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TEN-YEAR GAS TRANSMISSION NETWORK DEVELOPMENT PLAN FOR THE 2024-2033 PERIOD

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Plinovodi d.o.o, Cesta Ljubljanske brigade 11b, p.p 3720, 1001 Ljubljana; Tel.: +386 (0)1 582 07 00
Fax: +386 (0) 1 582 07 01; e-mail: info@plinovodi.si; VAT ID number: SI31378285

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Preface

This is a document addressing the development of the Slovenian gas transmission system in the coming ten-year period, i.e. from 2024 to 2033, with a special emphasis on the current geopolitical situation and the impact of the green transition on the gas transmission system development.

In accordance with the requirements of the legislation, we have included in the submitted material all infrastructure that will be planned, renovated or built in the next decade, the investments that are in progress and will be completed in this period, as well as their schedule.

We are actively monitoring the situation on the Slovenian gas market, assessing its development and thus the future consumption, while following the forecasts, in particular those made for national strategic documents in the past period. Moreover, we are closely monitoring the regional gas market, thus anticipating the flow of gas across the country.

The last year was highly affected by the war in Ukraine. In Europe, flows of natural gas changed significantly in several weeks. This was a change not experienced in the past decades. Transmission system operators, including Plinovodi, set up different activities and also started additional investments to provide smooth supply also from other supply routes not used before. Together with other stakeholders, including system users, we managed to provide sufficient supply during the 2022/23 winter.

The crisis showed two aspects of gas supply. Firstly, the use of gas is an important and integral part of energy supply in Europe, in particular in industry. Despite exceptionally high prices, the use of gas reduced only in the desired capacity of -15%, which was also formally required under the European Commission regulation. This testifies to a great significance of gas sector also in the coming short-term and medium term period. And secondly: The European Commission has drawn up a document REPower EU, which significantly increases the requirements for rapid introduction of renewable gas (hydrogen, biomethane) that have been pre-established in the Fit for 55 package. By implementing accelerated phasing-in of renewable gas, Europe will reduce dependence on Russian gas while at the same time provide a transition to a climate neutral society.

We are therefore faced with a complex challenge: to provide reliable and uninterrupted gas transmission for all the existing and new users, adapt the existing system to admit renewable gas (of domestic origin and from neighbouring countries), and at the same time design an upgrade the current system to transfer renewable hydrogen and establish a hydrogen backbone.

Two key strategic guidance documents for the planning of the network in Slovenia are the Resolution on the Slovenian climate long-term strategy 2050 and the National Energy and Climate Plan (NEPN). The Resolution aims for 2050 to reach net zero greenhouse gas emissions or climate neutrality. The National Energy and Climate Plan sets an indicative objective to have a 10% share of renewable hydrogen or methane in the gas network in 2030. The respective objectives were also fully in line with the guidelines of the European Green Deal. The gas network is gradually becoming a carrier of renewable energy. Our ten-year development plan indicates the initial activities that are going to lead us to reach this objective.

In 2021, the Gas Supply Act was adopted. It specifies the first steps aimed at decarbonisation of gases transmitted through the gas system. The Act gives room to renewable gas (in particular biomethane, synthetic methane and green hydrogen) in the gas mixture. The indicated changes open a series of tasks on the side of the transmission system operator, and also gradually on the side of the users of this system. Accordingly, also in line with the new Act, we have drawn up a completely new fourth chapter in our ten-year development plan: The adjustment plan to admit gas into the system.

One of the important development trend is also the supply of 100% green (renewable) hydrogen. In 2020, the European Commission adopted “A hydrogen strategy for a climate-neutral Europe”. It is envisaged

that green hydrogen will become one of the relevant carriers of renewable energy, and will also enable cost-effective storage of renewable energy, which is key for successful operation of connected energy sectors. By joining the European Hydrogen Backbone initiative, Plinovodi has ensured that Slovenia will make progress jointly and in coordination with other most developed European countries in the field of hydrogen transmission. This field will be laid down in detail in a relevant EU directive which is in the final phase of adoption.

Appropriate legislative and regulatory support for these policies is also extremely important for further development. Together with the Ministry of the Environment, Climate and Energy, the Energy Agency and all other stakeholders, in particular the existing and prospective network users, Plinovodi endeavours to reach an appropriate arrangement.

We thank all of you who contributed to the creation of the new Ten-Year Development Plan, as well as all stakeholders in the market for your trust.

Marjan Eberlinc

General manager

Abstract

The Slovenian gas transmission system is part of the energy infrastructure of national importance that runs through 93 Slovenian municipalities (of the total 212) and is planned to be constructed in 15 municipalities. In the Energy Balance Sheet of the Republic of Slovenia for 2022 it is estimated that structure of final energy consumption will be dominated by petroleum products with the share of 43.1%, followed by electricity (23.3%), renewable energy sources (15.3%), gas (12.8%), heat (4.1%), non-renewable industrial waste (0.9%) and solid fuels (0.4%). As an energy product, compared to the European average, gas has a much more modest representation in the national energy balance sheet, with the exception of industrial consumers sector.

Regarding the purpose of gas projects in relation to security updates, development of domestic gas market and harmonisation with international projects, the transmission system operator (TSO) breaks down the planned infrastructure into four groups. Group A consists of 37 projects to increase operational security and expand the transmission system, i.e. loops and adjustments to the pipeline system due to settlement and other circumstances. Group B comprises 98 connections. Group C includes 16 projects for the development of interconnection points with the transmission systems of neighbouring countries, which include 2 projects that were formally confirmed by the European Commission in 2021 as having the status of projects of common interest (PCI). Group D contains 2 corridors for the development of hydrogen transmission projects, which are also candidates to obtain a PCI status 2023 under the new Regulation (EU) 2022/869 of the European Parliament and of the Council on guidelines for trans-European energy infrastructure.

1 Introduction

As the TSO in the Republic of Slovenia, the Plinovodi company, in accordance with Article 6 and Article 42 of the Gas Supply Act (ZOP)[1], is obliged to adopt and submit for confirmation to the Energy Agency a 10-year network development plan every year after consulting the relevant stakeholders. The plan must be based on the existing and expected supply and demand and include efficient measures in order to guarantee the adequacy of the system and the security of supply.

