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NATURAL GAS TRANSMISSION SYSTEM OPERATOR'S TEN- YEAR NETWORK DEVELOPMENT PLAN (2020–2029)



Vilnius, 2020

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INTRODUCTION

Amber Grid AB (hereinafter - the Company) is the Lithuania's natural gas (hereinafter – gas) transmission system operator responsible for safe operation and development of the system. In order to ensure the reliability of natural gas supply (uninterrupted supply and sufficient capacity of the system) to Lithuania's consumers, efficient development of the gas transmission system aiming at its smooth integration into the Pan-European Natural Gas Transmission System and enabling the diversification of gas supply sources is important. To this end, the Parliament of the Republic of Lithuania has identified in the National Energy Independence Strategy the priority projects to be implemented in the gas sector in order to diversify Lithuania's gas supply sources and to interconnect the gas transmission system of Lithuania with the gas transmission system of the European Union (hereinafter - EU). Having regard to provisions of the national strategic documents, the Company's strategy and environmental protection policy, the needs of domestic natural gas users and the objectives of ensuring reliability of gas supply and efficient functioning of the gas transmission system, the Company drafted the Natural Gas Transmission System Operator's Ten-Year (2020–2029) Network Development Plan (hereinafter - the Plan). The Plan is based on the long-term objectives specified in the National Energy Independence Strategy and provisions of other legal acts defining the activities and principles of operation of transmission system operators and the gas sector.

The gas transmission system consists of gas transmission pipelines, gas compressor stations, gas metering and regulation stations (hereinafter - M&R Stations), gas metering stations (hereinafter - GMS), gas pipeline anti-corrosion protection equipment, data transmission and communication systems and other facilities attributed to the transmission system. The Lithuania's gas transmission system is connected to infrastructure of the Klaipėda liquefied natural gas terminal (LNGT) and gas transmission systems of the Russian Federation (the Kaliningrad Region), Belarus and Latvia. Gas is supplied to the Lithuania's gas transmission system from Russia (via the gas pipeline from Belarus via the Kotlovka GMS) and through the Klaipėda LNGT; gas can also be transported by gas transmission pipeline coming from Latvia.

In 2020–2029, the plan is to continue diversification of sources of gas supply, to increase the reliability of gas supply, to continue developing the cooperation between the Baltic Region states in the creation of a common market and to continue the integration of the Baltic Region transmission systems into the single gas system of the EU. Implementation of the following investment projects is planned in pursuit of successful achievement of these goals:

- constructing interconnection between the Lithuanian and Polish gas transmission systems;
- carrying out a joint project of Lithuania's and Latvia's natural gas transmission system operators aimed at increasing the capacity of the gas transmission system interconnection between the two countries.

These projects will be relevant for processes of the formation of the regional gas market in the East Baltic Region and will enable transmitting gas to participants of gas markets of other countries of the region.

The start of the implementation of the project for the construction of the gas transmission pipeline section (interconnection) from the gas transmission pipeline Kaunas–Šakiai to Kaunas M&R Station is planned in 2023. The aim of the project is to ensure a reliable and secure transmission of gas in the territory of Lithuania, because in case of an accident or inability to transport natural gas via one

of the existing lines of the gas transmission pipeline at the city of Kaunas for some other reason, gas supply would be interrupted for a large number of users in Lithuania and the Kaliningrad Region.

The implementation of several large transmission system rehabilitation and modernization projects co-financed from the EU Structural Funds planned in 2020–2029:

- installation of pig launching and receiving stations and implementation of prompt technological control of the gas transmission system (stage 2) in 2018–2021;
- implementation of the system of remote control of technological processes of the gas transmission system and collection of gas meter data in 2017–2020;
- replacement of valve units and their connection to SCADA remote control system in 2019–2022 (stage 1);
- reconstruction of individual sections of the gas transmission pipeline Vilnius–Kaunas in 2019–2023;
- replacement of valve units and their connection to SCADA remote control system in 2021–2023 (stage 2);
- modernization of Šiauliai and Telšiai gas M&R Stations and Mažeikiai gas metering station, to be implemented in 2020–2023;
- modernization of Kėdainiai, Vievis and Grigiškės gas M&R Stations, to be implemented in 2021–2023;
- reconstruction of individual sections of the gas transmission pipeline in 2021–2023 (stage 2);
- modernization of gas compressor station management and installation of a data center, to be implemented in 2021–2022;
- replacement of gas-cleaning equipment (gas filters F-1, F-2, F-3) at Panevėžys gas compressor station, to be implemented in 2020–2021;
- installation of a pressure limiting unit on the branch of the gas pipeline to Marijampolė gas M&R Station, to be implemented in 2021–2023.

