarios are used to assess future electricity and gas infrastructure needs and projects included in the Ten-Year Network Development Plan 2020[11 12] . Conexus included two new energy transition projects:

Biomethane production with infrastructure building/ enhancement in Latvia;

Power-to-Gas[13] production with infrastructure building/enhancement in Latvia.

[10]The conversion factor from ktoe to GWh is 11.63.
[11]From English - Ten-Year Network Development Plan 2020
[12]ENTSOG website. Available at: https://tyndp2020.entsog.eu/
[13]From English - Power-to-Gas

5. INFORMATION ON THE NATURAL GAS TRANSMISSION SYSTEM IN LATVIA

Conexus is a unified natural gas transmission and storage operator, which ensures the maintenance of the natural gas transmission system, its secure and uninterrupted operation, and interconnections with the transmission systems of other countries, enabling traders to use the natural gas transmission system for natural gas transportation.

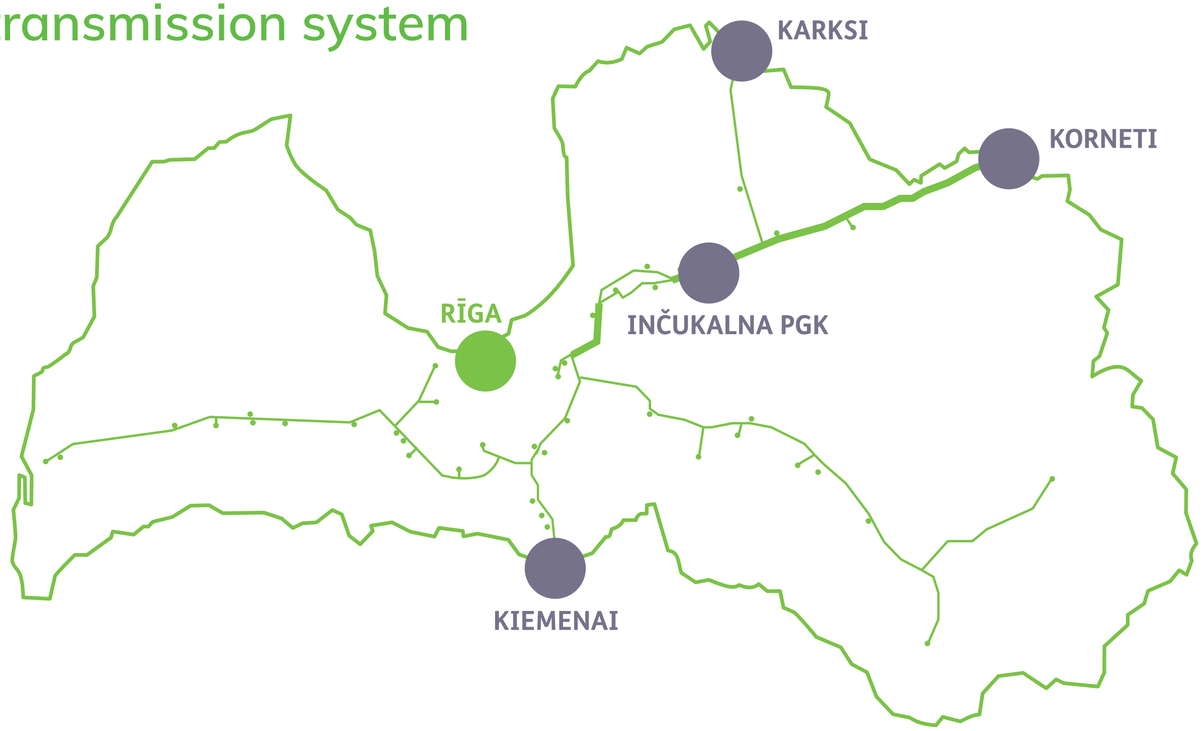
The main natural gas transmission system of the Company is 1 188 km long and is directly connected to the natural gas transmission systems of Lithuania, Estonia, and the Russian Federation, ensuring natural gas transmission both in regional gas pipelines in the territory of Latvia and in interconnections with the natural gas transmission systems of the neighbouring countries.

The diameter of the international gas pipelines of the transmission network of the Latvian natural gas transmission system is 720 mm with an operating pressure in the range of 28 to 40 bar, while the diameter of the regional gas pipelines is between 400 mm and 530 mm with an operating pressure of up to 35 bar. In order to transport natural gas to the local distribution system in Latvia, 40 gas regulation stations are used. For natural gas trade supplies for the needs of Latvian users, an exit point is provided for the supplies of natural gas to Latvian users, which compiles all technically feasible exits in the territory of Latvia.

Natural gas transmission system's technical capacity in 2020 (GWh/day)

Entry/exit point	Entry technical capacity	Exit technical capacity
Inčukalns UGS	275[14]	126[15]
Kiemenai (LV/LT)[16]	67.6	65.1
Luhamaa (EE/RU)	105[17]	105

Latvian natural gas transmission system



[14]Based on the recommendations provided by the Inčukalns UGS monitoring organisation; technical capacity 316 GWh

[15]Based on the recommendations provided by the Inčukalns UGS monitoring organization; technical capacity 178.5 GWh.

[16]The entry/exit point is seasonal in nature.s

[17]In 2020, the restrictions were related to repairs to the transmission pipeline Valdaja–Pskov; technical capacity 188.5 GWh.

5.1. Measures for maintenance, improvement and reconstruction of transmission infrastructure

The Company ensures timely and uninterrupted maintenance of natural gas transmission infrastructure at a high level, performing such works as maintenance, inspections, repairs, diagnostics and development works by use of modern and up-to-date equipment and systems, as well as provides fast and operative action in emergency situations.

The most significant measures for the maintenance, improvement and reconstruction of the natural gas transmission infrastructure in 2020:

- planned repairs to gas pipelines: replacement of 159 pipe segments with defects, repairs of 11 pipe segments with installation of a composite coupling;
- diagnostics of gas pipelines: diagnostic measures carried out by means of the method of magnetic tomography in 17 gas pipeline segments and branches;
- repairs of anti-corrosion protection of the gas pipelines: 10,562 m of restored external anti-corrosion protection;
- diagnostics of the GRS and GRU pressure equipment basic assemblies: external technical inspections of 40 GRS and 3 GRU, internal technical inspections of 9 GRS and 1 GRU, pneumatic inspections of 6 GRS;
- marking of the gas pipeline route: 350 new marking posts installed;
- levelling and cleaning of the gas pipeline route: a total of 303 ha levelled and cleaned;
- inspection of underwater crossings of gas pipelines: 14 crossings across rivers inspected;
- inspections of pressure equipment assemblies: 15 external technical inspections, 6 internal technical inspections, 3 hydraulic inspections;
- communication and telemechanic systems constructed and put into operation;
- intensive measurements: 127.3 km of the surveyed segments;
- overhaul of the grounding anodes of cathodic protection stations: 7 repair and reconstruction projects;
- equipment of the gas pipeline route with CMPs: 183 CMPs installed and renovated;
- installation and renewal of 6 insulating flanges;
- reconstruction of GRS Brocēni with replacement of technological equipment;

Figure 5.1. **Gas regulation station Brocēni before and after reconstruction**

The GRS Brocēni was put into operation in 1968 and partially reconstructed in 2000. In 2020, the GRS Brocēni was rebuilt to provide it with modern gas metering equipment and to improve energy efficiency. The replacement and modernisation of the GRS equipment improved the processes of gas purification, pressure regulation and accounting, as well as the control and management of the degree of odorization.

- Improvement of the GRS gas odorization system at GRS Liepāja and GRS Ziemeļi;
- Improvement of the GRS gas heating system at GRS Jelgava-2, GRS Krimulda, GRS Lode, GRS Daugavpils, GRS Rēzekne, and GRS Kaibala;
- Purchase and installation of solenoid valves, programming and commissioning of control units at GRS Rīga-1 and GRS Jēkabpils.

5.2. EU project of common interest “Enhancement of Latvia–Lithuania interconnection” [18]

Enhancement of Latvia–Lithuania interconnection (ELLI Project)[19] was included in the European Commission’s List of PCIs, in the BEMIP Gas Priority Corridor. In December 2019, Conexus and the Lithuanian transmission system operator Amber Grid entered into a tripartite agreement with INEA on financing the CEF construction works for the ELLI project. Within the framework of the agreement, 5 out of 17 sub-projects have been completed in the period of 2020:

- assessment of the transmission gas pipeline system for increasing the pressure to 50 bar;
- reconstruction of T5 and T6 block valve stations of the Vireši–Tallinn transmission gas pipeline;
- reconstruction of the GRS Valmiera-1 transmission gas pipeline branch;
- reconstruction of valve 1PI at GRS Palsmane;
- reconstruction of connection valve No. Iz-427.

Work continues on three subprojects:

- reconstruction of the connection node of the Vireši–Tallinn transmission gas pipeline;
- diagnostics of transmission gas pipelines;
- repairs of transmission gas pipelines.

Development of construction designs for five subprojects is completed:

- replacement of the transmission gas pipeline branch at GRS Ezerciems;
- replacement of segments of the transmission gas pipeline Riga–Inčukalns UGS at the Inčukalns UGS connection node;
- replacement of segments of the transmission gas pipeline Riga–Inčukalns UGS at GRS Riga-1;
- replacement of the transmission gas pipeline branch at GRS Krimulda;
- reconstruction of the connection node of the transmission gas pipeline Riga–Panevėžys.

Work has started on the last four subprojects: reconstruction of the transmission gas pipeline branches at GRS Vangaži, GRS Zaķumuiža, GRS Daugmale, and GRS Baldone.

[18] Information is available in Section 8 “Transmission system development”
[19] Project of Common Interest No. 8.2.1. “Enhancement of Latvia–Lithuania Interconnection”

5.3. Regional cooperation of transmission system operators

As the Baltic–Finnish regional integration processes continue, cross-border cooperation between operators and the interaction of technological elements of transmission systems are becoming increasingly important. It is essential to improve market participants' understanding of the potential of the regional gas transmission infrastructure and the factors contributing to and limiting its operation, both now and in the future, after the completion of the major infrastructure enhancement projects in the region, such as the ELLI Project, which envisages an increase in the technical capacity of Kiemenai interconnection point, or the project for the enhancement of the Inčukalns UGS compressor station, which will change the storage operation during the withdrawal season. In view of the above, the Latvian, Estonian and Finnish gas transmission system operators set up a new working group, whose objectives include raising market participants' awareness of the regional infrastructure and increasing the efficiency of the gas transmission systems of the involved TSOs by creating a unified gas transmission system model for assessing the operation of the system under normal and emergency conditions.

Coordination of Maintenance works Plans of Transmission System Operators of the Single entry tariff area

Shortly after the start of operation of the Single entry tariff area, Estonian, Latvian and Finnish operators identified the need to coordinate on maintenance works plan in order to minimize the market impact of the maintenance and repairs to be carried out. Among the participants of the first agreement on the maintenance works plans, along with neighbouring EU operators, was the Finnish transmission system operator Gasgrid Finland, which before the commissioning of the Balticconnector had experience only in cooperation with the transmission system operator of the Russian Federation.

Taking into account the differences in the attraction to the maintenance works planning, the agreed maintenance works plan for 2020/2021 covers 15 months of repairs to the Company's system (gas year plus the first quarter of the following gas year) and a calendar year of repairs to the Estonian and Finnish systems. The maintenance works plan agreed by each individual TSO was published on 20 July 2020 on each operator's website. Up-to-date information on planned maintenance works and capacity limitations is available on Conexus website[20].

Use of the Single UMM Platform

In 2020, Conexus and Elering worked together to improve information transparency. In order to provide market participants with convenient and unified access to urgent information on the transmission systems of the Estonian–Latvian Common Balancing zone operators, operators agreed to jointly publish future UMM on the GET Baltic inside information platform[21]. Following the changes, UMM information on all gas systems in the Baltic–Finnish region is now available in one place. It is possible to use the RSS feed-reading service or sign up to receive UMM by e-mail easily and quickly. Historical UMM reports are stored on TSOs' websites.

Solution for increasing the capacity of the Balticconnector

After a detailed analysis of the potential of the current regional gas transmission system and successful peak load tests for natural gas supply from the Inčukalns UGS to Finland, a technical working group set up by the Baltic–Finnish Transmission System Operators has found a solution to temporarily increase the technical capacity of the Balticconnector interconnection point to 5 GWh per day.

A closer cross-border technical cooperation has made it possible to ensure the availability of additional capacity to market participants until the Estonian transmission system operator Elering will have put into service gas compressor stations, the installation of which has been delayed. The technical capacity of the Balticconnector interconnection point is reviewed on a weekly basis, while the specific amount of the increase in technical capacity depends on several aspects of the use of the regional gas infrastructure.

[20] Conexus website. Available at: https://capacity.conexus.lv/

[21] GET Baltic website. Available at: https://umm.getbaltic.com/public-umm

6. CONFORMITY OF NATURAL GAS SUPPLY AND CONSUMPTION – NATURAL GAS FLOWS

6.1. Commercial data

As from 1 January 2020, with the establishment of the Estonian–Latvian Common Balancing zone, all users of the Latvian and Estonian transmission systems had to enter into agreements with only one of the operators in order to receive transmission services in the Estonian–Latvian Common Balancing zone.

During the reporting period, the number of concluded service agreements in both the transmission and storage systems increased, which can also be explained by access to the Finnish market. With the commissioning of Estonia–Finland interconnection point Balticconnector at the end of 2020, Conexus had 34 transmission service agreements and 30 natural gas storage service agreements in force. At the end of 2020, the number of transmission service agreements concluded with Elering was 8.

Of all users who had entered into transmission service agreements and storage service agreements, 35 system users were actively using natural gas transmission services in the Estonian–Latvian Common Balancing zone, and 20 users were actively using storage services. Natural gas was supplied from the natural gas transmission system to the natural gas distribution system by 16 users, 7 of them supplied natural gas to the Estonian distribution system and 12 – to the Latvian distribution system. In 2020, 5 users delegated their balance responsibility to a selected balance responsible party in the Estonian–Latvian Common Balancing zone.