The purpose of the Ten-Year Gas Transmission Network Development Plan for the 2024 – 2033 Period (hereinafter referred to as: the "Development Plan") is to:

- Determine the main infrastructure for transmission that is to be built and upgraded over the next years for market participants,
- Contain all the investments that have already been decided and identify new investments that have to be carried out within the next three years, and
- Provide a time frame for all investment projects.

When preparing the development plan, the TSO has formed reasonable assumptions on the development of production, consumption within the domestic energy market and exchanges with other countries. It has taken into account the investment plans for regional networks and EU-wide networks, as well as investments for the gas storage facilities and liquefied natural gas (LNG) re-gasification facilities.

In drawing up the development plan, the TSO also followed the guidelines and content of the National Energy and Climate Plan of the Republic of Slovenia (NEPN[2]) for the gas transmission infrastructure.

1.1 Definitions

Unless the meaning of an expression is otherwise defined in an individual section of the development plan, the expressions and units of measure used have the same meaning as defined in the applicable legislation.

[1] Official Gazette of the RS, Nos. 204/21 and 121/22 - http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO8376

[2] https://www.energetika-portal.si/fileadmin/dokumenti/publikacije/nepn/dokumenti/nepn_5.0_final_feb-2020.pdf

2 Consultations

2.1 TSO's consultations with stakeholders

Between 18 April and 18 May 2023, the TSO published a draft of the development plan on its website. Within the public consultation procedure, it invited all interested public representatives to present comments, suggestions, or additions to the draft. During the public consultation process, which lasted for one month, it has received 2 responses from neighbouring TSO. Based on the responses received, the Development Plan does not need to be amended.

2.2 Activities of the Energy Agency in relation to network development

After consulting the TSO, the Energy Agency will carry out an open and transparent consultation procedure with all actual and potential network users.

2.3 Legislative updates

Plinovodi d.o.o. carries out the activity of the gas transmission system operator which constitutes a compulsory public utility service. The legal framework of the gas transmission system operator's activity are acts of European Union law (EU), national laws (the umbrella laws being the Gas Supply Act (ZOP) and the Energy Act (EZ-1)), by-laws and Acts of the Energy Agency and the Transmission System Operator.

New legislative features in the field of gas supply mainly arise from the response of the legislator to geopolitical and price conditions in the region stemming from the intensified situation due to the war between Russia and Ukraine and associated risks of gas supply disruption in the region.

Responding to the issues and disruptions on the global energy market, on 18 May 2022, the European Commission presented a REPowerEU plan aiming at diversifying energy supply (alternative energy supply options to eliminate EU dependence on Russian fossil fuels), saving energy, accelerating green transition and associated incentives for large investments in renewable energy sources. As part of accelerating the introduction of renewable energy sources, the EU established a goal to reach 10 million tonnes of hydrogen produced from renewable energy sources and 10 million tonnes of imported hydrogen by 2030. The REPowerEU plan constitutes strengthening of long-term measures for energy efficiency as part of the legislative package "Fit for 55" to implement the goal of the European Green Deal, by which Europe would become climate neutral by 2050.

Due to changed operating conditions of the gas undertakings and increased risks in supply chains of natural gas, the National Assembly of the Republic of Slovenia adopted the Act amending the Gas Supply Act (ZOP-A) (Official Gazette of the Republic of Slovenia, No. 121/22 of 21/09/2022), by which the legislator regulated the alternative and basic gas supply and impose on the transmission system operator to establish, manage and maintain the Unified Information System (UIS) required for gas market operation and provision of reliable gas supply. The UIS keeps data on consumption points, information on the consumption points belonging to the system operator, supplier, balance group and the group according to the purpose of gas consumption, data on gas consumption and other details required for the operation of the gas market and provision of reliability of gas supply.

With a view to reinforcing energy security and resilience and providing diversification of energy supply in the EU and accelerating green and fair energy transition for sustainable, reliable and affordable energy, the EU, inter alia, adopted the following acts:

- Regulation (EU) 2022/869 of the European Parliament and of the Council of 30/05/2022 on guidelines for trans-European energy infrastructure, amending Regulations (EC), Nos. 715/2009, (EU) 2019/942 and (EU) 2019/943 and Directives 2009/73/EC and (EU) 2019/944), and repealing Regulation (EU) No. 347/2013, which lays down guidelines for priority corridors and energy infrastructure areas that contribute to achieving energy and climate goals of the EU, and the provision of connections, energy security and affordable energy prices,
- Commission Delegated Regulation (EU) 2022/1214 of 09/03/2022 amending the Delegated Regulation (EU) 2021/2139 as regards economic activities in certain energy sectors and Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities, meaning that, by amending the taxonomy, the European Commission defined natural gas as transitional green activity that will facilitate green transition,
- Regulation (EU) 2022/1032 of the European Parliament and of the Council of 29/07/2022 amending Regulations (EU) 2017/1938 and (EC) No. 715/2009 with regard to gas storage, and Corrigendum to the respective Regulation stipulating target values of the filling levels of underground gas storage facilities in the territory of Member States before the onset of winter periods up to at least 80% of total capacity of their underground gas storage facilities for 2022 or 90% of total capacity of their underground gas storage facilities for 2023 and subsequent years. It stipulates the obligation of Member States that do not have underground storage facilities to provide by the onset of the winter period the storage capacity of at least 15% of the average annual gas consumption from the previous five years in a Member State.
- Regulation (EU) 2022/1369 of 05/08/2022 on coordinated demand-reduction measures for gas in the period from 1 August to 31 March 2023 by 15 per cent according to the consumption in the last five years,
- Regulation (EU) 2022/2576 of 19/12/2022 enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders that ensures the aggregation of demand and joint gas purchasing for the EU, more efficient use of transmission capacity, stipulates default rules for solidarity measures and associated procedure if two neighbouring Member States have no solidarity agreement in place[3],
- Regulation (EU) 2022/2578 of 22/12/2022 establishing a market correction mechanism to protect Union citizens and the economy against excessively high prices, which specifies a correction mechanism for the market designed to prevent abnormally high prices and is activated automatically if the price for a month in advance within a TTF hub exceeds EUR 180/MWh for three business days and if the price within the TTF hub for a month in advance is higher by EUR 35 for the respective three business days from the benchmark price of liquefied natural gas on global markets.