1. SOURCES OF SUPPLY OF NATURAL GAS AND DEMAND FOR GAS TRANSMISSION SERVICES

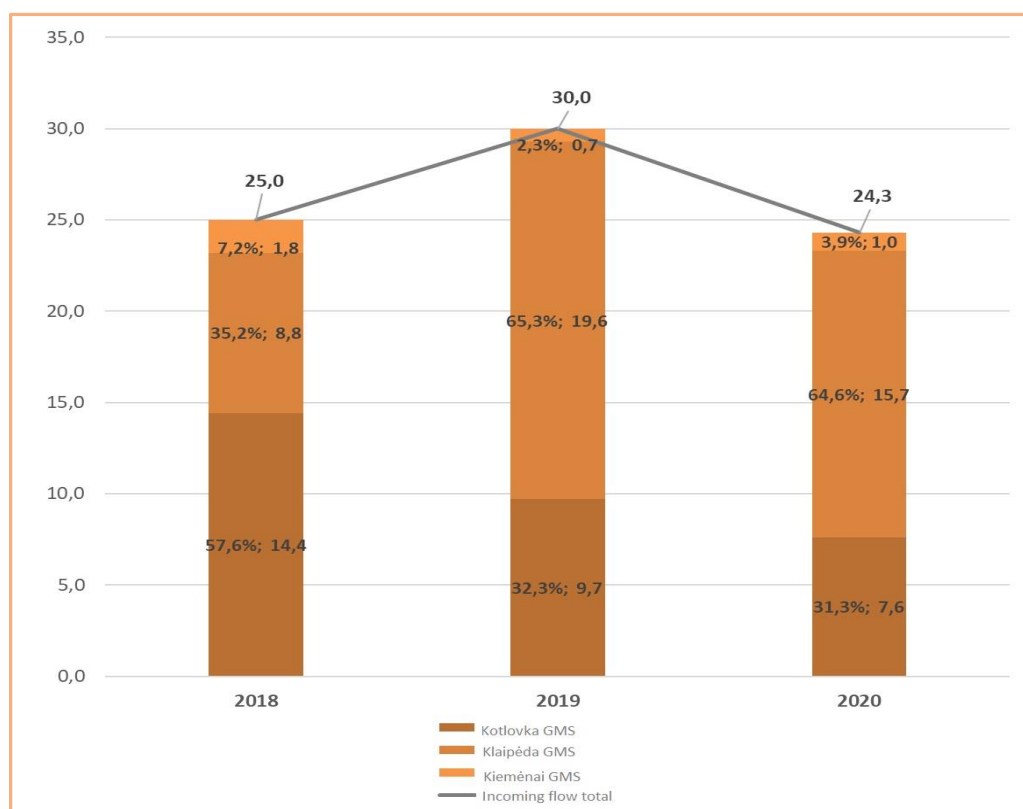
Forecasting gas consumption, cross-border gas flows and consumption capacities is one of the key factors in planning the development of the transmission system. The gas transportation projections for 2020–2029 have been prepared relying on the data on estimated gas transportation volumes provided by existing system users and forecasts of cross-border gas flows.

1.1. Supply sources (Incoming flows)

Since 2015, when the LNG terminal was launched in Klaipėda, gas has been supplied to Lithuania from two main sources – the LNG terminal in Klaipėda and from Russia, by transit via Belarus, Kotlovka GMS. If necessary, gas may be supplied to Lithuania from Latvia via Kiemėnai GMS. Starting from 2022, after the construction of Lithuanian–Polish gas interconnection, the gas will also be supplied from Poland.

In 2019, more than 65,3 % of gas (19.6 TWh of the total incoming flow of 30.0 TWh) entered from Klaipėda LNG terminal (in 2018, more than 35% of the volume of gas entered via Klaipėda GMS). The plan is to have about 65% of gas incoming via the Klaipėda GMS and the remaining part – via Kotlovka GMS (31 %) and Kiemėnai GMS (4 %) in 2020. Both this year and in the future, distribution of volumes of gas by entry points will depend on the competitive situation in the gas market (e.g. In 2019, due to competitive LNG prices, the historically largest amount of natural gas was transmitted to Latvia - see Plan 1.3. "Cross-border gas flows").

Figure 1. Natural gas supply sources by entry points in 2018–2020, in percent and TWh per year.



1.2. Domestic demand

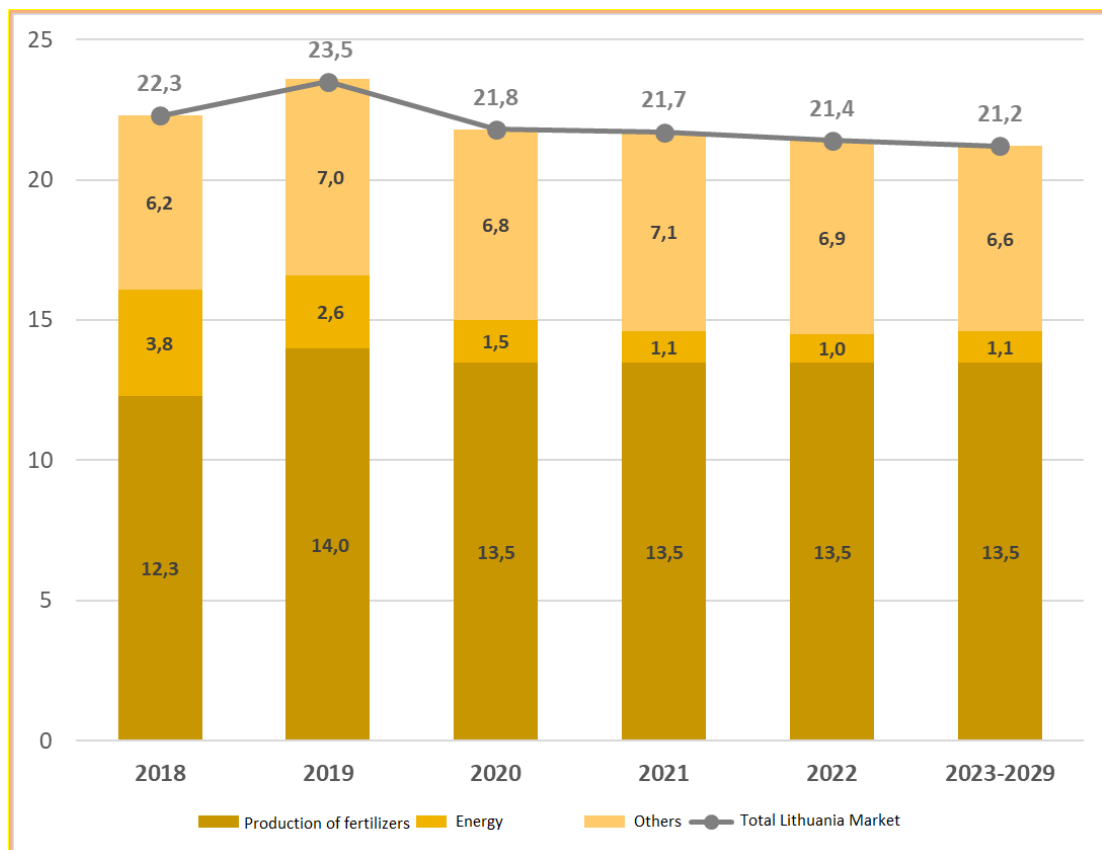
In order to ensure that the planning for gas volumes necessary to meet Lithuania's domestic needs is as accurate as possible, consultations with stakeholders, namely, the existing and potential transmission system users, supply companies and state authorities, have been held. System users were asked to provide estimations of gas volumes and capacities meeting their needs for the upcoming decade.