When assessing the distribution of reserved products in 2020, it should be concluded that the system users are increasingly focusing on longer time frames for booking transmission capacity products. The interest of system users in booking longer – monthly, quarterly and annual – capacities can be explained by product multipliers embedded in the tariffs, which ensure cheaper costs when booking capacity products for longer periods, while providing the system operator with more complete information on planned system operation.

Currently, the monthly product dominates in system users' portfolios. It should be outlined that in 2020, for the first time in the history, an annual capacity product was reserved at Värska entry point managed by Elering.

Figure 6.1. **Number of natural gas system users and agreements in the Estonian–Latvian Common Balancing zone in 2020**

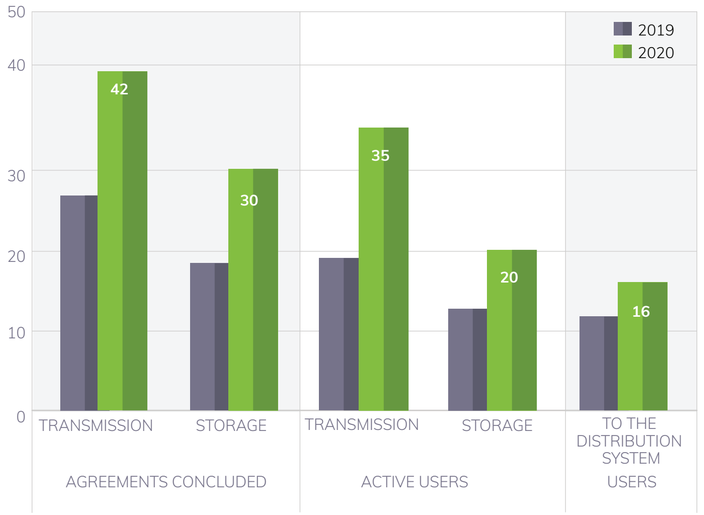
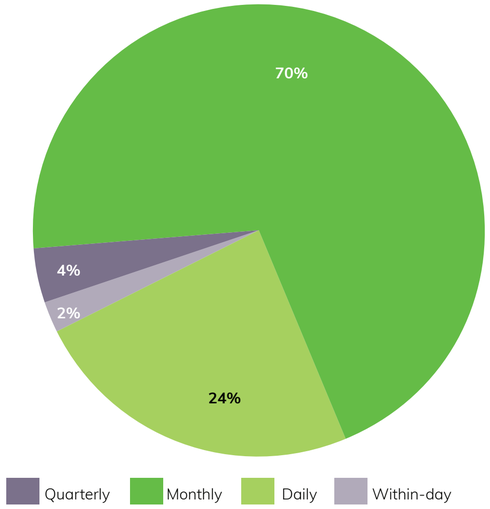


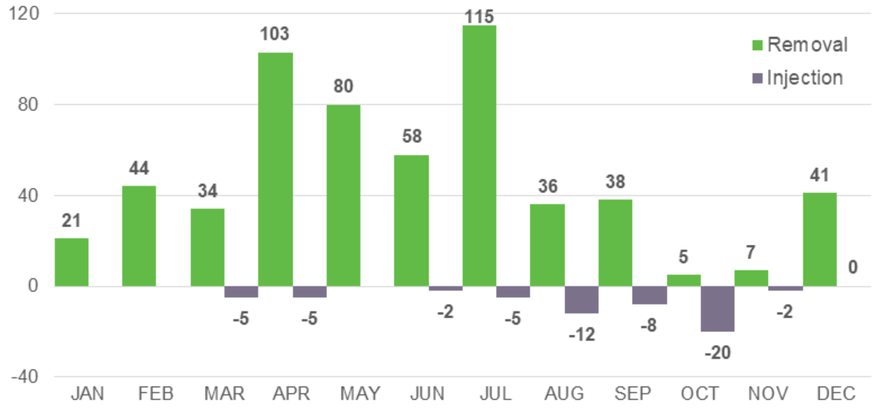
Figure 6.2. **Capacity reservation by product type in 2020 (%)**



6.2. Balancing operations

In 2020, Conexus, acting as the balancing coordinator in accordance with the cooperation agreement concluded between transmission system operators Conexus and Elering, performed a total of 641 balancing operations in the Estonian–Latvian Common Balancing zone - injecting the missing natural gas into the transmission system when the imbalance generated by the users was negative or removing the surplus natural gas from the transmission system when the imbalance generated by the users was positive. Conexus performed 582 balancing operations to eliminate positive imbalances and 59 balancing operations – to eliminate negative imbalances.

Figure 6.3. **Balancing operations in the Estonian–Latvian Common Balancing Zone in 2020 (GWh)**



In accordance with the approved balancing procedure, standardized short-term (day-ahead or within-day) products with delivery to the virtual trading point are selected as priority for balancing operations, buying or selling them on the UAB GET Baltic trading platform. Offers submitted by transmission system balancing service providers are used if, due to lack of liquidity in trade of standardized short-term products, economic disadvantage or other considerations, standardized short-term products are not suitable for ensuring the operation of the natural gas transmission system within its technical capabilities. During the reporting period, 88% of all balancing transactions were performed on the trading platform, while offers submitted by transmission system balancing service providers were used in 12% of cases.

Figure 6.4. **Distribution of balancing operations in 2020 (%)**

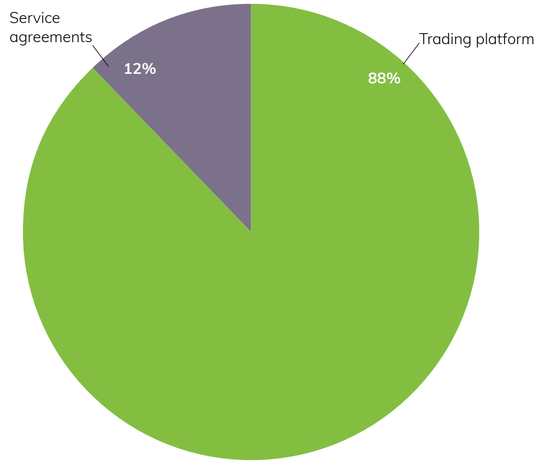
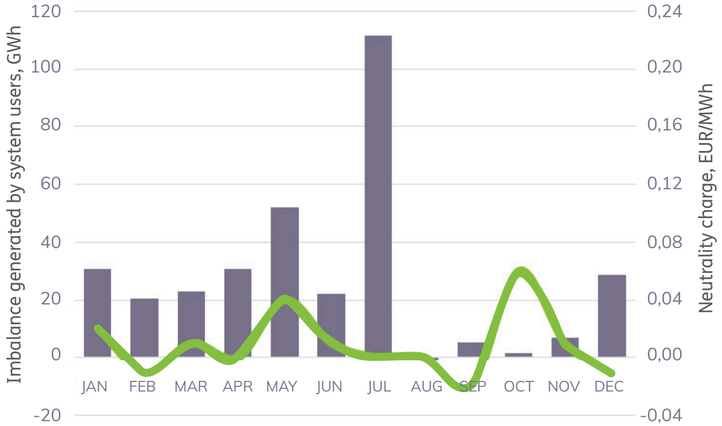


Figure 6.5. **Imbalance generated by system users (GWh) and neutrality charges (EUR/MWh) in 2020**



The total amount of the imbalance generated by all system users of the Estonian–Latvian Common Balancing zone in 2020 was 330,5 GWh. Balancing operations in the amount of 374,5 GWh were performed to eliminate the positive imbalance generated by the system users, of which 313,4 GWh – on the trading platform and 61,1 GWh – within the concluded balancing service agreements. In turn, balancing operations in the amount of 47 GWh were performed to eliminate the negative imbalance generated by system users, including 36,5 GWh – on the trading platform and 10,5 GWh – within the balancing service agreements.

Neutrality charge in 2020 (EUR/MWh)

Month	Applicable neutrality charge, EUR/MWh
January	0,02
February	-0,01
March	0,01
April	0,00
May	0,04
June	0,01
July	0,00
August	0,00
September	-0,02
October	0,06
November	0,01
December	-0,01
Average	€ 0,01

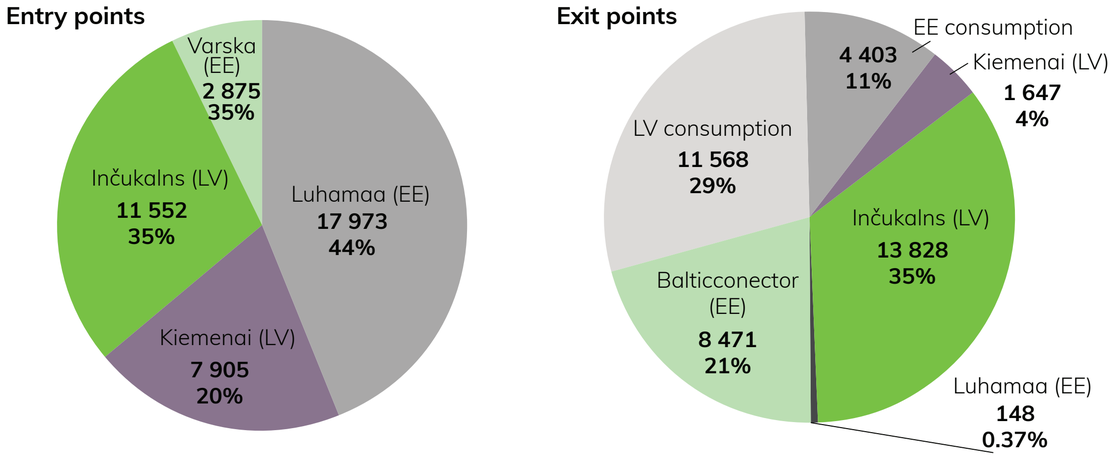
The neutrality charge applied in 2020 ranged from EUR -0.02 to EUR 0.06. In settlement periods when the neutrality charge was negative, the transmission system operator paid it to the transmission system users, while in the settlement periods when the neutrality charge was positive, the transmission system operator charged it to the transmission system users. The average neutrality charge in the period of 2020 was 0.01 EUR/MWh per month.

In 2020, changes were made in the incentive factors for applicable marginal prices. In the first half of the year, the incentive factor was 0.95 for the marginal buy price and 1.05 for the marginal sell price; however, after summarizing the operation results of the Common Balancing zone in the first half of the year and performing their detailed analysis, it was concluded that the applied values of marginal price incentive factors do not correspond to the actual market situation. In order to improve the balance situation of the Estonian–Latvian Common Balancing zone, changes were made to the marginal price incentive factors taking into account the results of the analysis, setting the incentive factor for marginal sell price at 0.90 and the incentive factor for marginal buy price at 1.10 as of 1 July 2020. As a result of the changes, the second half of 2020 showed a significant improvement in the overall balance of system users.

6.3 Transmission system flow data

In 2020, the total amount of gas transmitted reached 37,4 TWh, which is an increase of 10% compared to the previous year. With the start of operation of the Balticconnector interconnection point, a significant part of the total Finnish inflows was transmitted through the Single Estonian–Latvian Balancing Zone, including from the Inčukalns UGS in the first and fourth quarters of the year, which accounted for 34% of the total Finnish consumption. Such high interest in the supply of natural gas to Finland through the Estonian–Latvian Common Balancing zone is related to the existing gas price difference throughout the year, namely, significantly lower gas prices in the Estonian–Latvian Common Balancing zone compared to Finland.

Figure 6.6. **Amount of natural gas received and transmitted in the Estonian–Latvian Common Balancing zone in 2020 (GWh and %)**



In 2020, there was a decrease in technical capacities at the Inčukalns UGS and the Luhamaa interconnection point compared to 2019. The restrictions at the Luhamaa point were related to repairs to the Valday–Pskov transmission pipeline. In turn, the decrease in the technical capacity at the Inčukalns UGS was related to the recommendations provided by the monitoring organisation of the storage facility[22].

[22]Information is available in Section 5 "Information on the natural gas transmission system in Latvia".

7. INFORMATION ON STORAGE SYSTEMS AND STORAGE FLOWS IN 2020

Conexus is a unified natural gas transmission and storage operator, which structure includes the Inčukalns Underground Gas Storage. The Inčukalns UGS provides injection, storage and withdrawal of natural gas by supplying it to the gas transmission pipelines.

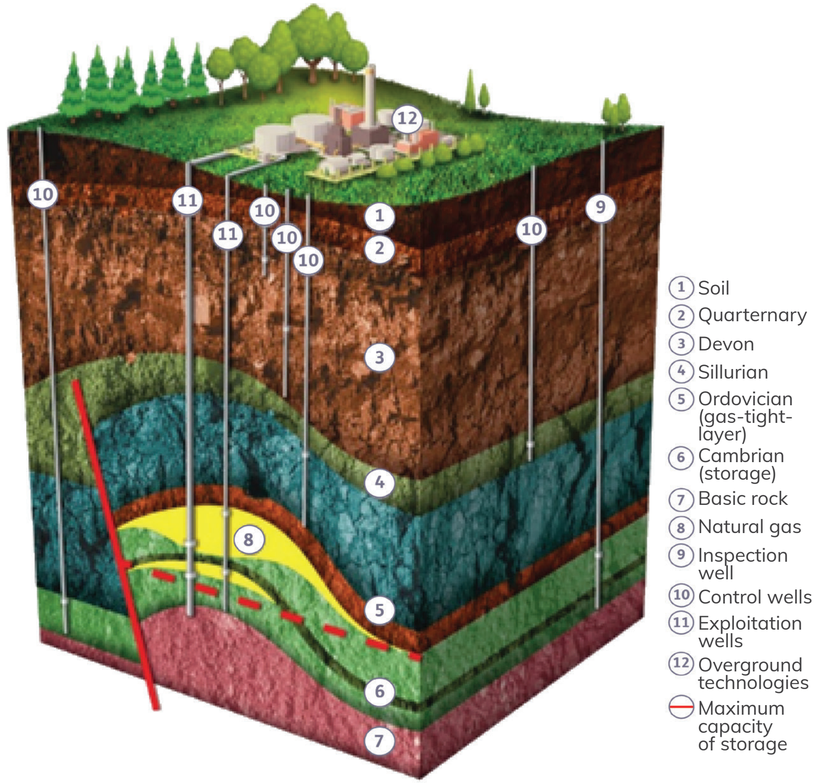
The Inčukalns UGS, which is part of the Conexus structure, consists of surface technological installations, wells, and underground reservoir. The reservoir is a naturally formed Cambrian period sedimentary rock in the aquatic medium horizon at the depth of aprox. 600 to 750 meters.