In the light of the events in the gas market and the adopted European legislation, several acts, regulations and other acts were adopted at the level of national legislation, namely, in addition to the respective Gas Supply Act (ZOP-A), also:

- Act Determining Emergency Measures to Mitigate the Consequences of the Impact of High Energy Commodity Prices (ZVOPVCE) (Official Gazette of the Republic of Slovenia, No. 29/22),
- Act on Measures for Management of Crisis Conditions in the Field of Energy Supply (ZUOKPOE) (Official Gazette of the Republic of Slovenia, No. 121/22),
- Act Governing Aid to Businesses Hit by High Increases in Electricity and Natural Gas Prices (ZPGVCEP) (Official Gazette of the Republic of Slovenia, Nos. 117/22 and 133/22),
- Act Regulating Emergency Intervention to Address High Energy Prices (ZNPOVCE) (Official Gazette of the Republic of Slovenia, No. 158/22),

[3] The Government of the Republic of Slovenia and the Government of the Republic of Italy signed the Agreement on solidarity measures to provide the reliability of gas supply, which was ratified by the Act of Ratification, Official Gazette of the Republic of Slovenia, No. 100/2022 of 25/07/2022.

- Act Governing Aid to Businesses to Mitigate Impact of Energy Crisis (ZPGOPEK) (Official Gazette of the Republic of Slovenia, Nos. 163/22 and 15/23),
- Regulation on the determination of the price of natural gas from the gas system (Official Gazette of the Republic of Slovenia, Nos. 98/22, 138/22 and 12/23) and the Regulation on the determination of the price of natural gas from the gas system for certain legal entities of public nature, providers of publicly valid programmes of education and providers of social services, social security programmes and programmes supporting families (Official Gazette of the Republic of Slovenia, No. 162/22),
- Regulation on the determination of the compensation to natural gas suppliers (Official Gazette of the Republic of Slovenia, No. 4/23),
- Legal Act on establishing criteria to determine alternative gas supply supplier (Official Gazette of the Republic of Slovenia, No. 127/22),
- Legal Act on the emergency plan for gas supply (Official Gazette of the Republic of Slovenia, No. 136/22),
- Legal Act on the methodology for the calculating price in the event of involuntary reduction or interruption of gas consumption (Official Gazette of the Republic of Slovenia, No. 136/22),
- Legal Act on the methodology for the calculating compensation in the event of involuntary reduction or interruption of gas consumption (Official Gazette of the Republic of Slovenia, No. 136/22),
- Act amending the Legal Act on the methodology for determining the regulatory framework of the natural gas transmission system operator (Official Gazette of the Republic of Slovenia, No. 136/22),
- Act amending the System operating instructions for the transmission system of natural gas (Official Gazette of the Republic of Slovenia, No. 136/22).

3 Supply and demand for transmission capacity of Slovenian gas transmission system and gas supply

3.1 Current situation of the gas transmission system

The geographical position of Slovenia is relatively favourable in relation to the flow of gas in Europe due to its close proximity to the transmission routes from North-Eastern Europe (from Russia through Slovakia and Austria towards Italy and Croatia) and its border with Italy, where the transmission routes from the Mediterranean basin and Northern Europe converge. The Slovenian system is in the vicinity of the existing and newly planned LNG terminals (LNG — liquefied natural gas) in the Adriatic Sea, and the storage of gas in the neighbouring systems.

The Slovenian gas transmission system comprises 1,200km of pipelines, two compressor stations in Kidričevo and Ajdovščina, and 257 metering and regulation stations or other stations. The gas transmission system connects most of the industrial and urban centres in Slovenia, with the exception of the Obalno-kraška region, Bela Krajina, and a part of Inner and Lower Carniola.

At key points, the gas transmission system is equipped with devices through which the system can be controlled and maintained. The remote control and monitoring functions are performed by means of an information and telemetry system. The gas transmission system is controlled and operated from the dispatch centre that is connected to the dispatch centres of transmission system operators of neighbouring countries as well as to distribution network operators and major consumers of gas.

Table 1. Main infrastructure - gas transmission pipelines by pipeline diameter and other facilities and equipment

Infrastructure		Status as of 01/01/2023
Gas distribution network	Total	1,200 km
	Pipelines with a diameter of 800 mm	167 km
	Pipelines with a diameter of 500 mm	162 km
	Pipelines with a diameter of 400 mm	212 km
	Other pipelines of smaller diameters	659 km
Facilities and equipment	Compressor stations, total power	CS Kidričevo 10.5 MW, CS Ajdovščina 9 MW
	Cross-border stations	Ceršak, Rogatec, Šempeter pri Gorici

Table 2. Gas transmission network - high and low pressure (as of 01/01/2023)

Pressure	Low pressure (<16 bar)	High pressure (>16bar)	Total
Horizontal length (km)	211	989	1,200
Share (%)	18	82	100

A major part of the existing gas transmission network is older than 30 years.