The consumption capacity of Lithuania's transmission system users declared/determined for 2020 (the greatest required daily volume of gas to meet the maximum gas consumption needs) is 181.1 GWh per day.

In recent years, the volume of gas transmitted via the Company's transmission system for domestic market needs have varied slightly: in 2018 - 22.3 TWh of gas and in 2019 – 23.5 TWh of gas was transmitted. According to the data presented by the system users, the planned volume of gas to be transmitted to meet the needs of Lithuanian consumers will be about 21.8 TWh in 2020 and 21.7 TWh – in 2021. Later the estimated annual volume could be about 21 TWh per year as from 2023.

The demand of Lithuanian consumers for long-term transmission system capacities in Lithuania in 2020 is 78.1 GWh per day. This demand for capacities planned to remain similar in the upcoming year, and as from 2023 will make up about 75 GWh per day.

Figure 2. Natural gas transmission volumes by business sectors in Lithuania in 2018–2029, TWh per year.



1.3. Cross-border gas flows

In recent years, the volume of gas transmitted to the Kaliningrad Region of the Russian Federation has ranged between 26 and 28 TWh. 25.7 TWh of gas was transmitted in 2017 and 27.8 TWh – in 2018. In 2019 the volume of gas transmitted in transit has decreased – 26 TWh. In subsequent years, the plan is to transmit about 26-27 TWh of gas per year.

Taking advantage of the LNG terminal alternative built in Klaipėda, supply of gas to other Baltic states through Lithuania was started in 2015. 2.3 TWh was transmitted via Kiemėnai cross-border exit point to consumers/ supply companies in other Baltic states in 2018, 6 TWh – in 2019.

According to forecasts, with transmission system operators of the Baltic states applying various market integration measures and having formed a gas market zone of the Baltic states and Finland and implemented common-interest infrastructure projects in the region later on, cross-border gas transmission flows will increase. It should be noted, however, that discussions are continuing on the integration measures to be applied. A study on the integration of the Lithuanian, Latvian, Estonian and Finnish natural gas markets is also being commissioned by Lithuanian, Latvian, Estonian and Finnish transmission system operators from the beginning of 2020, including the possibility for Lithuania to join the neighboring transmission price area operating from 2020 covering Latvia, Estonia and Finland (hereinafter referred to as the FINESTLAT price area), including the establishment of an Inter-TSO Compensation (ITC) mechanism (hereinafter referred to as the Integration Study). Substantial results of the study are expected in the second half of 2020.

The intensity of transporting additional gas flows in the Lithuanian transmission system depends on the conditions having formed in the natural gas markets of the region, application of integration measures and the use of infrastructures of regional significance (Inčukalns underground gas storage facility and Klaipėda LNG terminal).

2. THE EXISTING GAS TRANSMISSION SYSTEM

2.1. Lithuania's gas transmission system

Lithuania's gas transmission system is connected with the transmission systems of the Russian Federation (Kaliningrad Region), Belarus, Latvia and the LNG terminal in Klaipėda.

The total length of pipelines of the transmission system in the territory of Lithuania is more than 2 100 km. In order to secure a smooth operation of the transmission system and to facilitate the supply of natural gas to distribution systems, 65 M&R Stations and 1 GMS were built. Two GMS owned by the Company were installed in the territory of Lithuania for interconnections with gas transmission systems of other countries. Panevėžys and Jauniūnai gas compressor stations, together with agreements concluded with operators of neighboring systems wherefrom gas is received ensure the required gas pressure parameters throughout the transmission system.

Technical capacities of gas pipeline interconnections with gas transmission systems of other countries and the LNG terminal:

- at the entry point via Kotlovka GMS – 325.4 GWh per day;
- at the entry point via Klaipėda GMS (at the interconnection point of the transmission system and the LNG terminal) – 122.4 GWh per day;
- at the entry point Kiemėnai GMS to Lithuania – 65.1 GWh per day;
- at the exit point Kiemėnai GMS from Lithuania – 67.6 GWh per day;
- at the exit point Šakiai GMS – 114.2 GWh per day.

The existing transmission system capacities at points of interconnection with Lithuania's distribution systems and the directly-connected system users are sufficient to secure the needs of Lithuanian consumers.