Latvia is crossed by the geological layer of Cambrian period sedimentary rock. In Latvia, the porous Cambrian period sandstone sedimentary rock is characterized by very good properties. Namely, its porosity amounts up to 30%, allowing efficient and economic storage of natural gas.

The central territory of the Inčukalns UGS and the equipment needed to ensure the technological processes – three hereafter GCP and 180 gas storage wells[23] cover approximately 8 400 hectares. The total territory of Inčukalns UGS – underground geological formations[24] with a contour area of ~ 40 km^2 is located in the territories of Sēja, Krimulda and Inčukalns municipalities.

The maximum possible amount of active natural gas to be stored as foreseen in the technical project of the Inčukalns UGS is 24,219 TWh. The pressure of the collector layer and the amount of natural gas stored in it[25] are impacted by several technological factors, but in particular by the actual natural gas filling in the Inčukalns UGS during previous storage cycles and the injection intensity during the particular storage cycle. The maximum technical injection capacity of the Inčukalns UGS is 178.5 GWh/day, while the maximum withdrawal capacity of the storage facility is 316 GWh/day available if the amount of active natural gas is above 18 TWh. When the filling of the storage facility is lower, the natural gas withdrawal capacity decreases according to the storage facility's withdrawal capacity curve[26].

The Inčukalns UGS is a complicated engineering geological object the exploitation whereof is related to particular risks and resulting exploitation conditions. The maximum permissible pressure in the collector layer must not be exceeded. Violation of this condition can lead to gas leaking in the upper layer, i.e. gas losses and contamination. The permissible maximum injection pressure must also not be exceeded, as it may cause a hydraulic fracturing of collector layer – collapse of sandstone crystal grid and damage to technological equipment.



[23] Control and inspection wells, as well as 93 exploitation wells for natural gas injection and withdrawal processes.
[24] Collector layer.
[25] The pressure at which the storage facility's overlayer remains tight.
[26] The 2020 curve can be seen in Figure 7.3.

7.1. Measures for maintenance, improvement and reconstruction of the Inčukalns UGS infrastructure

The task of the gas storage facility is to ensure a constant supply of gas to consumers, regardless of the seasonal changes in its consumption, by injecting natural gas in summer and withdrawing it in winter. The Inčukalns UGS is the only functioning underground gas storage facility in the Baltic States. It ensures the stability of gas supply and continuous operation by monitoring and controlling the stability of the storage facility, inspecting and preventing damages to the infrastructure and investing in storage facility development and security.

The most significant measures for maintenance, improvement and reconstruction of the Inčukalns UGS infrastructure which were performed in 2020:

- maintenance of technological equipment and facilities;
- modernization of the water treatment plant;
- replacement of KC-2 communication shut-off valves No.38 and 39;
- modernization of the commercial metering unit of the gas compressor station No.1;
- technological monitoring of the storage facility in accordance with the agreement concluded between Conexus and Storengy[27];
- well safety assessment, well geophysical and geochemical surveys;
- preventive measures for well blowout safety;
- concluded agreements on well blowout safety monitoring and emergency response;
- diagnostics of technological equipment GCP-1, GCP-2, GCP-3 and repairs to the connecting gas pipeline, elimination of the damages detected during diagnostics;
- replacement works in the chromatograph unit No. 2.

[27]Supervisor of the technological processes of the Inčukalns UGS.

7.2. EU project of common interest “Enhancement of Inčukalns Underground Gas Storage”[28]

In 2020, Conexus continued the implementation of the EU co-financed project “Enhancement of Inčukalns UGS”. The project envisages the implementation of three main activities:

Inčukalns UGS development project

The total funding of the project is 88 million EUR. By 2025, the following project sections are planned:

Co-financed by the European Ur·
Connecting Europe Facility

IMPROVEMENT OF OVERGROUND EQUIPMENT (RECONSTRUCTION OF GAS COLLECTION POINT 3)’

32,3 Mio EUR

RESTORATION OF 36 WELLS

27,0 Mio EUR

MODERNIZATION OF THE EXISTING FIVE GAS COMPRESSION UNITS AND INSTALLATION OF ONE ADDITIONAL NEW GAS COMPRESSION UNIT

28,7 Mio EUR

36 % | **31 %** | **33 %** | **88** Mio EUR

The Inčukalns UGS development project aims to improve the functioning of the storage so that it can provide functionality after increasing pressure in the Baltic transmission system, as well as to reduce the dependence of productivity of the storage from the volume of natural gas stored. One of the most important tasks of the project is the installation of a new compressor in order to allow compression removal from storage, which will enable the output pressure of 50 to 55 bar in the Inčukalns UGS interconnection with the transmission system even if the pressure in the reservoir is below the pressure in the transmission system.

[28]Information is available in Section 8 “Transmission system development”.

According to the 2019 agreement concluded with INEA on the PCI, the project contains 35 benchmarks. By the end of 2020, 17 benchmarks were reached and fully met, representing 50% of the total project benchmarks:

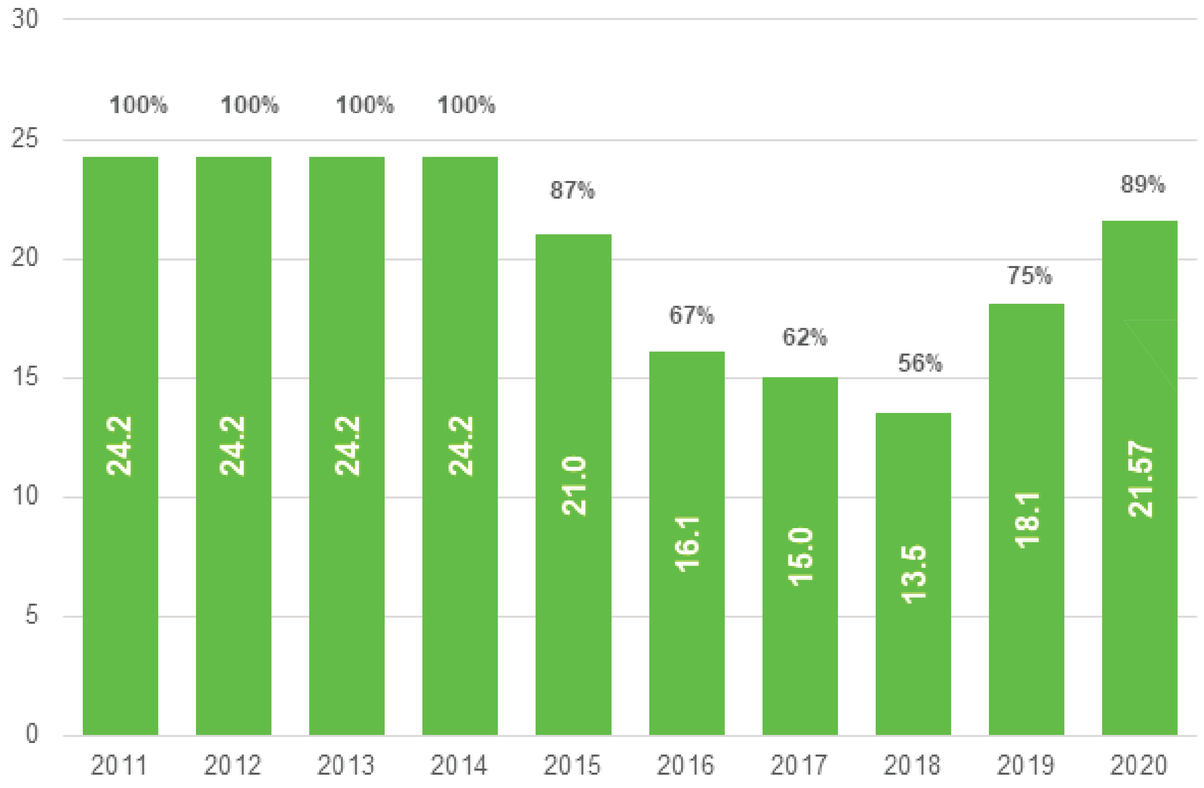
- the necessary building permits were received for construction and the started design works for the enhancement of GCP No. 3 continued. The aim of the project is to rebuild the technologically obsolete gas collection point in order to reduce its impact on the environment and to ensure the possibility to control technological processes remotely from the Inčukalns UGS control room;
- with the purpose of the improvement of overground equipment, an agreement on the development of the construction design and author's supervision was concluded, as well as documentation of the construction plan was prepared, as a result of which two building permits were received so that the construction of GCP No.3 could be implemented in two stages. An agreement was also concluded for the supply of basic technological equipment;
- within the framework of the restoration of 36 wells, 3 wells were put into operation; thus, restoration works were completed at 9 out of 36 wells;
- within the framework of modernization of the existing gas compression units, the necessary equipment was delivered in order to ensure the modernization of the gas compression unit No. 3 in the first compressor workshop No. 2;
- construction planning documents were developed for the installation of a new gas compression unit in the compressor workshop, as a result of which a building permit was obtained. In addition, a tender was announced for the procurement of a gas compression unit package.

Overall, the implementation of the project in 2020 was most affected by the Covid-19 pandemic, but thanks to the timely risk management plan, the Company managed to overcome the difficulties without any significant impact on the project implementation.

7.3. Storage facility flows in 2020

The withdrawal season of the 2019/2020 storage cycle ended on 30 April 2020 and the balance of active natural gas at the beginning of the Inčukalns UGS injection season in May 2020 was 7,75 TWh. The amount of active natural gas in the storage after the end of the natural gas injection season in mid-October 2020 was 21,57 TWh, which accounted for 89% of the maximum possible amount of active natural gas.

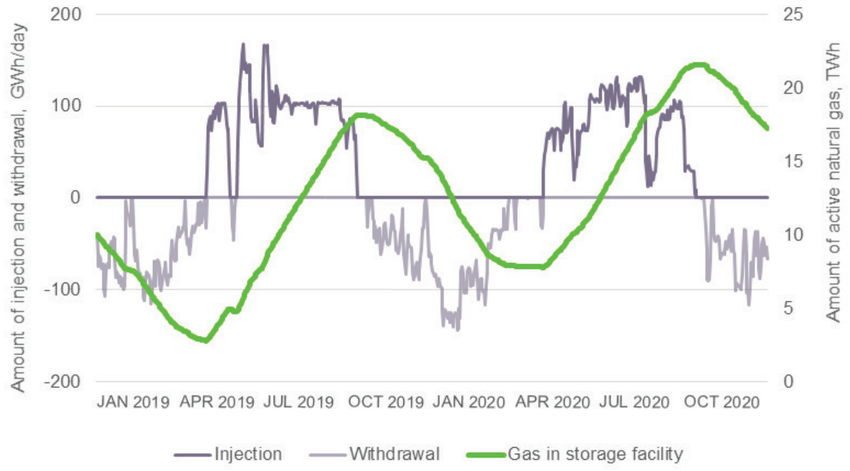
Figure 7.1. **Amount of active natural gas in Inčukalns UGS after the end of the natural gas injection season (TWh and % of full storage)**



The creation of the single market has boosted users' interest in storage. Estonia–Finland interconnection Balticconnector, opened at the beginning of 2020, ensured the additional withdrawal of natural gas from the Inčukalns UGS for supply to Finnish users.

The interest in storage in the summer of 2020 was also stimulated by the favourable gas price structure – a large difference between winter and summer prices, which encouraged users to buy natural gas and keep it in storage in order to sell it profitably in the winter season. During the injection season, regular monitoring of the injection regimes was carried out in cooperation with the supervisor of technological processes Storengy, within the framework of its recommendations and suggestions for process improvement which were received once a month. In this way, the injection capacity was revised depending on the technical capabilities of the storage facility in order to reduce the possibility of congestion. In addition, congestion management was carried out in accordance with the procedures specified in the Inčukalns UGS regulations: within the framework of the congestion management, the system operator distributes natural gas injection capacity among system users within the capacity available to the bundled capacity priority product and in proportion to their reserved available storage capacity.

Figure 7.2. **Amount of injection and withdrawal (GWh/day) and amount of active natural gas (TWh) in Inčukalns UGS in 2019 and 2020**[29]

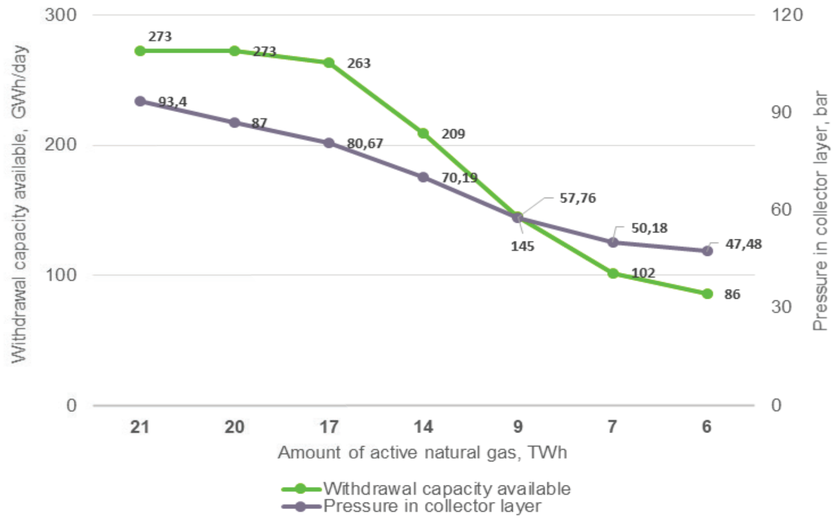


[29]GIE data. Available at: https://agsi.gie.eu/#/

In preparation for the next storage cycle, a technical capacity forecast was published in November 2020, predicting the 2021/2022 storage cycle to be 22,5 TWh. With high user interest in storage services, demand for technical capacity to be used over the next two to three storage cycles is expected to return to designed levels.

In the winter season, the reliability and stability of the transmission system depend on the amount of natural gas in the Inčukalns UGS, which in turn allows to ensure the required input capacity in the transmission system's interconnection with the storage facility and in the transmission system as a whole, as well as to ensure cross-border natural gas flows. The withdrawal of natural gas from the storage facility is carried out by means of the pressure difference between the collector layer and the transmission gas pipeline, and accordingly the daily withdrawal capacities depend on the filling of the storage facility. The withdrawal curve for the 2020/2021 storage cycle is shown in the figure below.