Table 3. Gas transmission network - age structure (as of 01/01/2023)

	less than 10 years	between 10 and 20 years	between 20 and 30 years	more than 30 years
Horizontal length (km)	109	148	35	908

Share (%)	9	12	3	76

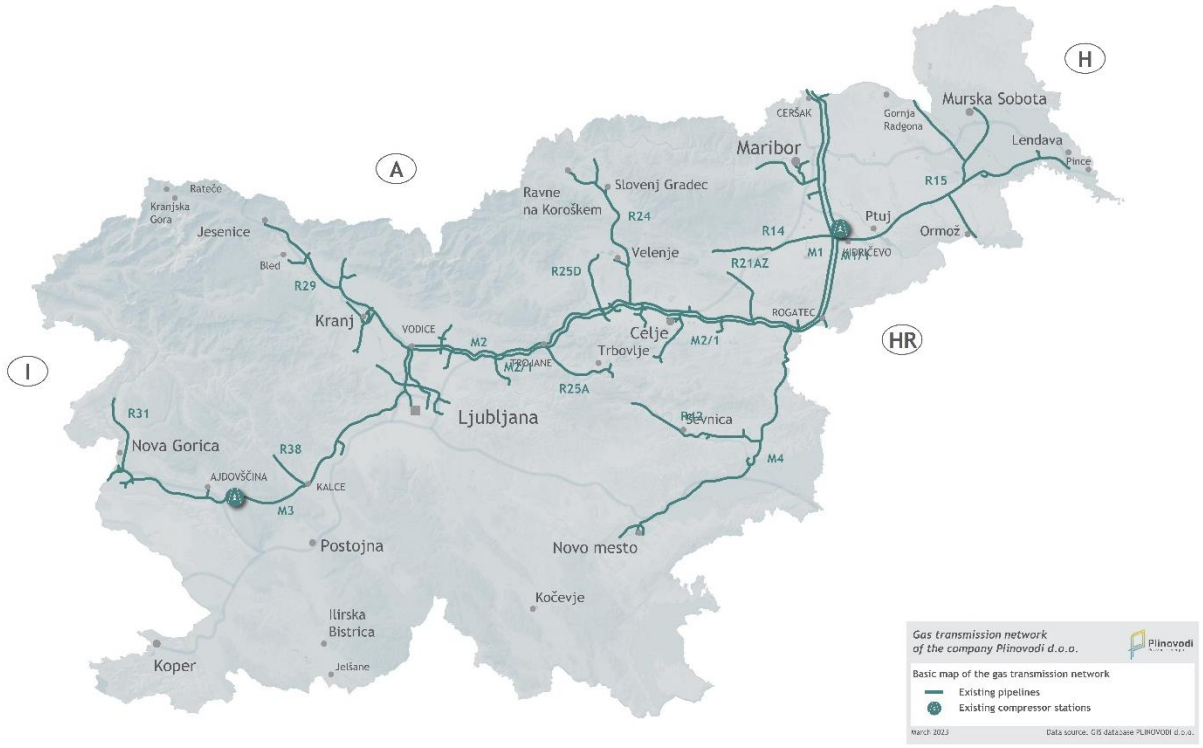


Figure 1. Gas transmission system

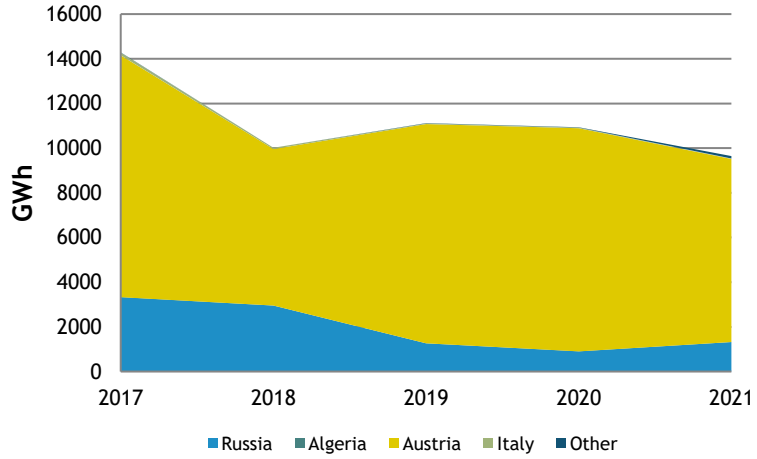
The Slovenian gas transmission system began its operation in 1978, and was then gradually expanded and upgraded. In 2014, the last major investment cycle was completed with the construction of a pipeline from the Austrian border at Ceršak to Vodice near Ljubljana. In addition to providing additional necessary transmission capacity, the safety and reliability of the transmission system operation were improved.

With regular inspections and regular maintenance work, the Plinovodi company as a transmission system operator ensures safe and reliable operation of the transmission system. The status of transmission pipelines is regularly monitored by supervising pipeline routes, by performing internal inspections of gas pipes, by using various methods of external gas pipeline inspection, and by constantly monitoring the operational parameters via the central control system. Using the cathodic protection system, transmission pipelines are protected against the development of corrosion damage. Based on preventive inspections and maintenance activities, the Plinovodi company estimates that the gas infrastructure is in very good operating condition.

3.2 Domestic market

3.2.1 Supply of gas to Slovenia and access to gas sources

Due to the lack of own sources, the supply of gas to the Slovenian market depends entirely on imports. From Austria, gas flows via the Ceršak entry point, and from Italy, via the Šempeter entry point. Gas, located in the trading hubs of the European market and transmitted to Slovenia, is of the European, North African, and Russian origin; since early 2021, due to the construction of the LNG Croatia terminal on the island of Krk, it may also be provided from any of global LNG producers.