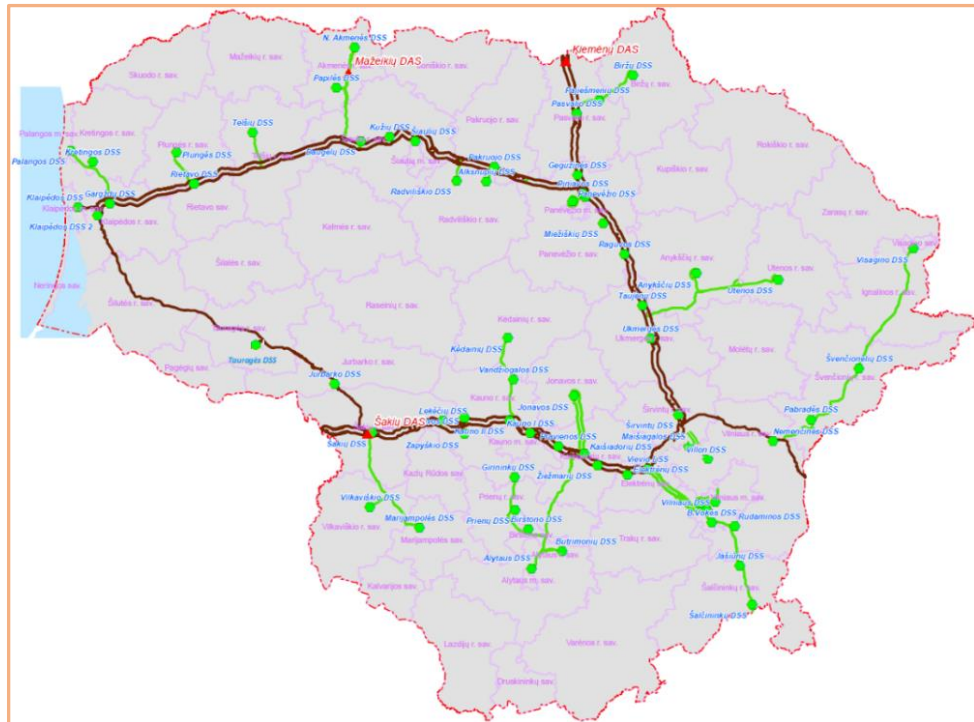
Figure 3. Lithuania's natural gas transmission system, 2020



The high-pressure (most of the transmission system design pressure is 54 bars) gas pipeline network operated by the Company is divided into:

- transmission (main) network - ~ 1 300 km (marked in brown in Figure 4); and
- regional distribution network / local network, by which gas is transmitted only to Lithuanian natural gas consumers - ~ 800 km (marked in green in Figure 4).

Figure 4. The main and the local transmission network of natural gas



2.2. Gas infrastructure of the East Baltic Region

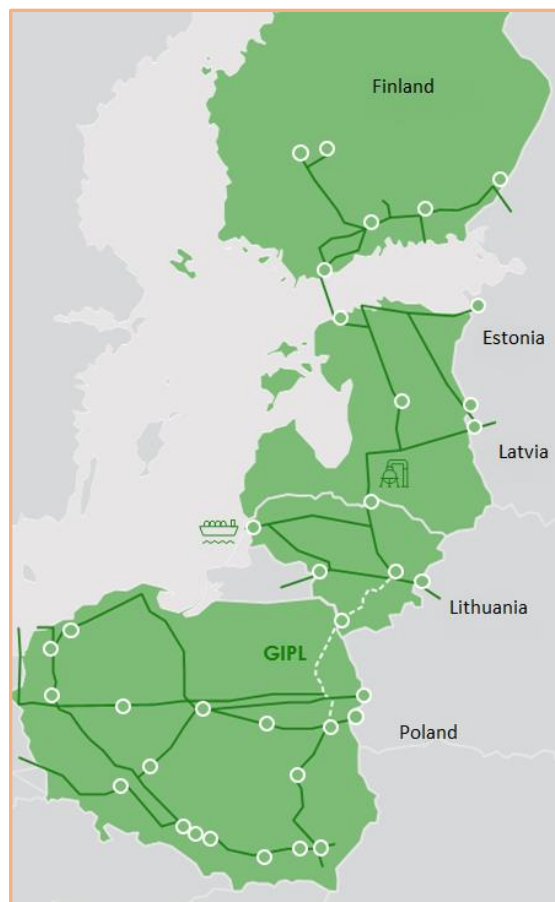
The Company has taken an active part in the formation of the gas market of the East Baltic region in order to reduce cross-border barriers to the functioning of gas markets, promote competition and liquidity of the gas market and increase the efficiency of use of gas infrastructures.

The key infrastructure projects under development in the Baltic region that are on the third list of the EU projects of common interest approved on 31 October 2019 include:

- gas interconnection Poland – Lithuania (GIPL),
- increasing the capacity of the gas interconnection Latvia – Lithuania,
- modernization of Inčukalns underground gas storage facility (Latvia),
- increasing the capacity of the gas interconnection Estonia – Latvia,
- gas interconnection Estonia – Finland (*Balticconnector*),
- gas interconnection Poland – Denmark (*Baltic Pipe*),
- increasing the capacity of Świnoujście LNG terminal in Poland.

The liquidity and competition of Baltic gas markets will also be affected by EU projects of common interest developed in the Central and Eastern and the Southeast Europe, namely, gas interconnections Poland – Slovakia, Poland – the Czech Republic and Poland – Ukraine, and investment for increasing capacities of domestic transmission networks of the countries related to these projects.

Figure 5. Gas infrastructure of the Eastern Baltic region, 2020–2029.



2.3. Further development directions of the transmission system

In order to assess the reliability and security of the Lithuanian gas transmission system, the ability to transmit gas flows to Lithuanian gas customers and to supply gas to other countries' systems and to ensure system maintenance, the Company continuously performs system hydraulic calculations and models various gas supply scenarios. The modeling takes into account the actual and forecasted volumes and capacities of transmitted gas at the Lithuanian domestic exit point, cross-border entry / exit points, assesses possible violations of certain system locations (pipelines), and other circumstances.

According to the company, the existing infrastructure ensures flows that meet the needs of system users, is sufficiently permeable to transmit them and is resistant to adverse circumstances.

The company envisages further development directions of the transmission system:

2.3.1. Maintenance of sufficient transmission system core network capacity, connected structure

In the main network of the transmission system, it is important to ensure the stable and reliable operation of cross-border entry / exit points and the LNG terminal in Klaipėda, the size of sufficient capacities. The Lithuanian transmission system will be connected and the structure of the system will be maintained in the future due to its possibilities to use the LNG terminal, which is important in the context of the whole region. Many of the main pipelines in the transmission system have parallel pipelines, which allows for cheaper and more flexible operation of the transmission system without interrupting the gas supply. Also, the results of internal pipeline diagnostics have a significant impact on the scope of pipeline reconstruction works. Internal diagnostics is currently the most reliable, modern and rational way to check the condition of an underground pipeline for both the core and local network.