Figure 7.3. **Curve of natural gas amount available for withdrawal in 2020**



Fulfilling the obligation imposed on the unified operator in the 2020/2021 storage cycle by the Cabinet of Ministers Regulations[30] to ensure the required natural gas withdrawal capacity during the energy crisis, in 2020 Conexus organized an auction on ensuring storage and availability of active natural gas in the storage facility in 2020–2021. Within the framework of the auction, bids from merchants of several countries were received with the total amount of 5,220 GWh and the highest offered price of 3,64 EUR/MWh. After evaluating the bids received, Conexus fully or partially approved the bids up to a total amount of 2,845 GWh.

[30]Cabinet of Ministers Regulations No. 312 "Procedures for the Supply of Energy Users and Sale of Heating Fuel During Declared Energy Crisis and in Case of Endangerment to the State" of 19 April 2011

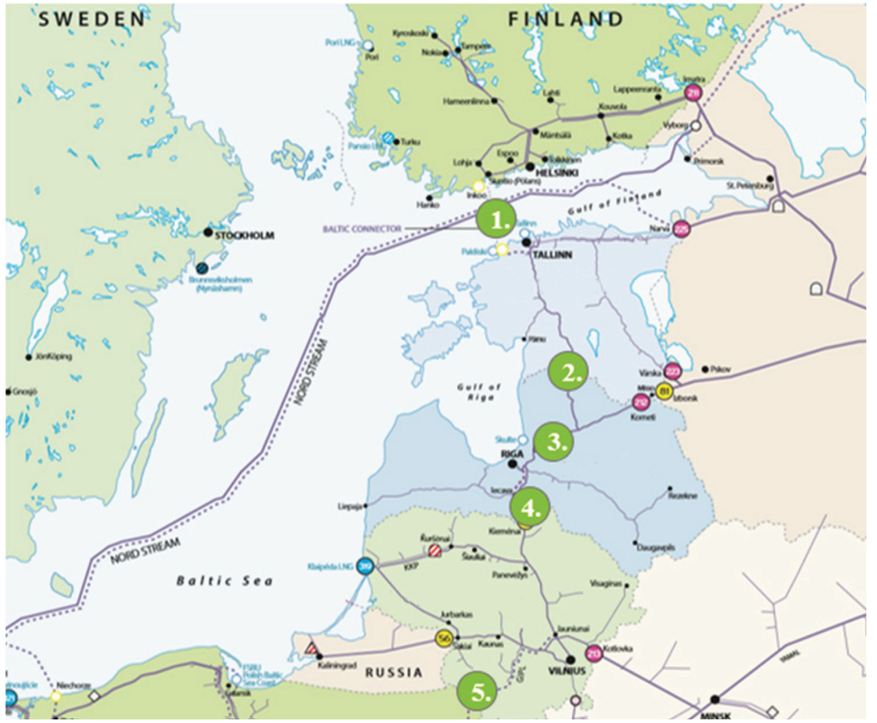
8. TRANSMISSION SYSTEM DEVELOPMENT

8.1. Interconnection system development

At present, the gas supply systems of the Eastern Baltic region are not connected to the common natural gas transmission network of the European Union. In order to remedy this situation, pursuant to 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, the Eastern Baltic region has been identified as one of the European Union's Priority Corridors.

In accordance with the above-mentioned Regulation, European PCIs have been established, for the implementation of which simplified procedures are available and which are also eligible for funding from the CEF Fund.

Figure 8.1. **Natural gas infrastructure projects in the Baltics**[31]



[31]ENTSOG website. Available at: https://www.entsog.eu/maps

The List of PCIs is reviewed every two years. On 31 October 2019, the European Commission published the fourth List of PCIs[32], which, like the third List of PCIs approved in 2017, included two Conexus projects: Enhancement of Inčukalns UGS and Enhancement of Latvia–Lithuania interconnection:

1. Estonia–Finland interconnection (Balticconnector)[33]. On 11 December 2019, the interconnection Balticconnector was officially opened: a two-way gas pipeline connecting the natural gas infrastructures of Estonia and Finland. Balticconnector, which began operating on 1 January 2020, connects the natural gas networks of the Baltic States and Finland, playing an important role in the single natural gas market.

The 77-km-long underwater section of the pipeline from Inkoo in Finland to Paldiski in Estonia is connected to a 21-km-long onshore pipeline in Finland and a 55-km-long onshore pipeline in Estonia, thus connecting the gas transmission systems of the two countries.

2. Enhancement of Estonia–Latvia interconnection[34]. Enhancement of this interconnection will increase the volume of natural gas flows, as well as organize natural gas supplies from Estonia to Latvia, which will be important to ensure natural gas flows in the Single Natural Gas Market and allow Estonian and Finnish market participants to store natural gas at the Inčukalns UGS. The planned input and output capacity of the interconnection – 105 GWh/day – will be significantly affected by the implementation of the project for the Enhancement of Latvia–Lithuania interconnection, which is planned to be completed by the end of 2023. The interconnection enhancement works on the Estonian side are planned to be completed in 2021, while on the Latvian side, taking into account the deadline of the project for the Enhancement of Latvia–Lithuania interconnection – not earlier than 2024.

3. Enhancement of Inčukalns Underground Gas Storage[35]. The Inčukalns UGS is the only underground natural gas storage facility in the Baltic region that provides the region with stable natural gas supplies during winter. On 15 May 2019, INEA signed an agreement with Conexus on the PCIs. The project envisages the implementation of three main operations: improvement of overground equipment, restoration of gas wells and modernization of gas compression units. The project will significantly reduce the dependence between the capacity available for withdrawal and the natural gas reserves in the storage facility, which will significantly improve the security of natural gas supplies as well as the efficiency of the storage facility, which is especially important in the Single Natural Gas Market. In addition to the above, the project will implement additional environmental protection measures, reducing CO_2, NO_x and other emissions. The project deadline is December 2025.

4. Enhancement of Latvia–Lithuania interconnection[36]. On 19 December 2019, INEA signed an agreement with Conexus and the Lithuanian transmission system operator Amber Grid on the financing of construction works within the framework of the project for the increase in the capacity of Latvia–Lithuania interconnection: Enhancement of Latvia–Lithuania interconnection. Increasing the interconnection capacity will not only ensure greater volumes of natural gas exchange between Latvia and Lithuania but will also ensure sufficient capacity in the Latvian transmission system for natural gas flows with the establishment of a regional natural gas market. The aim of the project is to carry out reconstruction works, diagnostics and repair works of individual gas transmission facilities in order to prepare the system for increase in the pressure, which at the same time will increase the interconnection capacity for flows in the direction from Latvia to Lithuania to 119.5 GWh per day and from Lithuania to Latvia – to 130.47 GWh per day. The project deadline is December 2023.

[32]EU's Fourth List of Projects of Common Interest. Available at: https://ec.europa.eu/energy/sites/ener/files/c_2019_7772_1_annex.pdf
[33]Project of Common Interest No. 8.1.1. Estonia–Finland interconnection.
[34]Project of Common Interest No. 8.2.2. Enhancement of Estonia–Latvia interconnection.
[35]Project of Common Interest No. 8.2.4. Enhancement of Inčukalns Underground Gas Storage.
[36]Project of Common Interest No. 8.2.1. Enhancement of Latvia–Lithuania interconnection.

5. Gas interconnection Poland–Lithuania (GIPL)[37]. The aim of this project is to connect the Polish and Lithuanian natural gas transmission systems, thus ensuring the connection of the Eastern Baltic natural gas transmission systems to the Central European natural gas transmission network. The GIPL will function as an alternative gas supply source for the Eastern Baltic region, improving the natural gas supply security in the region and allowing to integrate the region in the EU natural gas transmission network. The planned capacity towards Lithuania will be 73,9 GWh per day, while towards Poland – 57,7 GWh per day. The project is planned to be completed in 2022.

At the end of 2020, work was started on the fifth List of PCIs, in which Conexus wants to include the two projects on the fourth List, as well as an additional connecting gas pipeline between the Inčukalns UGS and Skulte LNG Terminal if the necessary permits for the liquefied natural gas project are received from JSC Skulte LNG Terminal. The fifth List of PCIs is expected to be approved at the end of 2021.

The fifth List of PCIs is the last list of PCIs to be established under the existing 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. In view of the EU's commitment to decarbonisation, the European Commission has launched a public consultation on the recast of Regulation, which is expected not to include natural gas projects.

Desynchronization of the Baltic electricity network from the BRELL[38] circle and synchronization with Continental Europe will have a significant impact on the natural gas market. After joining the new synchronization zone, Latvian electricity producers will have to provide their own generating capacities and natural gas will largely play the role of a guarantor of a stable electricity supply. The Baltic power interconnections NordBalt (Sweden–Lithuania), Estlink (Estonia–Finland) and LitPol (Lithuania–Poland), which had the status of PCIs, have significantly changed the power generation market in the Baltic States, as well as increased the demand for natural gas and its storage facilities.

Electricity interconnections with the Scandinavian region have increased competition in the power generation market, which requires more flexibility from electricity producers than can be offered by gas-fired thermal power plants. The Scandinavian electricity market will indirectly but significantly affect the natural gas market in the Baltics, as a result of which the demand for natural gas flexibility and storage facilities will increase. Gas-fired thermal power plants must be able to ensure the production of the required amount of electricity in a short time, as a result of which it will be necessary to ensure sufficient and operative withdrawal of natural gas from the Inčukalns UGS. In the next 10 years, the Inčukalns UGS will play an important role in Latvia's energy supply, because after the desynchronization of the Baltic electricity network, the Inčukalns UGS will act as a guarantor of the region's electricity supply and energy security.

[37] Project of Common Interest No. 8.5. Gas interconnection Poland–Lithuania.
[38] Agreement signed by Belarus, Russia, Estonia, Latvia and Lithuania on synchronization of the countries' power grids.

8.2. National system development

Energy Transition Projects

Regulation (EC) No 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 the ENTSOG to establish a Ten-Year Network Development Plan every two years. The aim of the TYNDP is to identify and eliminate the bottlenecks in European gas infrastructure.

At the end of May 2019, ENTSOG started collecting information on the projects to be included in the 2020 TYNDP.

The following project could be included in the TYNDP:

- gas infrastructure projects (interconnections, storage facilities, liquefied gas terminals);
- projects that significantly reduce CO_2 emissions and air pollution, as well as ensure the introduction of renewable energy sources into the system and sector coupling[39];
- energy transition projects[40], involving projects such as Power-to-Gas[41], hydrogen or synthetic methane, biomethane production plants, the improvement of power and gas systems for the injection of energy obtained in the above-mentioned ways.

In the 2020 TYNDP, Conexus included two new energy transition projects:

- Biomethane production with infrastructure building/enhancement in Latvia;
- Power-to-Gas production with infrastructure building/enhancement in Latvia.

[39]From English - Sector Coupling [40]From English - Energy Transition Projects [41]From English - Power-to-Gas

Connections to the Transmission System

In 2019, PUC approved regulations in the natural gas sector that improve the process of connection to the natural gas system: “Natural gas transmission system connection for manufacturers of biomethane, operators of liquefied natural gas system and natural gas users”. The aim of the Regulations is to ensure the possibility for the natural gas users themselves to decide, plan and implement connection to the natural gas transmission system in places where it is technically possible and economically justified. At these connection points, natural gas of appropriate quality[42] can be injected into the transmission system or withdrawn from the transmission system, for example, to ensure the operation of LNG refuelling stations or industrial facilities.

Since the Regulations came into force, six potential users have shown interest in establishing a direct connection to the transmission system, and in the summer of 2020, the implementation of the first direct connection to the gas transmission system project was started. The first direct connection is located in Priekuļi, and its construction is carried out by the compressed natural gas producer SIA GasOn[43] under the supervision of Conexus specialists. In the middle of 2021, SIA GasOn plans to start supplies to customers, commissioning the first gas compression plant.

The Company created a map of possible connection points with potentially the lowest costs of connection to the gas pipeline of the natural gas transmission system. In 2020, the Company continued to work on the identification of potential connection points, and today 19 potential connection points are marked on the map.

The map of the Latvian natural gas transmission system with connection points is attached in Annex 1.

[42]Cabinet Regulation 650 as of 4 October 2016, ‘Requirements for injection and transportation of bio-methane and liquefi ed natural gas in the natural gas transmission and distribution system’

[43]Previous name: SIA RiGas Cylinders.

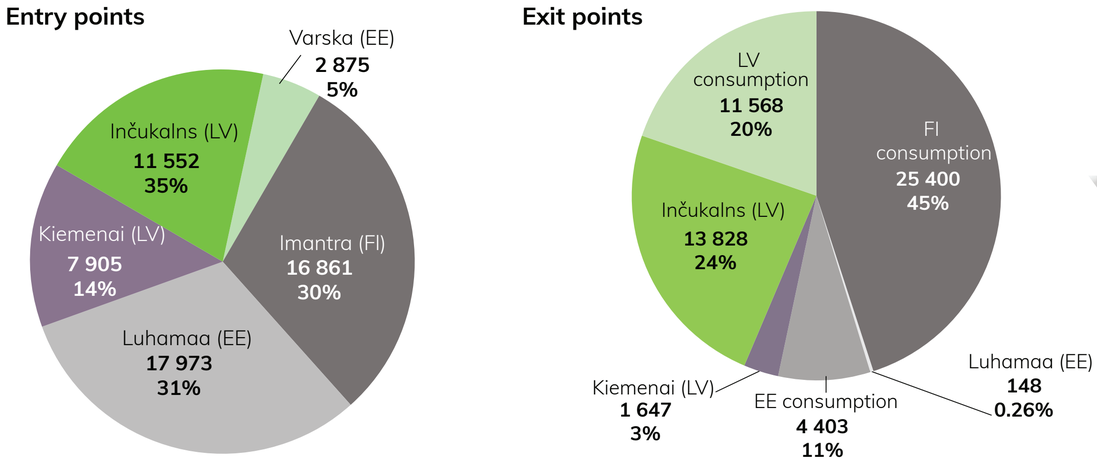
9. SINGLE NATURAL GAS MARKET

RGMCG[44] was established within the framework of the Baltic Energy Market Interconnection Plan[45], with the Heads of Government of the Baltic States and Finland concluding an agreement on 5 December 2014 on the harmonization of network codes and the establishment of Single Natural Gas Market. The members of the RGMCG – transmission system operators, national regulatory authorities and the relevant ministries - have different tasks. Transmission system operators were tasked with harmonising transmission system regulations and balancing measures while also creating a common entry - exit area. National regulatory authorities are responsible for the development of single tariff area methodologies, establishment of principles for socialization of natural gas infrastructure of regional significance and harmonization of licensing regimes. In turn, the ministries are responsible for security issues of regional natural gas supply. The RGMCG is also closely monitored by the European Commission Directorate-General for Energy. In 2020, RGMCG, in cooperation with the European Commission, developed and on 20 April approved a roadmap[46] establishing a process for further integration of the Baltic-Finnish natural gas market.