Data source:
Energy Agency

Figure 2. Sources of gas supply to Slovenia

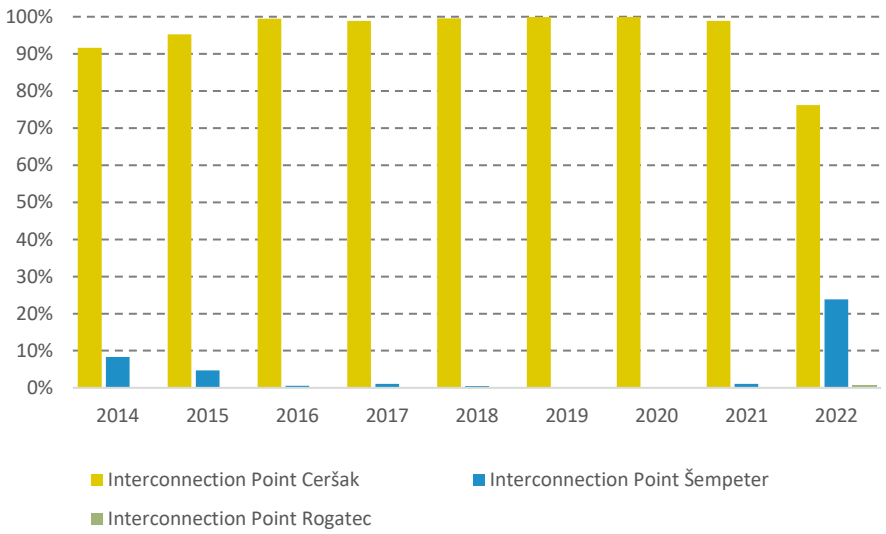


Figure 3. Gas import routes to Slovenia

Through the Ceršak interconnection point, the TSO can supply all Slovenian consumers, regardless of their location. This is also reflected in the positive trend of increasing the share of gas supply in recent years via the Ceršak point in Figure 3. In 2022, the increase in the share of gas supply from Italy is evident, resulting in the proportional decrease in the share of gas transmission via the Ceršak interconnection point. In this way, suppliers provide competitive supply to all consumers as it is not limited to the interconnection point or a potential bottleneck on the gas transmission system. Since 2019, a capacity is available for the transmission of gas from Croatia to Slovenia via the Rogatec interconnection point.

3.2.2 Comprehensive National Energy and Climate Plan of the Republic of Slovenia

In accordance with the Regulation (EU) 2018/1999[4], Slovenia adopted the National Energy and Climate Plan (NEPN) on 27 February 2020.

[4] REGULATION (EU) 2018/1999 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 on the Governance of the Energy Union and Climate Action. (ES) No. 663/2009 and (ES) No. 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC,

In accordance with the provisions of the NEPN, Slovenia must achieve at least 27% share of renewable energy sources (RES) in final energy consumption by the year 2030 and reduce greenhouse gas (GHG) emissions by at least 20%, of which by at least 76% in general use, 43% in industry, and 34% in energy sector. At least 41% of RESs are planned in the heating and cooling sector and at least 11% in the transport sector. These provisions will also be reflected in the future role of gas. In order to achieve the RES targets in the electricity and heating and cooling sectors, as well as for the GHG emission reduction targets, it is indicative that at least 10% of natural gas by the year 2030 will be presented by hydrogen or methane from renewable sources. It is envisaged that the respective share will increase to 25% by 2040. Given the projected energy balance for the year 2030, it will be necessary to provide 1,047GWh of synthetic gas and 116GWh of hydrogen in the energy supply.

In the electricity sector, it is planned to increase the share of RES to at least 43% and at least 75% of the supply of electricity from sources in Slovenia, while maintaining at least the existing level of security of supply. In order to achieve these objectives, it will be necessary to build additional generation capacity for the production of electricity from solar energy. Due to the fact that solar energy is a volatile energy source whose availability profile does not follow market needs, it will be difficult to ensure the stability of the electricity system with the additional capacity of solar power plants (SPP). The NEPN envisages solving such problems by using the gas system as an energy storage and storing surplus electricity in the form of synthetic gas and hydrogen. Pilot projects for the production and injection of renewable gases into the transmission gas system are envisaged.

The Plinovodi company is prepared for an active role in designing the transmission system to include renewable gases, hydrogen and synthetic methane and analysing the potential locations in the transmission gas system to connect the electricity and gas sectors as well as pilot and large commercial production installations. Appropriate legislative and regulatory support for these policies is extremely important for further developing the supply of renewable gases.

3.2.2.1 Tracking and compliance of the development plan with strategic documents

In all scenarios until the year 2050, which were prepared for the above-mentioned documents and also publicly discussed, the Ministry of Infrastructure (now the Ministry of the Environment, Climate and Energy) took into account the use of gas and biogas. The role of gas in the scenarios under consideration is important, and is particularly important in the production of electricity when its production decreases due to a reduction in the use of domestic coal, also in combination with the nuclear option.

Diverse scenarios for the use of gases are currently difficult to define; to a large extent, the use of energy gases will depend on the development of technologies. All indications show that the Slovenian gas transmission system will get a new role also due to the role of other energy gases, including hydrogen. This is a new development phase of the transmission system, which must follow the preparations under way in the neighbouring transmission systems connected to Slovenia.

Gas enters the transmission system at entry points and leaves it at exit points. Relevant entry and exit points are cross-border interconnection points and a point for aggregate information on the combined exit / transmission for users in the Republic of Slovenia. The so-called relevant points are approved by the Energy Agency and are shown in Figure 4. The TSO publishes on the website publicly available data on capacities, transmitted quantities, calorific value of gas, etc. for all six relevant points shown in the figure below.

2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No. 525/2013 of the European Parliament and of the Council