2.3.2. Reliable operation of the local transmission network, gradually transforming and optimizing it according to the needs of Lithuanian users

It is important for the transmission system operator to maintain the reliable operation of the pipeline branches to GMS by ensuring a stable gas supply to Lithuanian customers, but at the same time to optimize the transmission system costs when historically created capacities are not necessary. During the reconstruction of transmission system objects, new technical parameters are selected taking into account the results of hydraulic modeling - if necessary, the possibilities to reduce transmission capacity, reduce pressures or pipeline diameters, optimize GMS capacity.

2.3.3. Innovation and green energy

In line with the latest trends in sustainable development set out in the European Commission's *The European Green Deal* for a modern, resource-efficient and competitive economy with decoupled growth and zero emissions and greenhouse gas emissions by 2050, future demand for green gas in Europe is expected to increase. A potential increase in the number of green energy projects in Lithuania is also expected. The company supports and contributes to the promotion of green energy development in Lithuania in order to implement the goals set for the state to reduce the impact on climate change and become a country of green energy.

In the short term, connections of biomethane production systems are planned (the first is planned for 2021).

In the long run, the introduction of innovative hydrogen transportation technologies through natural gas pipelines is possible. Hydrogen (or synthetic methane) produced by Power to Gas (P2G) plants can be fed into existing gas transmission infrastructure and blended with conventional natural gas. As the calorific value of hydrogen is much lower (about 3 times) than that of conventional natural gas, an increase in the demand for gas system capacity is possible.

3. DEVELOPMENT OF THE TRANSMISSION SYSTEM IN 2020–2029

A number of investment projects for the development of the transmission system aimed at the diversification of sources of gas supply in Lithuania and other Baltic countries and increasing the security and reliability of gas supply are planned for the period 2020 – 2029.

The investments are stated in the Plan in current prices exclusive of value added tax (VAT).

3.1. EU projects of common interest

The Company continues the development and implementation of strategic gas transmission infrastructure projects “Gas interconnection Poland - Lithuania (GIPL)” and “Increasing the capacity of the gas interconnection Latvia – Lithuania”. Both these projects were included in the third list of the EU projects of common interest, the Ten-Year Network Development Plan (TYNDP) of the European Network of Transmission System Operators for Gas (ENTSOG) published in 2018 and 2020, the Baltic Energy Market Interconnection Plan (BEMIP) for 2017 – 2026 of transmission system operators of the Baltic region, and the National Plan on the Implementation of Priority Projects on Electricity and Natural Gas Transmission Infrastructure approved by resolution of the Government of the Republic of Lithuania.

3.1.1. Gas interconnection Poland–Lithuania (GIPL)/TRA-N-341¹

The European Commission has recognized the GIPL project as an infrastructure project of high importance ensuring the security of gas supply and significantly contributing to assuring EU energy security. Amber Grid AB has been implementing the project together with the Polish gas transmission system operator GAZ-SYSTEM S.A.

The goals of the project are:

- to integrate gas markets of the Baltic states and Finland into a single EU gas market;
- to diversify sources of gas supply; and
- to increase the security of gas supply;
- promoting competition in the gas market.

The preparatory works for the implementation of the GIPL project were started in 2009. The analysis of the GIPL business environment was carried out in 2011, a GIPL feasibility study was conducted in 2013, procedures of the project’s environmental impact assessment in the territory of Lithuania were carried out in 2013-2015, and on 5 November 2014, the part of the GIPL project in Lithuania’s territory was recognized as an economic project of national significance.

On 26 September 2016, the Government of the Republic of Lithuania passed Resolution No 944 on the extension of the deadline for the implementation of the GIPL project part in the territory of Lithuania until 31 December 2021.

All documents permitting construction of the part of the GIPL project in the territory of Lithuania were obtained by 27 September 2016. On 11 May 2018, an agreement on cost allocation was signed by the Polish, Lithuanian, Latvian and Estonian transmission system operators, which established the

¹ Number conferred by ENTSOG

procedures and principles necessary to implement the decision of the European Agency for the Cooperation of Energy Regulators (ACER) on the allocation of cross-border costs of the GIPL project. This agreement completed the securing of financing for the GIPL project in Poland.

On 24 May 2018, the Lithuanian and Polish transmission system operators signed a network interconnection agreement, which confirmed the final decision to invest in the GIPL project, and started the gas pipeline construction stage.

Figure 6. Route of the implementation of the gas interconnection Poland – Lithuania project (GIPL)



The estimated route of the gas pipeline extends from Hołowczyce compressor station (Poland) to Jauniūnai compressor station (Lithuania) (see Figure 6). The estimated total length of the gas pipeline is about 508 km (including about 343 km in the territory of Poland and 165 km - in the territory of Lithuania). Moreover, renovation of Hołowczyce compressor station and construction of the new Gustorzyn compressor station, with about 16 MW designated for GIPL purposes, is planned in Poland. A gas pressure regulation and metering station will be constructed in the territory of Lithuania.

The following are the preliminary technical parameters of the GIPL project part in Lithuania:

- gas pipeline length – about 165 km;
- gas pipeline diameter – 700 mm;
- the maximum design pressure – 5.4 MPa.

The plan is to have the gas interconnection Poland – Lithuania constructed by the end of 2021. The implementation of the GIPL project will create the capacities, which will allow transporting about 27 TWh of gas per year to the Baltic states and about 22 TWh of gas per year to Poland.