The first activity in the framework of the gradual implementation of the BEMIP plan is the integration of the Baltic-Finnish gas market, creating a single entry tariff area for Estonia, Latvia and Finland, more commonly known as FINESTLAT single entry tariff area, and two balancing zones – Estonian-Latvian and Finnish. FINESTLAT became operational on 1 January 2020 with the start of commercial use of the Estonian-Finnish interconnection Balticconnector. It should be noted that FINESTLAT is the first single market region of its kind in the European Union.

The results of the first year of operation of the Single Natural Gas Market area confirm that all participants involved in the supply of natural gas are significant beneficiaries. The choice of supplier for natural gas transmission system users and gas end-users have increased significantly as the creation of a single entry tariff area has led to the abolition of charges for crossing the borders between the countries of that area, thus promoting competition between natural gas traders and facilitating access to alternative gas sources. Natural gas traders have the opportunity to use the available natural gas transmission and storage infrastructure more efficiently, but the Estonian-Latvian Common Balancing zone reduces the bureaucratic burden and ensures a convenient and transparent balancing process.

Figure 9.1. **Amount of gas received and transferred in the Single Natural Gas Market in 2020 (GWh)**



Market integration marks a significant step of change for Latvia's energy independence, sustainable and efficient use and availability of infrastructure, especially the Inčukalns underground gas storage facility, on a regional scale, and wider opportunities to develop the production and use of the so-called "green" gases and cross-sectoral integration, building on the region's integration into the European Union's single gas market.

[44] from English - Regional Gas Market Coordination Group
[45] from English - Baltic Energy Market Interconnection Plan
[46] European Commission website. Available here: https://ec.europa.eu/info/sites/default/files/energy_climate_change_environment/news/documents/roadmap_on_regional_gas_market_integration.pdf

Finnish, Estonian and Latvian tariff area and ITC mechanism

From 1 January 2020, the ITC procedure of the natural gas transmission system operators Gasgrid Finland, Elering and Conexus of the Single Finnish, Estonian and Latvian tariff area has been introduced, based on the inter-operator agreement signed on 14 February 2019 on the implementation of the ITC mechanism and coordinated with the decision of the Council of the Public Utilities Commission of 18 December 2019 No. 201 “On Reference Price Methodology and Agreement on the Inter-Transmission System Operator Compensation Mechanism”. The ITC procedure for natural gas transmission system operators is to be understood as a mechanism whereby the revenues generated by all external entry point tariffs of the single entry tariff area are combined and distributed among the operators of the single entry tariff area system.

The ITC mechanism provides that the redistribution of combined revenues takes place on a monthly basis, taking into account the share of each tariff area country’s natural gas consumption in the total annual consumption of the tariff area countries in the previous calendar year. If the system operator incurs demonstrable eligible variable costs related to the provision of regional flows but which are not eligible for supplies to the national natural gas retail market, such as fuel gas costs required for the operation of compressors, the operator is entitled to deduct eligible costs from its revenue from reserving input power before the redistribution of revenue.

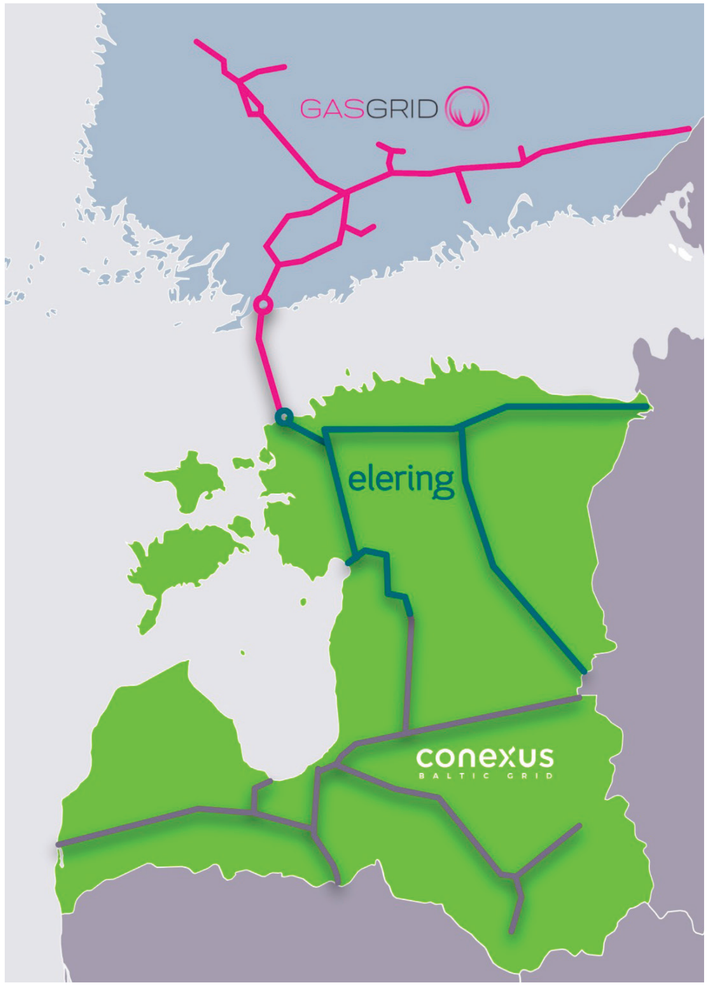
In order to evaluate the ITC mechanism and compliance with the TAR NC[47], as well as to assess the results of market consolidation, in 2020 the Baltic and Finnish transmission operators, in cooperation with REKK[48], conducted a study “Evaluating the FinEst-Lat gas market coupling”. Based on the analysis, the ITC mechanism complies with the TAR NC - it is transparent and non-discriminatory, and although the entry tariffs are not set in full compliance with the TAR NC, the Finnish, Estonian and Latvian tariff area is broadly in line with the TAR NC idea and purpose. Due to the uniqueness of the network and the market, the ITC needs to include the possibility to set tariffs nationally, but to coordinate them regionally. The general recommendations of the REKK recommend maintaining the existing model of the ITC mechanism due to its simplicity and comprehensible framework.

[47]European Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas

[48]Regional Centre for Energy Policy Research. Available: https://rekk.hu/

Estonian – Latvian Common Balancing zone

As of January 1, 2020, the Estonian – Latvian Common natural gas transmission system balancing zone, which covers the Latvian and Estonian gas supply systems, became operational. The balancing mode covers all processes, from the entry to the transmission system to the end-user connection, simplifying daily balancing and avoiding the introduction of a separate distribution system balancing process. The operation of the Common Balancing zone shall be regulated by the common rules for the use of the transmission system[49] and the common balancing rules[50]. Within the framework of the regulations, system users are entitled to sign transmission and balancing agreements with any of the two transmission system operators and use the entire Latvian and Estonian gas transmission infrastructure. The common balancing rules provide for the introduction of a new balancing element, the neutrality charge, which is applied as of 1 January 2020. The neutrality charge shall consist of the difference between the costs and revenues of the transmission system operators of the Common Balancing zone from balancing activities and shall ensure the financial neutrality of the transmission system operators.



The principles of cooperation between Conexus and Elering within the Common Balancing zone are set out in the cooperation agreement concluded between the operators on the implementation of the common balancing zone, which includes several roles and appropriate division of functions and responsibilities in the day-to-day operation of the common balancing zone. By concluding the cooperation agreement, the operators agreed that from 1 January 2020, the role of the settlement and balancing coordinator provided for in the agreement, as well as the authorization to perform balancing activities of the Estonia-Latvia Common Balancing area, will be delegated to Conexus, retaining the right of any operator of the Common Balancing area to request the rotation of the contractor specified in the contract.

In order to introduce and implement the balancing and settlement coordination processes included in the cooperation agreement, a new, unique unit was created in Conexus – a Common Market Area Division. Based on the above-mentioned inter-operator agreement, it performs the functions of the Market Area Manager[51] and serves system users and transmission system operators active in the Estonian-Latvian Balancing zone. The unit ensures the operation of the virtual trading point and performs the day-to-day balancing process of the common balancing zone, which includes both the analysis of gas flows and the preparation of the imbalance report of the Latvian and Estonian transmission systems, and actual balancing activities on the trading platform or within balancing service agreements, thus balancing the operation of the gas transmission system on a daily basis[52]. It is also responsible for the collection and preparation of settlement data – monthly invoice supplements for neutrality, balancing and booked capacity settlements are prepared for all participants of the Estonian-Latvian Common Balancing area.

[49] Available here: https://likumi.lv/ta/id/314277-par-vienoto-dabasgazes-parvades-sistemas-lietosanas-noteikumu-saskanosanu
[50] Available here: https://likumi.lv/ta/id/310338-par-vienotas-dabasgazes-parvades-ieejas-izejas-sistemas-balansesanas-noteikumu-saskanosanu
[51] from English – Market Area Manager
[52] Information on balancing activities in 2020 is available in Section 6 "Conformity of natural gas supply and consumption – natural gas flows"

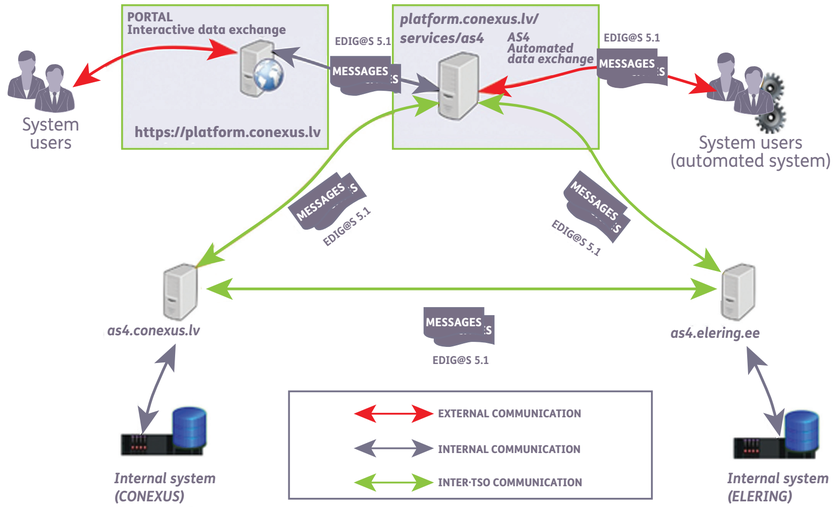
Common IT platform

Starting with the establishment of the Estonian – Latvian Common Balancing zone, the Latvian and Estonian gas transmission system operators also started servicing joint transmission and storage service users by using the common IT solution on the website platform. conexus.lv. The common IT platform is the sales channel of the services provided by both operators and the most important IT system for communication with the users of transmission and storage services. To ensure easy use of the common platform, it has an interactive web interface as well as direct data exchange with EDIG@S 5.1. standard messages via AS4 data channels.

The development and implementation of the common IT platform was performed in several successive stages or development stages, initially providing users with the basic functionality of the system for reserving transmission capacity and submitting nominations. In the following stages, the system was supplemented with the functionality necessary for the daily operation of other users, such as the display of assignments and imbalance data.

In 2020, work will continue on the further development and improvement of the common IT platform. A number of important user recommendations have been compiled and implemented to improve the day-to-day usability of the platform, such as the ability to copy a user's previous nominations on a new gas day, nomination overview and nomination aggregation by directions and interconnection points, capacity transfer function, improved *.csv export, a new section has been developed and implemented - an overview for visual graphical representation of user data, etc.

Figure 9.2. **IT system cooperation between the transmission system operators of Estonia and Latvia**



10. PROJECTS FOR THE TRANSITION OF ENERGY TO A MORE ENVIRONMENTALLY FRIENDLY ENERGY SECTOR

10.1. European Union policy planning in the gas sector

The European Green Deal is an ambitious package of climate measures that aims to reduce GHG emissions by 55% by 2030 (compared to 1990), while the European Union wants to become the first climate-neutral part of the world by 2050. RES-produced as well as low-carbon gases will play an important role in this transition to climate neutrality, based on the development documents published by the European Commission in the second half of 2020: Strategy to Reduce Methane Emissions[53], Strategy on Energy System Integration[54] and Hydrogen Strategy[55].

In 2020, ENTSOG launched the 2050 Roadmap Action Plan[56], renewing recommendations on the role of European gas TSOs in the transition to clean energy and decarbonisation. The ENTSOG roadmap explores various aspects of the decarbonisation of gas infrastructure in order to contribute to the implementation of the European Green Course, based on the following key principles:

- gas and gas networks can be decarbonised using existing gas systems;
- biomethane, hydrogen, as well as Carbon Capture and Utilisation and Capture and Storage will play an important role[57].
- In many Member States of the European Union, natural gas will continue to play an important role in the overall energy balance. It continues to reduce CO_2 significantly and, by replacing other fossil fuels, natural gas holds out the potential for reduction of air pollution;
- integrated energy systems will be characterized by synergies between the electricity and gas sectors.

In 2020, the Cabinet of Ministers approved a strategically important energy policy document – Latvia's NECP for 2030. Latvia's NECP stipulates that the RES consumption target for 2030 is 50% of the total energy consumption and it is also in line with the EU target.

Latvia's planned reduction of GHG emissions in 2030 (compared to 1990) is -65%; while in 2050, it is planned to reach climate neutrality. These binding targets will have an impact on final energy consumption and will facilitate the market penetration of RES gases. Biomethane has great development potential in terms of both production and consumption in Latvia.