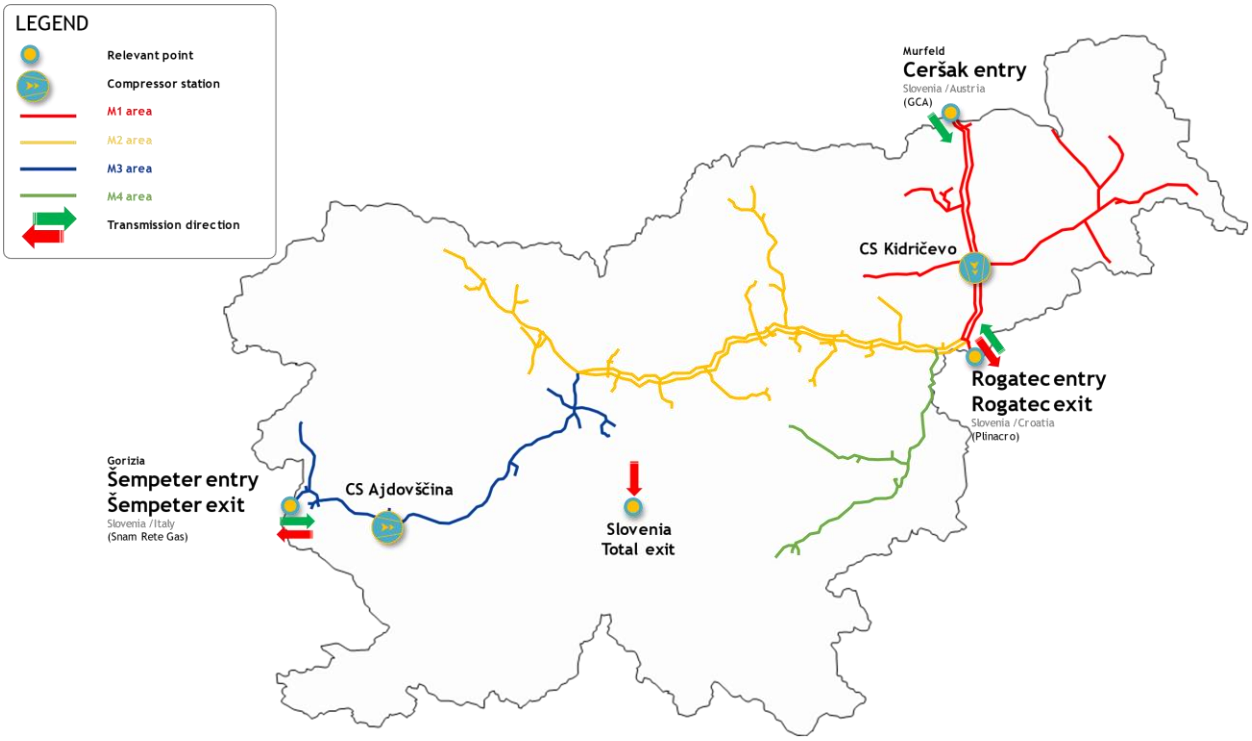


Figure 4. Schematic map of the gas transmission system with relevant points

Table 4 shows data on the capacity of the relevant points as of 01/01/2023, the total contractually booked capacity and utilisation for different periods.

Table 4. Capacity of the gas transmission system on relevant points[5]

Relevant point	Technical capacity	Total contractually booked capacity	Maximum daily utilisation of technical capacity	Average monthly utilisation of technical capacity	Maximum monthly utilisation of technical capacity
	GWh/day	GWh/day	%	%	%
Ceršak - entry	139.867	40.381	56 (13/01/2022)	22.3 (year 2022)	34.4 (AUG 2022)
Rogatec - entry	7.697	3.903	82.5 (06/12/2022)	3.1 (year 2022)	35.2 (DEC 2022)
Rogatec - exit	68.922	21.888	66.6 (09/11/2022)	17.3 (year 2022)	49.4 (AUG 2022)
Šempeter - entry	38.992	30.661	100.0 (06/11/2022)	16.0 (year 2022)	62.9 (NOV 2022)
Šempeter - exit	25.769	0.000	96.2 (05/07/2022)	1.6 (year 2022)	11.7 (JAN 2022)
Exit in RS	91.864	58.128	59.0 (13/01/2022)	29.6 (year 2022)	49.3 (JAN 2022)

In accordance with the requirements for ensuring the secure supply of gas, the TSO is obliged to develop the transmission system to ensure additional capacities in the domestic gas market and cross-border

[5] The capacity data refer to 01/01/2023, while the technical capacity utilisation data refer to the year 2022.

transmission capacity. Monitoring the demand and dynamics of transmission capacity booking at individual relevant points is the basis for the optimum development of the transmission system.

In accordance with the Regulation (EC) 715/2009[6], the TSO allows the use of transmission capacity to network users separately at all entry and exit points of the system (according to the so-called Entry-Exit System). To ensure successful operation of the entry-exit points system, the TSO must provide appropriate technical conditions, such as the elimination of bottlenecks on the transmission system, in order to enable suitable marketing and booking of capacity under this method and to allow the booking of capacity at entry and exit points in various combinations.

3.2.3 Infrastructure standard and compliance with the requirements of regulations concerning the security of gas supply

The Regulation 2017/1938[7] addresses the infrastructure criterion N-1 stipulating for the considered geographic area that in the event of interruption on an individual largest gas infrastructure there must be sufficient technical capacity available to meet the entire daily demand for gas, even in cases of exceptionally high demand (peak consumption).

In the respective Regulation, the European Commission has taken into account that the circumstances in Slovenia and in some EU Member States are rather specific compared to other Member States. Slovenia has no gas storage facilities nor liquefied natural gas (LNG) plants and in addition to that, the Slovenian transmission system is connected to foreign transmission systems in only three handover points. For these reasons, Slovenia (along with Luxembourg and Sweden) is an exception and therefore not obliged to meet the criterion N-1. This exception applies as long as Slovenia maintains at least two interconnectors with other Member States, at least two different gas supply sources and no gas storage facilities nor liquefied natural gas plants.

An analysis of the infrastructure standard has been prepared for the Ten-Year Development Plan 2024 – 2033, where the updated information on the development of transmission capacity at cross-border interconnection points was taken into account as a result of changes in characteristics (technical, developmental) of the gas infrastructure projects in the region due to the crisis in Ukraine. Due to the development of transmission capacities at the cross-border interconnection points, there is an increase in the infrastructure standard in 2028.

When calculating the infrastructure standard, only the firm transmission capacities were taken into account as technical capacities of cross-border interconnection points, without taking into account the possible specific measures of the transmission system operator to provide additional interruptible transmission capacity in the event that supply security is threatened. The technical capacities of the respective cross-border interconnection points are defined on the basis of flow-pressure calculations of the transmission system, taking into account the technical capacities of all the transmission system components included in the transmission (gas pipelines, metering and regulation stations, and the two compressor stations), as well as the operational characteristics and operational boundary conditions of the transmission system as a whole.

Given the changed geopolitical situation at eastern supply corridors since February 2022 and EU measures aiming at reducing the exposure to eastern supply sources, the TSO prioritises the plan to increase transmission capacity at the cross-border point with the Italian transmission system, which is reflected

[6] 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

[7] REGULATION (EU) 2017/1938 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2017 concerning measures to safeguard security of gas supply and repealing the Regulation (EU) 994/2010.

also through the improvement of the N-1 infrastructure criterion. As evident from the Graph in Figure 5, in 2025, the infrastructure standard starts to increase from the range of 74% to the range over 89%.