In the future GIPL capacities may be increased to 46 TWh of gas per year to the Baltic states (and Finland) additionally building or expanding compressor stations in Lithuania and Poland.

On 25 July 2019, a contract was signed for the purchase of pipes required for the GIPL project, and on 23 December 2019, for the GIPL construction of a gas pipeline connection between Poland and Lithuania.

Securing financing:

- 1) EU financial assistance was received in 2011-2013 for preparing a GIPL project business environment analysis, a feasibility study and an environmental impact assessment (EIA) report under the Trans-European Networks for Energy (TEN-E) programme, which accounted for 50% of eligible expenditure.
- 2) On 11 May 2015 (amended on 23 May 2016 and 9 January 2017), the Company, the Polish gas transmission system operator GAZ-SYSTEM S.A. and the EU Innovation and Networks Executing Agency (INEA) signed a tripartite agreement on allocating EU financial assistance for preparatory works of the gas interconnection Lithuania – Latvia until the issue of construction permits. EU support of EUR 10.6 million was allocated under the agreement under the Connecting Europe Facility (CEF). The maximum EU assistance intensity (of 50%) was allocated for preparatory project works: Amber Grid AB received EUR 2.5 million and GAZ-SYSTEM S.A. received EUR 8.1 million.
- 3) In October 2015 (amended on 23 May 2016 and 12 January 2017), Amber Grid AB, GAZ-SYSTEM S.A. and INEA concluded an agreement on CEF financial assistance under which EU financial assistance up to EUR 58 million was allocated for financing works of construction of the GIPL project to Amber Grid AB and up to EUR 208 million – to GAZ-SYSTEM S.A.
- 4) In addition to the EU financial assistance, works of construction of the GIPL project will be financed by Lithuania, Latvia and Estonia, covering a part of the GIPL infrastructure costs in the territory of Poland according to ACER’s cross-border cost allocation decision of 11 August 2014. According to the said decision, upon the completion of the project, Amber Grid AB will have to pay GAZ-SYSTEM S.A. a compensation of up to EUR 54.9 million. Amber Grid AB was allocated CEF financial support of up to 50 % (up to EUR 27.5 million) to cover the compensation payable.

Table 1. The planned need for GIPL project financing by year in the territory of Lithuania (million EUR):

Till 2020	2020	2021	Total*
6.8	74.1	55.1	136

* – after evaluating the results of public procurement, the value of the project may be about EUR 20 million lower; the total funding requirement does not include the operator GAZ-SYSTEM S.A. compensation payable.

3.1.2. Increasing the capacity of the gas interconnection Lithuania – Latvia /TRA-N-382²

The project “Increasing the capacity of gas interconnection Lithuania – Latvia” is aimed at increasing the capacity of the gas system interconnection Latvia – Lithuania, ensuring the security and reliability of natural gas supply, more efficient use of infrastructure, better integration of gas markets of the Baltic states and the functioning of the single market, also creating better conditions for using the Inčukalns underground gas storage facility in Latvia. With the integration of the Baltic gas markets into the common EU gas market, this connection will become an important part of the route connecting the European and Eastern Baltic markets.

² Number conferred by ENTSOG.

During the project, the capacity of the Kiemėnai gas metering station will be increased on the Lithuanian side and the gas pipeline near the Panevėžys compressor station will be rebuilt, and in Latvia, the main gas pipeline will be rebuilt to increase the maximum operating pressure from 40 to 50 bar. The investments will increase gas interconnection capacity to 130.47 GWh per day in the direction of Latvia (now 67.6 GWh per day) and to 119.5 GWh per day in the direction of Lithuania (now 65.1 GWh per day).

The project implementers are AS Conexus Baltic Grid, the operator of the Latvian gas transmission system and the Inčukalns underground gas storage facility, and Amber Grid AB.

On 21 December 2019, Amber Grid AB and AS Conexus Baltic Grid signed a tripartite agreement on EU financial assistance with the Innovation and Networks Executive Agency (INEA) to finance the feasibility study for increasing the capacity of the gas interconnection between Latvia and Lithuania under the Connecting Europe Facility (CEF). EU support will amount to up to 50 percent of the eligible project costs.

The total investment for this project will amount to EUR 10.2 million. Lithuanian investments in this project will reach EU 4.7 million. The planned launch of the project is the end of 2023.

Table 2. Estimated need for funds for the implementation of the project “Increasing the capacity of gas interconnection Lithuania - Latvia” in the territory of Lithuania (million EUR):

2020	2021	2022	2023	Total
0.15	0.25	2.5	1.8	4.7

3.2. Development projects aimed at ensuring transmission system’s reliability

In addition to common-interest projects, the implementation of other projects required for ensuring continuous operation of the transmission is planned.

3.2.1. Gas transmission pipeline Vilnius–Kaunas and Kaunas–Šakiai interconnection (second line)

The gas transmission pipeline used for the supply of gas to consumers in South-West Lithuania (districts of Marijampolė, Vilkaviškis, Kazlų Rūda, Šakiai, Jurbarkas and Kėdainiai) and the Kaliningrad Region of the Russian Federation, which could also be used (in a certain gas flow scenario) for the supply of gas to the districts of Vilnius and Kaunas from the LNG terminal, is a double-line pipeline in the sections between Vilnius and Kaunas M&R Station-1 and between Kaunas M&R Station-2 and the Kaliningrad Region. However, it is a single-line pipeline at the city of Kaunas (between Kaunas M&R Station-1 and M&R Station-2). In case of an emergency or impossibility to supply gas via the existing single-line section of the gas transmission pipeline for other reasons, the supply of gas would be interrupted for a large number of consumers in Lithuania and the Kaliningrad Region.