[53] European Commission website. Available here: https://ec.europa.eu/energy/sites/ener/files/eu_methane_strategy.pdf
[54] European Commission website. Available here: https://ec.europa.eu/energy/sites/ener/files/energy_system_integration_strategy_.pdf
[55] European Commission website. Available here: https://ec.europa.eu/energy/sites/ener/files/hydrogen_strategy.pdf
[56] ENTSOG website. Available here: https://entsog.eu/sites/default/files/2020-10/entsog_Roadmap_2050_Action_Plan_201008_final.pdf
[57] from English - Carbon Capture and Utilisation (CCU) and Carbon Capture and Storage (CCS)

10.2. The work of Conexus in the transition toward a more environmentally friendly energy sector

Study “Feasibility study of biogas transmission from production facilities to the consumer and possible biomethane production options”

In order to assess Latvia’s biomethane production potential and related costs, in 2020 Conexus, in cooperation with the University of Latvia, conducted a study “Feasibility study of biogas transmission from production facilities to the consumer and possible biomethane production options”. Within its framework, possible production and transmission business models and scenarios were evaluated, cost estimates of identified technical and economic models were made and the most economically advantageous options for biogas collection and processing into biomethane with later injection into the transmission system were identified.

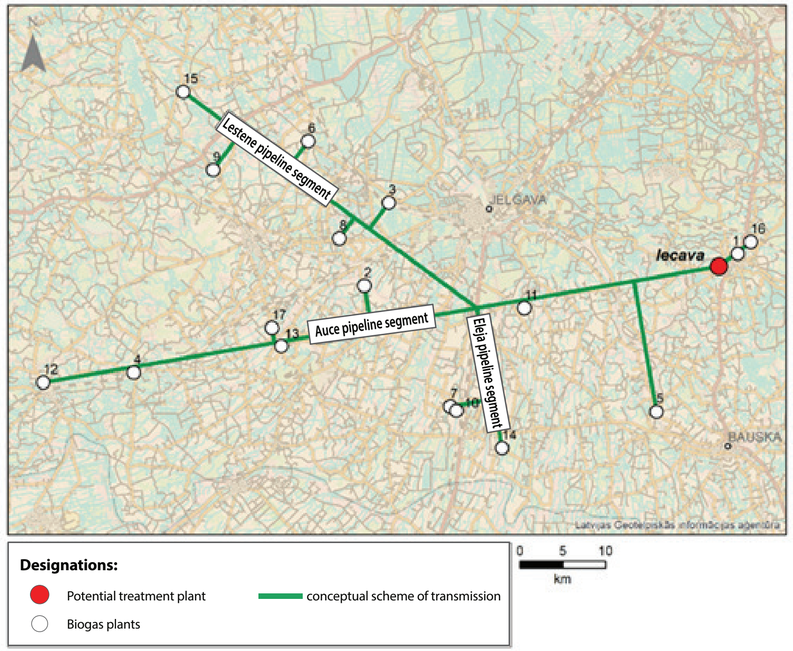
Based on the analysis, it is concluded that from the economic point of view the most useful approach would be to combine biogas plants into clusters on a geographical basis, providing for each cluster a common (modular) biomethane station, which would purify raw or partially purified biogas to biomethane quality, which would then be injected into the natural gas transmission network.

From a theoretical point of view, the most economically optimal would be the Iecava cluster, which could combine up to 17 existing biogas plants using a low-pressure pipeline system designed for this purpose by centrally processing the collected biogas into biomethane. The total annual biomethane production of the cluster could reach 44 million m^3 or ~0.5 TWh.

Cost estimates for biogas processing in biomethane and its injection into the transmission system in the Iecava cluster scenario vary from ~16 EUR to 22 EUR/MWh of biomethane depending on the electricity source. The most favourable scenarios for the operation of the biomethane plant and the biogas supply infrastructure are obtaining energy either from a local high-voltage plant or from raw biogas.

In total, biogas plants operating in Latvia could be combined into 8 clusters, although the level of specific costs of each cluster will depend on the productivity of the combined biogas plants and the necessary biogas collection infrastructure.

Figure 10.1. **Theoretical model of Iecava biomethane cluster**



The cluster principle would also be applicable in the future if large-scale biogas plants were developed in Latvia, allowing activities related to the use of CO_2 to develop on the basis of biomethane (CO_2 as a product, CO_2 as a raw material for the storage of renewable (wind, solar) energy using the Power-to-Gas[58] methanization (Power-to-Methane[59]) process, etc.).

[58] from English - Power-to-Gas
[59] from English - Power-to-Methane

Membership in the European Clean Hydrogen Alliance

On 8 July 2020, the EC launched the Hydrogen Strategy for a Climate-Neutral Europe, which aims to decarbonise the industrial, transport, electricity and building sectors into an integrated energy system through hydrogen.

The strategy sets out how hydrogen produced from RES can be turned into a viable solution to help decarbonise different sectors, as well as identifies the challenges to be addressed and sets out the mechanisms available to the EU. At the same time, an action plan is presented for the coming years (to install RES-hydrogen electrolysis plants with a total capacity of 6 GW in the EU by 2024, and RES-hydrogen electrolysis plants with a capacity of 40 GW by 2030).

On the basis of the above, the European Clean Hydrogen Alliance[60] was established on 8 July 2020 with the aim of deploying hydrogen technologies by 2030, combining renewable and low-carbon hydrogen production, industrial, mobility and other sectors, as well as hydrogen transmission, distribution and storage.

The main task of the Clean Hydrogen Alliance is to identify and develop a viable investment program with certain projects. The investment program will also complement the Energy System Integration Strategy, which describes how current EU energy policies, including the development of the hydrogen sector, will contribute to a climate-neutral, integrated energy system based on RES electricity, RES and low carbon fuels.

In 2020, Conexus joined the European Clean Hydrogen Alliance and participates in the Thematic Working Group on Hydrogen Transport and Distribution, taking into account the challenges of building hydrogen infrastructure as well as moving towards decarbonisation.

The Clean Hydrogen Alliance is open to all interested parties who want to engage and contribute to the deployment of renewable and low carbon hydrogen in terms of supply, demand and distribution, as well as those who will use renewable and low carbon hydrogen as a tool to decarbonise industrial processes and economic sectors as a whole.

[60]from English - European Clean Hydrogen Alliance. Available here: : **https://ec.europa.eu/growth/industry/policy/european-clean-hydrogen-alliance_en**

Participation in the studies of the GIE on “The value of gas storage infrastructure in electricity system” and “Development of concrete proposals for European legislation on gas storage”

It is now widely acknowledged that RES and low carbon gases will be an important component in promoting decarbonisation, as the conversion of renewable electricity into gas provides both energy transportation and potentially a way to balance short-term and seasonal fluctuations in renewable energy demand.

At the 33rd Madrid Forum, GIE presented the results of the 2019 study “The value of gas storage infrastructure in electricity system”[61], which assessed the value of gas storage capacity in the electricity sector and presented a quantitative calculation of investment avoidance in electricity generation. In response, the European Commission asked the GIE to make concrete legislative proposals on gas storage. In this context, the consulting company Frontier, together with Baker Botts, worked on behalf of GIE in 2020 on cross-sectoral regulatory measures to improve energy system integration through the flexibility provided by gas storage. The GIE presented the European Commission and launched a discussion on the findings of the study “Development of concrete proposals for European legislation on gas storage”[62], focusing on three main recommendations:

- ensure more coordinated planning of electricity, gas, hydrogen and storage infrastructure;
- ensure that the benefits of gas storage for electricity generation are recognized, avoiding investment costs;
- allow further government intervention to ensure a reliable energy system if market failures persist.

[61]GIE website. Available here: https://www.gie.eu/index.php/gie-publications/studies/27906-gie-artelys-study-capacity-value-of-gas-storage/file
[62]GIE website. Available: https://www.gie.eu/index.php/gie-publications/studies/28628-elaborating-concrete-european-legislative-proposals-on-gas-storage/file

Participation in the report of the GIE CEE and SEE task force on decarbonisation “How gas infrastructure can contribute to meet EU’s long-term decarbonisation objectives”

The challenges related to the decarbonisation of the gas sector in terms of production, consumption and transportation call for a transformation of the energy system and in order to achieve the EU’s common goal of climate neutrality by ensuring an efficient and equitable transition to a green energy future, it is essential to take into account the specificities of the resources and potential of the various countries and regions of the European Union.

In 2020, GIE, together with transmission and storage operators from 11 countries, including Conexus, prepared a report entitled “Decarbonisation in Central-Eastern and South-Eastern Europe: How gas infrastructure can contribute to meet EU’s long-term decarbonisation objectives” to identify and highlight the opportunities that gas infrastructure and gas in all its forms – natural gas, low carbon gas and RES gas – offer to countries in Central-Eastern and South-Eastern Europe in the context of energy transition. The report and its results and recommendations are available on the GIE website[63].

Reduction of methane emissions

In order to promote the issuance of technically and economically justified regulatory enactments, Conexus was involved in the development of the national position of the EU methane emission reduction strategy. The most important activity resulting from the methane emission reduction strategy is the improvement of methane emission monitoring and reporting.

During 2020, further possibilities for improving the management of methane emissions were assessed, envisaging more detailed collection of methane emissions data and regular measurements to specify the amount of methane emissions. At the end of 2020, work began on identifying the situation for joining the Oil and Gas Methane Partnership (OGMP 2.0). Participation in the Oil and Gas Methane Partnership would promote higher accuracy of collecting methane emissions data, and it would be easier and faster for Conexus to implement the requirements set out in international laws and regulations related to the monitoring of air emissions and further reduction.

[63]GIE website. Available: https://www.gie.eu/download/brochure/BROCH_CEE_SEE_2021.pdf

Significance analysis of sustainability aspects

In order to improve sustainable development, define the framework and key aspects of sustainability, in 2020 Conexus carried out a materiality analysis of sustainability aspects, involving representatives of all key stakeholder categories. The assessment was carried out on the relevant environmental, social and governance aspects, taking into account the views of stakeholders, the relevance of the assessment by management, trends of other industry players and opinions of external experts.

Sustainability, energy and society experts from universities, NGOs, business organizations and specialized consulting firms took part in the analysis. In total, 250 stakeholders and experts from around 200 organizations were addressed.

There was also a discussion between the leaders of the groups of people affected by Conexus activities, whose decisions and opinions affect the Company, through an online survey and one-on-one interviews conducted by neutral third-party consultants. See Conexus 2020 Annual Report for details[64].

Work has begun on the development of the Conexus Sustainable Development Agenda, setting out the objectives, targets and key initiatives to be seen in the context of the UN Sustainable Development Goals and sub-objectives, which will identify where Conexus has a significant impact. The sustainable development program will be integrated into the Company's medium-term strategy in 2021.

[64]Conexus website. Available here: https://www.conexus.lv/parskati/akciju-sabiedribas-conexus-baltic-grid-2020-gada-parskats

Priority SDG-s for Conexus

To aim towards minimizing the footprint and maximising the positive impact of the core work of Conexus

Medium-priority

To be managed with high responsibility and care, reduce risks and maximise positive effect

Although health and competence related sustainability topics are among the most relevant ones, SDG3 and SDG4 targets are not that directly linked to the impact and activities of Conexus

Low-priority

Environmental and energy management

To promote the sustainable development of the company, Conexus has implemented, certified and maintains an Integrated Management System, which includes environmental management (ISO 14001:2015), energy management (ISO 50001:2018), occupational health and safety (ISO 45001:2018) management systems. The maintenance of the Integrated Management System continuously improves Conexus' environmental performance, promoting the preconditions for reducing environmental pollution, improving the efficient use of energy resources, as well as increasing the level of responsibility of employees for the quality of work. In December 2020, the 1st supervisory audit of the Integrated Management System took place. There were no non-compliances identified during the audit.

11. SYSTEM SECURITY

11.1. Physical flow security

Conventional N-1 calculation

The functional capability of the natural gas system in the event of failure of one of its facilities has been assessed in accordance with the Security of Supply Regulation[65], which is guided by the N-1 principle, i.e. operating failure in a region's single largest natural gas infrastructure.

The N-1 calculation is theoretical in nature, describing the technical capacity of a natural gas infrastructure to meet the total demand for natural gas within a certain area, assuming that on a day with the highest demand in the last 20 years, the biggest interconnection in the natural gas supply infrastructure becomes unavailable.

N-1 allows to assess the level of protection of natural gas consumers or the adequacy of natural gas infrastructure capacity in the selected area in percentage terms, taking into account the characteristics of various elements of the natural gas system. The N-1 calculation formula and explanations of the elements to be calculated are available in Annex 2, while the results of N-1 calculations at different Inčukalns UGS fillings are summarized in the table. The full calculation of N-1 values is available in Annex 3.

N-1 calculation results based on the Inčukalns UGS fill level

Filling of Inčukalns UGS	N-1 value[66]
30 %	170,2%
100 %	193,21%

The N-1 value is directly proportional to the filling of Inčukalns UGS. Under the Security of Supply Regulation, the value in both situations exceeds the minimum set by the Regulation. From the calculation results, it can be concluded that the security of natural gas supply in Latvia is at a high level, but N-1 does not provide full information on the total security of natural gas supply in Latvia, because the technical capacities of the system used in the N-1 calculation do not describe the availability of natural gas at the relevant infrastructure entry points, but only assess the technical capabilities of the natural gas transmission system. In addition, the seasonality of the natural gas system is not taken into account in the N-1 calculation – in the case of Latvia, natural gas is injected into Inčukalns UGS during the summer, while in winter natural gas is withdrawn from Inčukalns UGS to ensure natural gas supply to the Baltic region. It should be taken into account that during summer, the Latvian natural gas transmission system, ensuring the injection of natural gas into the Inčukalns UGS, operates for a longer period with a higher load than in winter, during the Inčukalns UGS withdrawal season. The filling of Inčukalns UGS directly impacts the performance of the natural gas transmission system, because the degree of filling of Inčukalns UGS determines the amount of natural gas available for withdrawal within one day and, indirectly, the pressure in the natural gas transmission system. Therefore, it is necessary to assess the security of natural gas supply, taking into account the seasonality characteristic of the Latvian natural gas supply system and the more significant impact of summer N-1 on security of supply in winter than winter N-1.