The TSO estimates that it could ensure the fulfilment of requirements of the infrastructure standard in the long term with the development of cross-border connections from the year 2026 onwards, when additional capacity is planned at cross-border entry points. After the fulfilment of the infrastructure criterion N-1, the TSO will be able to ensure the suppliers full transmission of supply intended for consumption in Slovenia at other entry interconnection points with the neighbouring transmission systems in the event of a physical interruption of the transmission from any of the supply directions, regardless of the system load or the duration of the interruption.

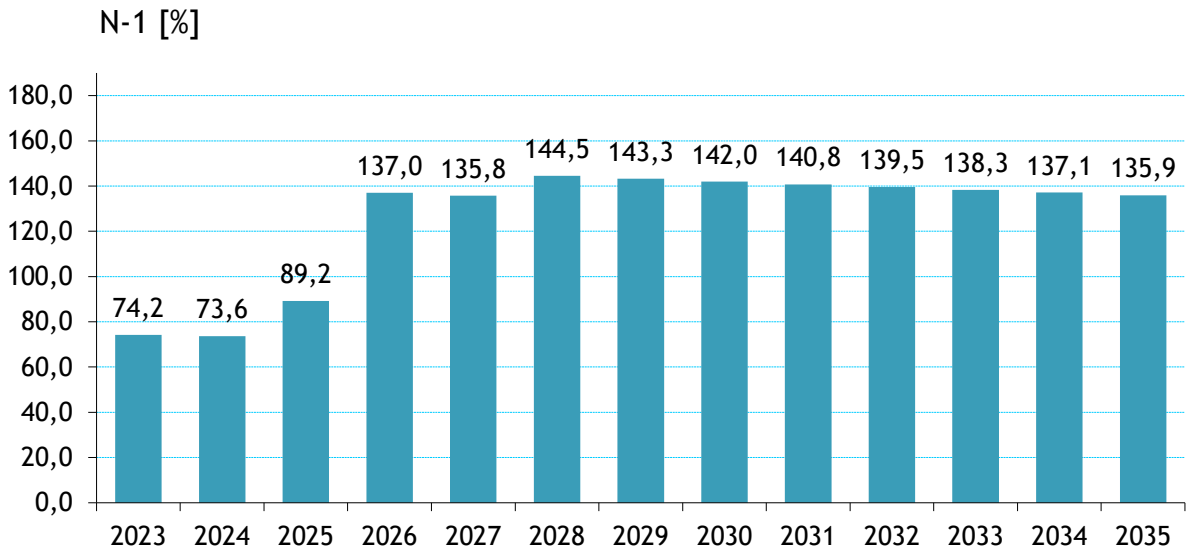


Figure 5. Estimation of infrastructure criterion N-1 development for the Slovenian transmission system (%)

As TSO, the Plinovodi company will be able to manage the requirements of the infrastructure criterion N-1 in the long term by:

i. Prioritising the increase in transmission capacity at the cross-border point between the Italian and Slovenian transmission system in 2025 as a response to the changed geopolitical situation at the eastern supply routes, thus providing uninterrupted gas supply to Slovenian users via western supply routes;
ii. An additional connection of the Slovenian transmission system with neighbouring system, which could be realised within the scope of the project of the new connection with Hungary or the project to increase capacity in the transmission direction from Croatia to Slovenia.

The estimations of value increments of infrastructure criterion N-1, inter alia, also depend on the estimated growth of the peak load of the system, which has taken into account the baseline peak load of the Slovenian transmission system, established on the basis of peak consumption data in Slovenia. In the graph in Figure 5, it is taken into account that the peak load of the Slovenian transmission system is going to increase moderately in the coming years due to the growth of wide consumption and due to the increased consumption of the new thermal energy plant in the area of Ljubljana. The development of peak load in Slovenia will also depend on the utilisation of transmission capacities for gas power stations.

3.2.4 Supply and demand for transmission capacity – territorial coverage

On 01/01/2023, the TSO had concluded transmission contracts with 159 network users, of which 12 are DSOs, 129 industrial or commercial customers, of which there are 5 system users having the status of a closed distribution system, two power plants and 12 domestic or foreign gas suppliers without the booking capacity at the final exit point in the Republic of Slovenia.