The main purpose of this project is to ensure a reliable and efficient gas transmission in the territory of Lithuania. Gas supply would be ensured in both directions:

- from the west – to consumers in East Lithuania, with the operation of the Klaipėda LNG terminal;

- to the west (if necessary) transporting gas from Belarus via Kotlovka GMS and supplying it to consumers in South West and West Lithuania and meeting the needs for transmission to Kaliningrad Region.

Having built a gas pipeline, the gas transmission pipeline in South West Lithuania would be double-line throughout its length.

The length of the pipeline to be constructed is 11.6 km, with its diameter being 500 mm. The implementation of the project is planned after 2022, having regard to the needs of system users and their possibilities to contribute to the project financing. A technical design has been prepared, agreements with land owners have been signed, and a construction permit has been obtained.

The project has been included in the National Plan on the Implementation of Priority Projects on Electricity and Natural Gas Transmission Infrastructure.

3.3. Reconstruction and modernisation of the gas transmission system

In order to ensure reliability and security of gas transmission pipelines, the Company's "Strategy for ensuring security and reliability of the transmission system" (hereinafter - the Strategy) providing for continued and new measures covering the reconstruction and modernization of the linear part of gas transmission pipelines, gas metering and regulation stations and compressor stations, is being implemented. In the implementation of the approved requirements for physical and information security of enterprises of strategic or high significance for national security, measures for increasing the Company's information security have been installed.

Some of projects of reconstruction of the transmission system have been co-financed from the EU assistance funds.

In pursuit of the implementation of the National Energy Independence Strategy and the National Progress Programme, on 22 July 2014, the Government of the Republic of Lithuania approved the National Plan on the Implementation of Electricity and Gas Transmission Infrastructure Projects, which also includes projects of modernization of infrastructure of the existing transmission system. The table below presents information on investments planned in the upcoming 5 years.

Table 3. Need for funds necessary for the reconstruction and modernization of the transmission system (million EUR):

Seq. No.	Name	Till 2020*	2020	2021	2022	2023	2024	2025–2029	Total	Total, excl. investments made till 2020
1	Reconstruction of the linear part of gas transmission pipelines	4.4	11.0	15.2	19.8	12.4	4.8	Need for funds will be revised in the future	67.6	63.2
2	Reconstruction of gas M&R Stations		0.3	0.9	5.7	3.8			10.7	10.7
3	Reconstruction and modernization of compressor stations		1.1	2.2	0.3		0.1		3.7	3.7
4	Reconstruction and modernisation of other appurtenances and facilities of the transmission system (corrosion protection, measuring devices, telemetry)	1.5	1.0	0.5	0.6	1.3	1.0		5.9	4.4

	Total investments	5.9	13.4	18.8	26.4	17.5	5.9		87.9	82.0
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* Share of continuous project funds invested before 2020

3.3.1. Reconstruction of the linear part of gas transmission pipelines

One of the key measures identified in the Strategy is the inner diagnostics of gas pipelines by means of intelligent pigging. For this purpose, installation of pig launching and receiving stations as well as replacement of linear closing valves, pipe parts and branch units are planned in the gas pipelines.

Out of the total length of gas pipelines in operation of 2 115 km, 1 672 km (approx. 79% of all gas pipelines) may be adapted for inner diagnostics:

- 1 179 km of gas pipelines have already been adapted and inspected;
- 210 km of gas pipelines have been adapted (pig launching and receiving stations have been installed) and are undergoing inspection;
- 283 km of gas pipelines are planned to be adapted for inner diagnostics.

The aim is to complete the adaptation of all suitable gas pipelines for inner diagnostics by 2025.

In 2019–2021, pig launching and receiving chambers are planned to be installed on the gas pipeline Panevėžys–Šiauliai (DN350), the second line of Panevėžys–Šiauliai gas pipeline and the second line of Šiauliai–Kuršėnai gas pipeline (DN500), Ivacevičiai–Vilnius–Ryga gas pipeline interconnection with Vilnius–Kaunas gas pipeline (DN700), Vilnius–Kaunas gas pipeline (DN350), on the gas pipeline branches Vandžiogala M&R Station, Kėdainiai M&R Station and Biržai M&R Station. Also, mobile pig launching/receiving chambers on the gas transmission pipeline Ivacevičiai–Vilnius–Ryga (DN500) in the Panevėžys–Kiemėnai sections (approximate length is 50 km) are planned to be installed.

Works of connecting closing valves to the remote control system will be continued. About 50% of all main closing valves are planned to be controlled remotely in 2022, ensuring the target level of promptness of technological control of gas transmission pipelines.

Also, the plan is to implement the project “Reconstruction of individual sections of the second part of Vilnius – Kaunas gas transmission pipeline” by the end of 2023.

Having determined the actual technical condition of gas pipelines, before making a decision on the renovation of the linear part of gas pipelines, the analysis of project alternatives will be carried out, choosing most cost-efficient solutions.

3.3.2. Reconstruction of M&R Stations

Currently, the Company operates 65 M&R Stations and 3 GMS.

The process of planning for the renovation of M&R Stations involves an assessment of current and future gas flows after which equipment of the optimum capacity will be selected in order to effectively use the funds allocated for renovation.

Reconstruction of Šiauliai, Telšiai M&R Stations and Mažeikiai GMS is planned in 2020–2023, Grigiškės, Kėdainiai and Vievis GMS are planned to be reconstructed in 2021–2023.

These solutions ensure proper functioning of gas infrastructure and lead to optimisation of its maintenance costs.

3.3.3. Modernisation of compressor stations

Three compressor units with the total capacity of 34.5 MW are installed in Jauniūnai compressor station built in 2010.

Since 1974, 7 reciprocating gas compressor units with the total capacity of 7.7 MW have been operating at Panevėžys compressor station. The technological equipment of the station has been gradually modernised.

Installation of additional combustion gas of Panevėžys compressor station and modernisation of air supply systems was completed in 2017. Works of modernization of automated control and fuel feed system were finished in 2018, and the replacement of filters is planned in 2020-2021.