From the point of view of security of supply, Inčukalns UGS cannot be considered as an object with 100% or 0% availability – the connection of Inčukalns UGS technological lines during the withdrawal season allows to ensure natural gas withdrawal with reduced capacity even in case of a failure of any of the technological equipment.

It should be noted that with the opening of the Estonian-Finnish natural gas interconnection Balticconnector, which was opened at the end of 2019, it is possible for Latvia to receive gas from Finland via Estonia, but during 2020 such a flow direction was not observed.

[65] Regulation (EU) No 182/2011 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply

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

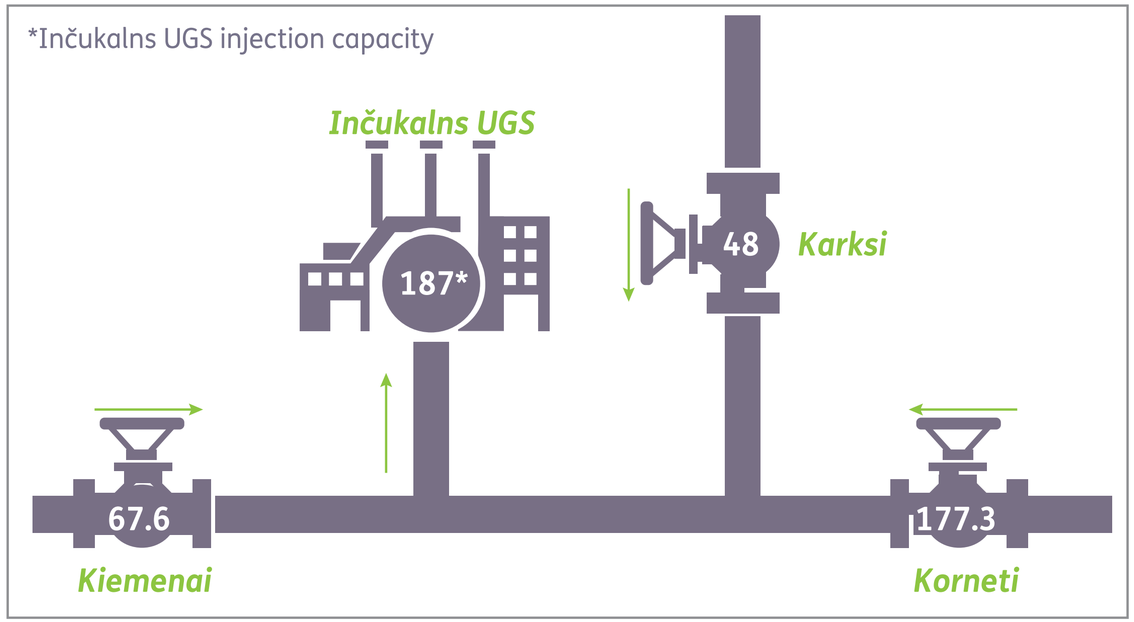
ENTSOG TYNDP Single Largest Infrastructure Disruption method

ENTSOG TYNDP introduced a new N-1 calculation method – Single Largest Infrastructure Disruption[67]. The method models a situation involving the entry capacity of the transmission system, the internal demand in the country, and infrastructure disruptions, whereby one of the major gas supply infrastructure facilities is unavailable or not operational.

Inčukalns UGS is traditionally considered to be the largest natural gas system infrastructure in Latvia. However, the operation of Inčukalns UGS depends on the filling of the storage facility. As the filling of the storage facility in summer is mainly ensured through the Luhamaa entry point, the Luhamaa entry point (gas metering station Korneti) should be designated as the largest infrastructure of the natural gas system. It should also be taken into account that during the last 20 years, no disturbances that would endanger the security of supply have been identified in Inčukalns UGS. The technical entry capacities of the Latvian natural gas transmission system are shown in Figure 11.1.

[67]from English - Single Largest Infrastructure Disruptions

Figure 11.1. **Latvian natural gas transmission system technical capacity at entry points (GWh/day)**

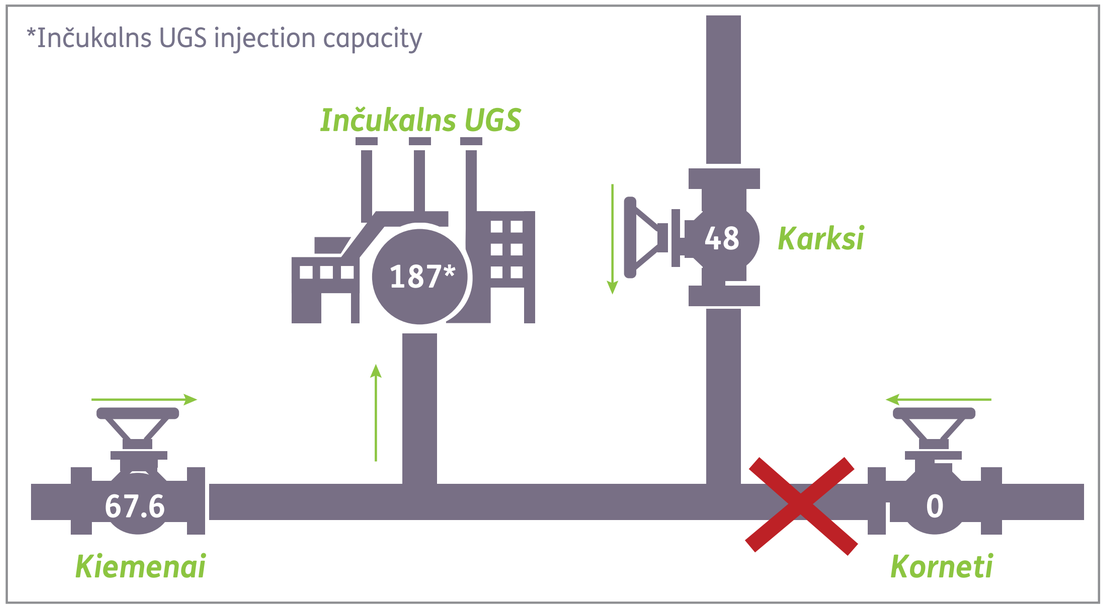


The total (designed) capacity of Inčukalns UGS is 24,219 GWh, during the natural gas injection season (May 1 to October 14), through the entry point Luhamaa (gas metering station Korneti), it is possible to inject 29,61 TWh to Inčukalns UGS, which is 100% of the maximum capacity. And through the entry point Kiemena, it is possible to inject 11,29 TWh into Inčukalns UGS, which makes up 46,61% of the maximum capacity. Through Finland/ Estonia, the entry point Karksi could theoretically deliver up to 8,02 TWh during the injection season, but in 2020 there was no supply for injection at Inčukalns UGS via this transmission route, therefore it is not possible to objectively assess its potential impact on SLID calculation.

In the SLID calculation, assuming that the supply of natural gas through the Luhamaa entry point (gas metering station Korneti) is interrupted, the only verified source of natural gas supply remains Kiemena, through which 11,29 TWh (46,61% of the maximum capacity) can be injected into Inčukalns UGS during the natural gas injection season. In order to provide Latvia with natural gas supply during the winter heating season, it is necessary to fill Inčukalns UGS with natural gas in the amount of at least 7,4 TWh by the end of the injection season using the Kiemenai entry point, as well as ensure the possibility of natural gas supply from Lithuania during winter. According to the study "Joint Risk Assessment of the gas system of Estonia, Finland, Latvia and Lithuania" conducted by the European Joint Research Centre in 2016, the total amount of active natural gas at the beginning of the winter season should be 8,262 TWh.

According to the SLID method included in the ENTSOG TYNDP and the explanation given above, the entry point to Luhamaa (gas metering station Korneti) is considered to be the largest natural gas supply infrastructure. According to the simulation calculation, the technical capacity entry points of the Latvian natural gas transmission system are shown in Figure 11.2.

Figure 11.2. **Latvian natural gas transmission system technical capacity at entry points according to simulation calculation (GWh/day)**



11.2. System cybersecurity

Assessing the importance to the national economy, the Ministry of Economics granted Conexus the status of a basic service provider in accordance with Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union. The status envisages closer cooperation with the Information Technology Security Incident Prevention Institution and the fulfilment of additional organizational and technical requirements.

In order to ensure the confidentiality and integrity of communications with system operators and users, in accordance with the European Commission Regulation (EU) 2015/703 of 30 April 2015 establishing a network code on interoperability and data exchange rules, during 2019 Conexus, in cooperation with the Estonian transmission system operator Elering, jointly developed a new platform for transmission system users, improving the security of information submission. At the same time, Conexus extended the usability of the data exchange protocol EDIG@S in accordance with the data exchange standards set by ENTSOG and ENTSO-E, for example, for the exchange of commercial data with the Estonian transmission operator Elering by using EDIG@S standard messages much more widely.

In 2020, Conexus, in cooperation with the National IT Security Incident Prevention Unit CERT.LV[68], started using the services offered to Public Administration Institutions and Critical Infrastructure Managers. This ensures that infrastructure security responds effectively to cyber security incidents and complies with the requirements of the NIS Directive.

During the reporting period, Conexus has reviewed and updated cyber security procedures for industrial management systems and IT security policy in Conexus as a whole. Conexus' procedures for responding to IT security incidents, product lifecycle management and security issues, as well as supply chain security issues have been clarified.

In cooperation with AST[69], Conexus has applied for EU support in the INEA Telecom program in order to establish a cyber security operations centre for the energy sector in the Baltic region together with AST. The project aims to use shared resources and expertise in cyber security incident management. As the infrastructure of energy companies is interdependent, cooperation in incident response and the exchange of information on cyber security issues can significantly improve cyber security in the whole sector.

[68]CERT.LV website. Available here: https://cert.lv/lv
[69]AST website. Available heres: https://ast.lv/lv

11.3. System physical security

In 2020, active work on improving the physical security of Conexus' infrastructure objects continues. In order for Conexus to be able to withstand the current threats to physical security by providing a professional approach and the implementation of the latest security solutions, an independent third-party audit of existing physical security systems and solutions, including fire, video surveillance, access control, theft alarm systems, and security service was performed during the reporting period. It is planned to continue the modernization of security systems with the technical design of the systems in 2021 and the system construction works starting from 2022 and completing them by 2023.

At the same time, work was carried out on updating the Civil Protection Plans of Conexus' infrastructure objects, implementing appropriate actions in the event of a crisis and/or imminent crisis. According to the plan, Conexus staff are trained in civil protection issues and receive regular training to check the staff behaviour and compliance with civil protection plans. In October 2020, Inčukalns UGS held a theoretical and practical training in civil protection, where together with Conexus specialists, the State Fire and Rescue Service, Emergency Medical Service, Police, Environmental Service, National Guard, Security Service and local governments (Sēja, Krimulda, Sigulda) also participated. In 2021, work will continue on the development of a common Civil Protection Plan for the gas transmission system, which will replace separate plans for gas transmission facilities.

In 2019, Conexus developed the Inčukalns UGS Safety Report assessing the risk of industrial accidents at a high-risk facility, developing and implementing the necessary industrial accident risk reduction measures to ensure the safety of employees, surrounding residents and the public and to protect them from the potential harmful effects of industrial accidents, as well as to preserve the quality of the environment. The safety report has been submitted to the State Environmental Bureau for evaluation. In February 2020, the assessment of the State Environmental Monitoring Bureau was received stating that the safety management system established and implemented at the facility ensures the objective prevention of the risk of industrial accidents, planning of risk reduction measures and internal monitoring of the working environment in accordance with regulatory requirements, the organizational structure and complexity of the operation of the facility, as well as the danger of industrial accidents. Tasks have also been set for the improvement of the safety report and for the implementation of additional measures with a deadline of March 2024.

In view of the impact of the Covid-19 pandemic, Conexus regularly assessed the impact of the risk on the company's operations and took risk mitigation measures. In order to ensure the supervision of Covid-19 control measures, operative actions and decision making, the Covid-19 Restriction Supervisory Steering Group has been established and necessary changes have been made in the work organization processes, incl. an action plan being developed in the case of detection of Covid-19, remote work has been organized, critical staff have been identified, physical contact has been banned, distancing measures have been taken, disinfectants have been provided, personal protective equipment has been provided and safety bypasses have been introduced in order to control Covid-19 precautions. It is planned to actively continue to follow the current situation and implement the necessary measures.

12. PLANNED TRANSMISSION MEASURES IN CASE OF MAXIMUM DEMAND

During 2020, the Ministry of Economics submitted and the European Commission approved the Latvian Preventive Action Plan and Emergency Plan for natural gas[70], which has been developed in accordance with Regulation No. 2017/1938 of the European Parliament and the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No. 994/2010.

Latvia's emergency plan envisages three levels of energy crisis:

- Early warning, announced when specific, serious and credible information is available that the natural gas supply situation may deteriorate significantly and that a declaration of alert or state of emergency is likely.
- An alert issued in the event of a natural gas supply disruption or extreme demand for natural gas, but the market can still cope with disruptions and non-market-based measures are not required.
- An emergency declared in the event of an extreme demand for natural gas or a major disruption of natural gas supply, all market-based measures have been exhausted, but meeting demand for natural gas is still not fully possible and non-market measures are needed, especially in order to supply the protected users.

According to the Latvian Emergency Plan, early warning can be announced if the natural gas demand ratio[71] for at least three consecutive days in the next seven-day period is from 90% to 95%; alert - between 95% and 100% respectively, but natural gas market participants are still able to ensure a full supply of natural gas without activating non-market-based measures. The emergency may be declared if the natural gas demand ratio exceeds 100% for at least three consecutive days in the next seven-day period, as well as if there is a significant gas supply disruption.

Each crisis level announcement procedure requires Conexus to submit information to the Ministry of Economics regarding the occurrence of the level announcement criterion and the Ministry of Economics, after assessing the forecast of changes in the natural gas supply or the operation of the natural gas transmission and storage system, shall make a decision regarding the declaration of the crisis level or regarding the refusal to declare the crisis level.

[70]The European Commission website. Available here: https://ec.europa.eu/energy/topics/energy-security/secure-gas-supplies/commissions-opinions-preventive-action-plans-and-emergency-plans-submitted-member-states-2019_en?redir=1

[71]The ratio of the forecasted natural gas demand to the maximum withdrawal capacity per day of the Inčukalns underground gas storage, expressed as a percentage.