In addition, in 2021-2022, it is planned to implement the investment project “Modernisation of Gas Compressor Station Management and Installation of a Data Center”.

The implementation of all these measures will ensure more secure and efficient operation of Panevėžys compressor station, reduce gas consumption for fuel and gas emissions to the atmosphere by 8 to 10 %.

ANNEX 1.

Investments provided for in the Plan (million EUR)

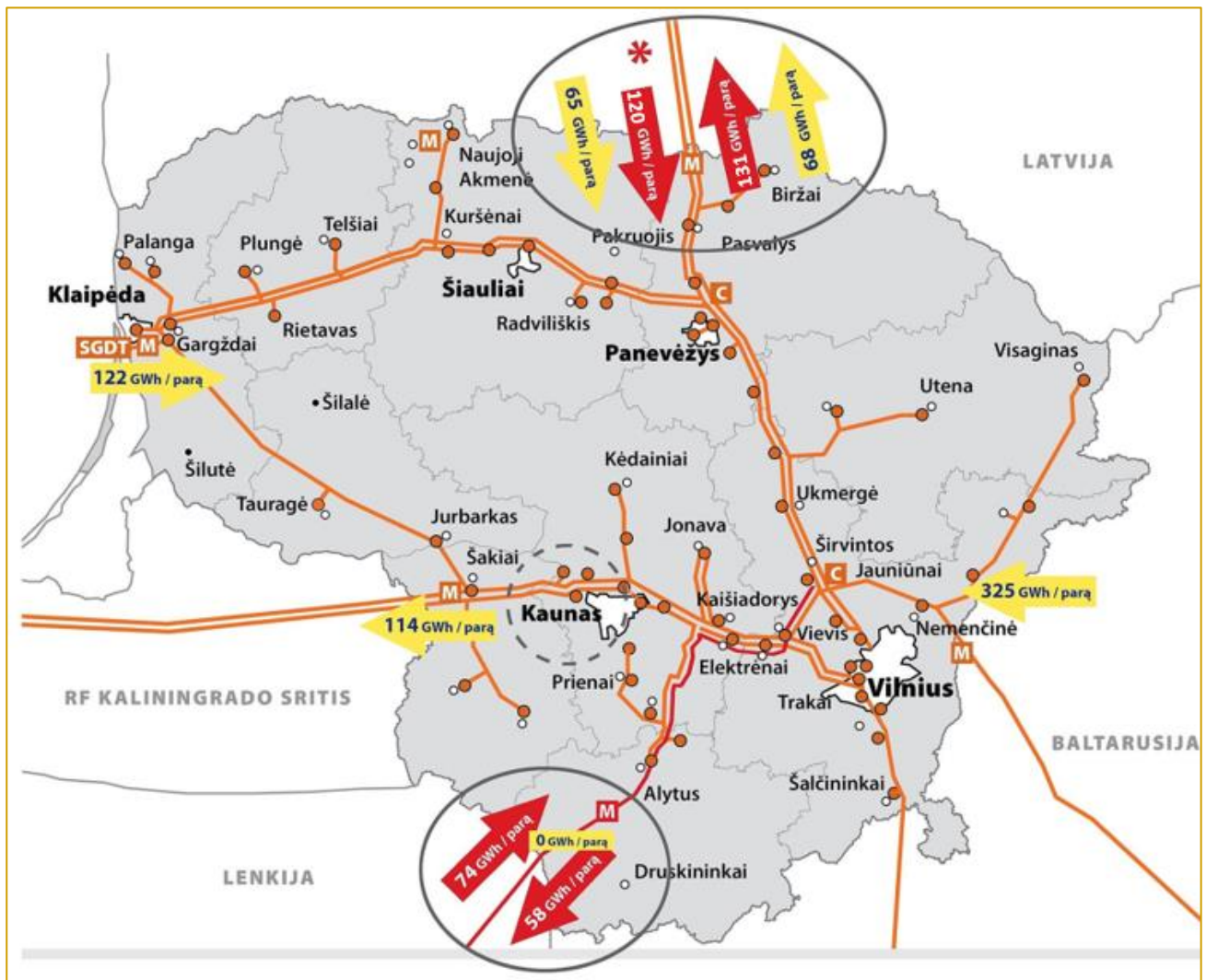
Seq. No.		Till 2020*	2020	2021	2022	2023	2024	2025–2029	Total	Total, excl. investments made till 2020
	Projects of common interest:									
1	Gas interconnection Poland–Lithuania	6.8	74.1	55.1					136**	129.2**
2	Increasing the capacity of gas interconnection Lithuania - Latvia		0.15	0.25	2.5	1.8			4.7	4.7
	Other transmission system projects:									
3	Interconnection of the gas transmission pipeline Vilnius–Kaunas and Kaunas–Šakiai (second line)	0.55						Data will be provided in subsequent years	0.55	
4	Reconstruction and modernisation of the gas transmission system	5.9	13.4	18.8	26.4	17.5	5.9	Need for funds will be revised in the future	87.9	82.0
	Total investments:	13.25	87.65	74.15	28.9	19.3	5.9		229.15	215.9

* – share of continuous investments indicated in the Plan made before 2020

** - after evaluating the results of public procurement, the value of the project may be about EUR 20 million lower

ANNEX 2.

Lithuania's gas transmission system with transmission system development projects planned to be implemented by 2029



- Gas transmission pipeline
- Planned gas transmission pipeline
- M Gas metering stations
- M Planned gas metering station
- C Gas compressor stations
- Gas distribution stations
- M Major towns connected to the natural gas system
- Towns not connected to the natural gas system
- ➔ Technical capacity of Entry / Exit points in 2016
- ➔ Capacity after implementation of the Plan
- LNGT Liquefied natural gas terminal
- * Capacity enhancement need (Feasibility study)