The Latvian Emergency Plan states that Conexus is the crisis manager if an early warning or alert is announced. Conexus, as the crisis manager in early warning or alert situations, is mainly responsible for providing the functions of an information exchange and the natural gas supply situation monitoring centre, by compiling and passing on the information to the Ministry of Economics as well as information on energy crisis management obtained by the Company at its own and which would be provided to the Company by the natural gas distribution system operator, natural gas traders and major natural gas consumers. Whereas the Emergency crisis manager will be the State Energy Crisis Centre. Conexus is one of the members of the State Energy Crisis Centre in accordance with subparagraph 8.13 to the Cabinet of Ministers Regulation No. 40 "By-laws of the State Energy Crisis Centre". During an emergency, the Company's responsibilities change because the disruption of natural gas supply is so significant that it is necessary to introduce non-market-based measures, such as consumption restrictions and the use of natural gas reserves.

During the reporting period, Conexus ensured the operation of the monitoring system, which monitors the Inčukalns UGS and the entire Latvian gas supply system. The key task of the monitoring system is to follow the fluctuations of natural gas demand in Latvia and the Baltic region during the withdrawal season in order to assess in a timely manner the gas supply system's ability to meet system users' reservations and demand. In 2020, Conexus participated in "Demola Latvija"[72] with the aim of developing and improving the natural gas consumption forecasting module for Latvia for the next 14 days. In the "Demola Latvia" project team, the task submitted by the Company was carried out by four students of Latvian universities – Zane Feodorova, Leons Ālītis, Filips Pavārs, Annija Katrīna Zikmane, and in the course of the project, a natural gas consumption forecast calculation module was developed, which took into account not only temperature data, but also climatic parameters such as solar radiation levels and wind speed.

In the second half of the year, in cooperation with Conexus, the students improved the module using the machine learning[73] tool and developed an information system that automatically calculates natural gas demand in Latvia for the next 14 days, taking into account data input parameters such as climatic parameters, Inčukalns UGS withdrawal capacity, natural gas system user reservations, etc., calculates the natural gas demand coefficient and generates a report regarding the situation in the natural gas supply. As a result of the cooperation, the Company acquired a monitoring system that is able to calculate the demand for natural gas more accurately, as well as reduce the amount and time of manual work.

[72] A collaboration platform for students, companies and universities that enables companies to bring new competencies and ideas to the organization using the open innovation model. Available here: https://issuu.com/rtudesignfactory/docs/rtu_sig_2019-2020

[73] From English - machine learning

In the winter of 2020/2021, in accordance with the Latvian Emergency Plan, the Company informed the Ministry of Economics about the signs of the early warning level as part of the monitoring of the Latvian natural gas supply system. After evaluating the provided information, the Ministry indicated that such a situation has arisen as a result of commercial activities due to the development of the regional natural gas market, which indicates high demand but not physical gas shortages or supply disruptions. Thus, no circumstances have occurred which would significantly worsen the gas supply situation and require the issuance of an early warning or alert level. In the light of the experience of the 2020/2021 heating season, it is necessary to review the set of criteria on the basis of which early warning and alert states are identified.

The natural gas transmission system operator has specific obligations for the creation and storage of natural gas reserves related to the provision of gas supply during the announced energy crisis. The paragraph 344 of Cabinet of Ministers Regulation No. 312 "Procedures for the Supply of Energy Users and Sale of Heating Fuel During Declared Energy Crisis and in Case of Endangerment to the State" of 19 April 2011 stipulates that the natural gas transmission system operator in Inčukalns UGS provides and stores natural gas reserves in the standard amount of gas supply determined in accordance with Article 6 of the Security of Supply Regulation. This natural gas reserve is intended to supply the protected customers with natural gas. It is continuously stored in Inčukalns UGS for the purpose of using it only during the announced energy crisis, if a relevant decision of the Cabinet of Ministers has been adopted. After the occurrence of an emergency situation, the natural gas transmission system operator is obliged to supply this reserve to the natural gas distribution system operator, which further ensures its supply to the protected customers.

The paragraph 12^1 of Cabinet of Ministers Regulation No. 312 "Procedures for the Supply of Energy Users and Sale of Heating Fuel During Declared Energy Crisis and in Case of Endangerment to the State" (hereinafter - Regulation No. 312) of 19 April 2011 also imposes an additional obligation for the unified natural gas transmission and storage system operator to ensure that Inčukalns UGS has the amount of active natural gas of not less than 3 160 GWh (300 million m^3 of natural gas), which is intended to ensure the daily withdrawal capacity of Inčukalns UGS during the energy crisis and is intended to ensure the supply of natural gas to Latvia. In accordance with paragraph 38 of Regulation No. 312, such a reserve must be maintained until 1 March 2022.

Based on the information on Inčukalns UGS capacity reservations between 2018 and 2021, it can be concluded that traders' decisions on Inčukalns UGS capacity reservations are based on the situation in the natural gas market (for example, summer/winter and summer/summer + 1 price difference) before reserving capacity in Inčukalns UGS, as well as fundamental events (such as the availability of the Finnish market from 1 January 2020). Taking into account the existing infrastructure constraints, Conexus considers that it necessary to develop a flexible regulation to apply after 1 March 2022, which would ensure gas reserves available to ensure supply to Latvia in case of maximum demand from Inčukalns UGS capacity reservation in an unfavourable market situation.

13. CONCLUSIONS

- Inčukalns UGS – the main element of security of natural gas supply in Latvia and ensures gas supply to users in the Baltic states and Finland. With the opening of the natural gas market and the integration of the regional market, the role of Inčukalns UGS has expanded, improving competition, flexibility of supply and security of gas supply in the region.
- As the decision of the storage users to reserve the capacity of Inčukalns UGS is based on commercial considerations, which depend, in turn, on the situation in the gas market, for example, summer/winter and summer/summer + 1 spread, Conexus considers it necessary to develop flexible regulation for application after 1 March 2022[74], which would ensure gas reserves available to ensure supply to Latvia in case of maximum demand from Inčukalns UGS capacity reservation in an unfavourable market situation.
- The results of the first year of operation of the Single Natural Gas Market confirm that all participants involved in the supply of natural gas are significant beneficiaries. Due to the opportunities provided by Conexus, the number of transmission and storage system users has increased during the reporting period and significantly increased the choice of supplier for natural gas users, thus promoting competition among gas traders and facilitating access to alternative gas sources.
- The Estonian-Latvian Common Balancing zone has a positive effect on the functioning of the market, reducing bureaucratic burdens and ensuring a convenient and transparent balancing process. In 2020, the number of balancing transactions increased significantly, of which 88% of all balancing transactions were executed on the trading platform GET Baltic during the reporting period.
- Transmission system users are paying more and more attention to the reservation of longer-term capacity products. The interest of system users in reserving longer-term – monthly, quarterly and annual – capacity products provides the system operator with more complete information on the planned operation of the system.
- Taking into account the European climate neutrality objective, there is a need to further develop the knowledge base on sustainable gases such as biomethane, hydrogen from renewable energy sources or synthetic methane and their integration into existing gas infrastructure, while addressing the risk of energy poverty. The use of sustainable gases, such as biomethane, could potentially be facilitated by the growing development of an internationally recognized guarantee of origin system and the promotion of sustainable gases in the transport sector.
- Taking into account the experience of the 2020/2021 heating season, it is necessary to specify the criteria of the Latvian Emergency Plan for determining the state of emergency, as well as to strengthen the legal status of the Latvian Emergency Plan and the Latvian Preventive Action Plan.

Riga, May 31, 2021

ULDIS BARISS
Chairman of the Board

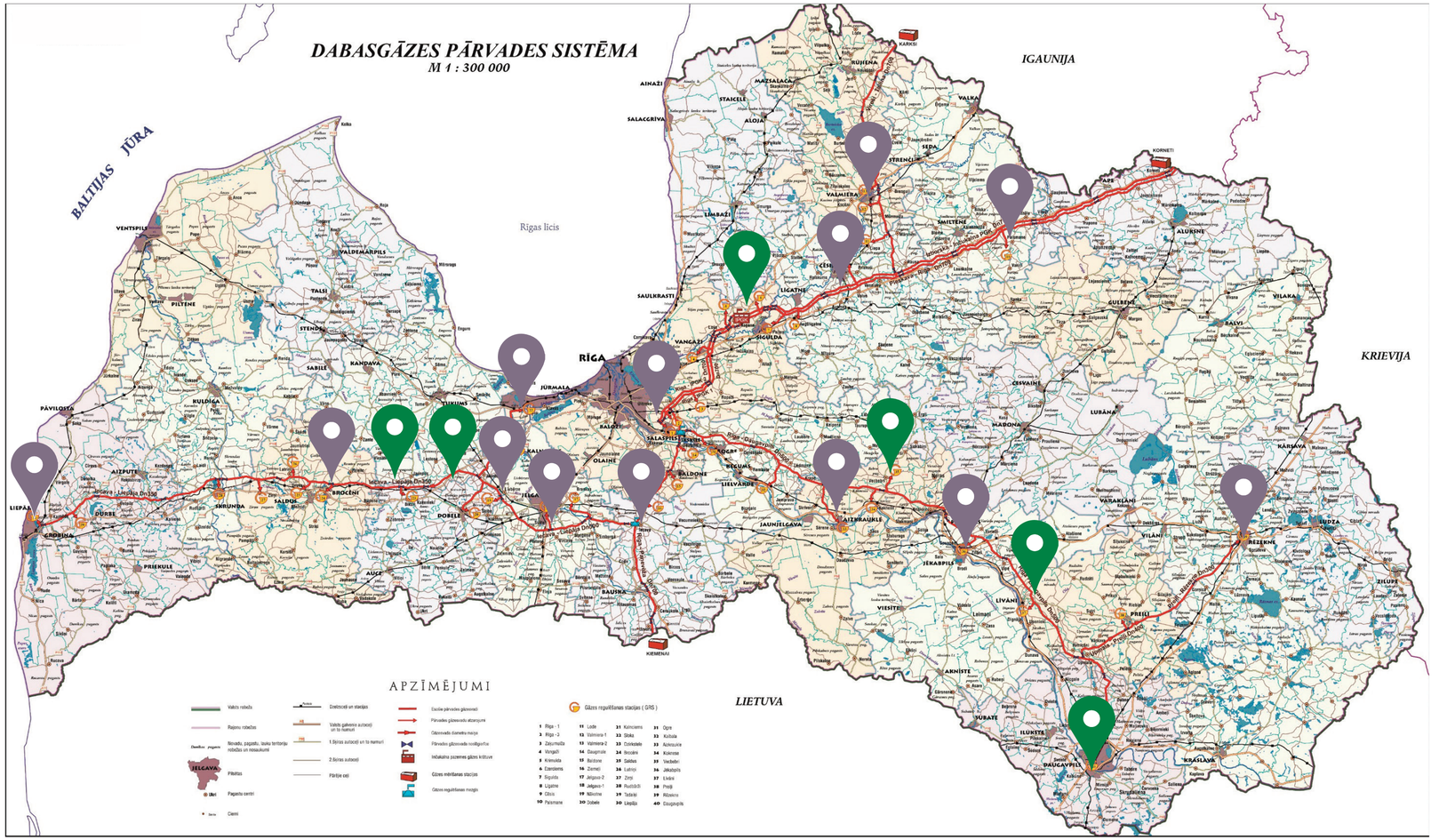
GINTS FREIBERGS
Member of the Board

[74]Solution specified in paragraph 12.1 of Cabinet Regulation No. 312 "Procedure of supply of energy to users and sale of heating fuel during a declared energy crisis and in case of endangerment of the state" of 19 April 2011

* This document is electronically signed with a secure electronic signature and contains a time-stamp

ANNEX No. 1

Map of the natural gas transmission system of Latvia, including the connection points



ANNEX No.2

N-1 calculation formula

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

Where:

EP_m – technical capacity of entry points (GWh/d), other than production, LNG and storage facilities covered by P_m, LNG^m and S^m, means the sum of the technical capacity of all border entry points capable of supplying gas to the calculated area;

P_m – maximal technical production capability (GWh/d) means the sum of the maximal technical daily production capability of all gas production facilities which can be delivered to the entry points in the calculated area;

S_m – maximal technical storage deliverability (GWh/d) means the sum of the maximal technical daily withdrawal capacity of all storage facilities which can be delivered to the entry points of the calculated area, taking into account their respective physical characteristics;

LNG_m – maximal technical LNG facility capacity (GWh/d) means the sum of the maximal technical daily send-out capacities at all LNG facilities in the calculated area, taking into account critical elements like offloading, ancillary services, temporary storage and re-gasifi cation of LNG as well as technical send-out capacity to the system;

I_m – means the technical capacity of the single largest gas infrastructure (GWh/d) with the highest capacity to supply the calculated area. When several gas infrastructures are connected to a common upstream or downstream gas infrastructure and cannot be separately operated, they shall be considered as one single gas infrastructure;

D_{max} – means the total daily gas demand (GWh/d) of the calculated area during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years.

ANNEX No. 3

N-1 calculation

N-1 estimated data at the 30% fi ll level of the Incukalns UGS

Indicator	Value (GWh/d)
EP_m Pipeline interconnections — Entry capacity: •from Russia, 188.5* GWh per day •from Lithuania, 67.6 GWh per day	256,1
P_m	0
S_m	158**
LNG_m	0
I_m	188,5*
D_{max}	132,55

Notes
*Maximum technical capacity of the Korneti entry point. In winter, only 20–30 GWh can be obtained from Russia per day; the unavailability of the pipeline during the repairs was not taken into account.
**Indicator value at the 30% fi ll level of the Incukalns UGS, in accordance with the updated storage facility curve.

$$N\text{-}1 = \frac{256,1+0+158+0-188,5}{132,55} \times 100 = 170,2\,\%$$

N-1 estimated data at the 100% fi ll level of the Incukalns UGS

Indicator	Value (GWh/d)
EP_m Pipeline interconnections — Entry capacity: •from Russia, 188.5 GWh per day •from Lithuania, 67.6 GWh per day	256,1
P_m	0
S_m	315*
LNG_m	0
I_m	315*
D_{max}	132,55

Notes
*Indicator value at the 100% fi ll level of the Incukalns UGS.

$$N\text{-}1 = \frac{256,1+0+315+0-315}{132,55} \times 100 = 193,21\%$$