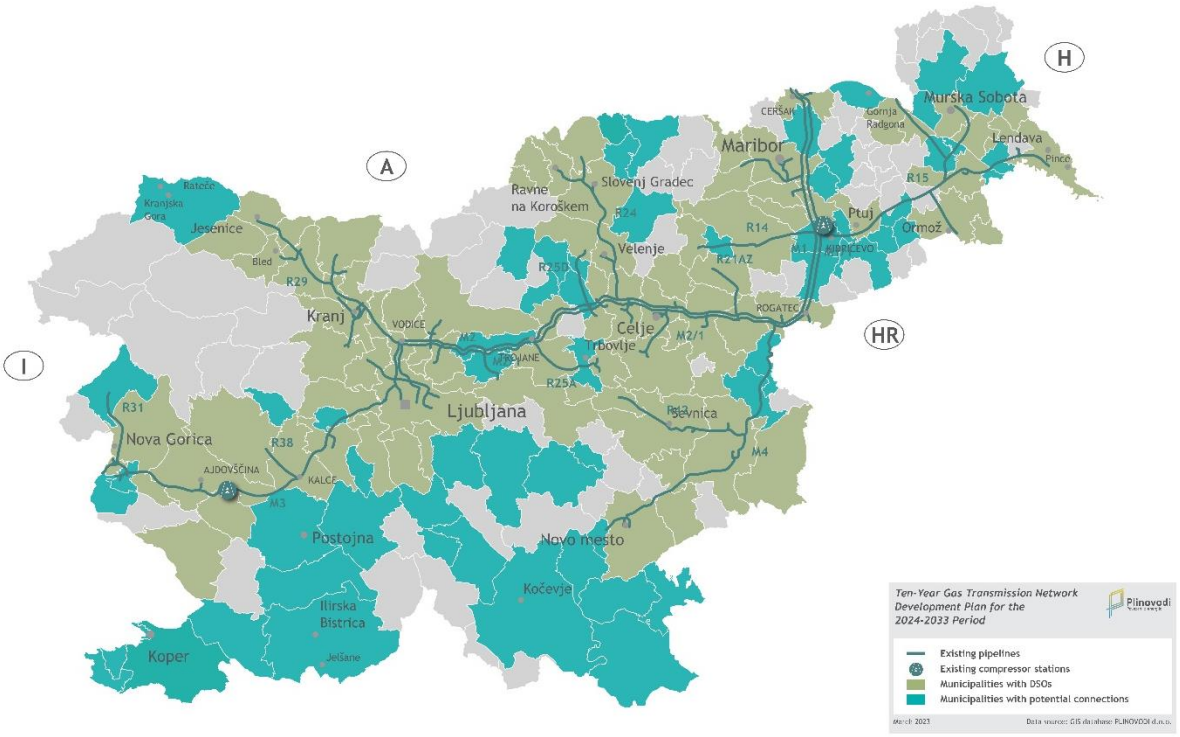


Figure 6. Regional availability of the gas transmission network

In 2022, gas supply via gas distribution systems (DS) was provided in 85[8] municipalities in the Republic of Slovenia, and by connecting the Municipality of Črenšovci in 2022 and the Municipality of Vransko in 2023, the gas supply in the Republic of Slovenia has increased by two municipalities, i.e. 87. A gas network is implemented in the respective municipalities with a possibility to connect to DSO. There are two DSOs in the Municipality of Šenčur, which is divided into 4 areas.

Table 5 shows individual statistical regions in the Republic of Slovenia with the number of municipalities provided with the gas supply through DSO and having a DS constructed (87). Potentially connectible municipalities are classified in Table 5 according to the possibility of connection by using the existing MRSs (11 municipalities) and the existing gas transmission pipeline (16 municipalities), for it is already present in the respective municipality. Table 5 also shows municipalities where the planned transmission infrastructure runs through (16 municipalities) and also the municipalities where a shorter (31 municipalities) and longer (51 municipalities) connecting pipeline would have to be built. The analysis shows that 74 municipalities have a relatively simple connection of DSO to the gas transmission system, while longer pipelines would have to be constructed for other 51 municipalities.

[8] https://www.zemeljski-plin.si/zemeljski-plin/priklop-plina

Table 5. Regional availability of the gas transmission network and local communities with potential connections

Statistical region[9]		Municipalities with DSO and DS	Local communities with potential connections and infrastructure required				
			Use of the existing MRS	New constructions: Use of existing pipeline and construction of new MRS	New constructions: Construction of the system pipeline, connection pipeline and MRS	New constructions: Construction of short connection pipeline and MRS	New constructions: Construction of long connection pipeline or system pipeline and MRS
1	Pomurska (27 municipalities)	Beltinci, Gornja Radgona, Lendava, Ljutomer, CM Murska Sobota, Odranci, Radenci, Turnišče, Dobrovnik, Črenšovci (10)	Velika Polana, Križevci (2)	Razkrižje, Veržej (2)		Apače, Moravske Toplice, Puconci, Tišina, Sveti Jurij ob Ščavnici (5)	Cankova, Gornji Petrovci, Grad, Hodoš, Kobilje, Kuzma, Rogašovci, Šalovci (8)
2	Koroška (12 municipalities)	Dravograd, Mežica, Muta, Prevalje, Ravne na Koroškem, Črna na Koroškem, CM Slovenj Gradec (7)				Mislinja (1)	Ribnica na Pohorju, Vuzenica, Radlje ob Dravi, Podvelka (4)
3	Podravska (41 municipalities)	Hoče - Slivnica, CM Maribor, Miklavž na Dravskem polju, Ormož, CM Ptuj, Rače - Fram, Ruše, Slovenska Bistrica, Središče ob Dravi, Šentilj (10)	Starše*, Kidričevo (2)	Oplotnica, Pesnica, Sveti Tomaž, Majšperk, Hajdina, Jurišinci, Dornava (7)		Gorišnica, Markovci, Duplek, Videm, Selnica ob Dravi*, Lenart, Destrnik, Kungota, Makole, Poljčane, Sveti Jurij, Žetale (12)	Benedikt, Cerkvenjak, Cirkulane, Lovrenc na Pohorju, Podlehnik, Sveta Ana, Sveta Trojica, Sveti Andraž, Trnovska vas, Zavrč (10)
4	Savinjska (31 municipalities)	CM Celje, Laško, Polzela, Prebold, Rogaška Slatina, Rogatec, Slovenske Konjice, Šentjur, Šmarje pri Jelšah, Štore, Šoštanj, CM Velenje, Vojnik, Vransko*, Zreče, Žalec (16)	Šmartno ob Paki (1)	Braslovče, Kozje, Tabor, Podčetrtek (4)		Nazarje, Mozirje, Dobrna, Vitanje (4)	Dobje, Gornji Grad, Rečica ob Savinji, Ljubno, Luče, Solčava (6)
5	Zasavska (4 municipalities)	Hrastnik, Zagorje ob Savi, Litija (3)	Trbovlje (1)				
6	Posavska (6 municipalities)	Brežice, Krško, Sevnica, Radeče (4)				Bistrica ob Sotli, Kostanjevica na Krki (2)	
7	Osrednje-slovenska (25 municipalities)	Brezovica, Dobrova - Polhov Gradec, Dol pri Ljubljani, Domžale, Ig, Kamnik, Komenda, CM Ljubljana, Litija, Logatec, Log - Dragomer,	Moravče (1)	Lukovica, Horjul (2)	M5: Ivančna Gorica (1)	Borovnica (1)	Šmartno pri Litiji, Velike Lašče, Dobrepolje (3)

[9] https://www.stat.si/obcine/sl

		Medvode, Mengeš, Škofljica, Grosuplje, Trzin, Vodice, Vrhnika (17)					
8	Primorsko-notranjska (6 municipalities)				M8: Postojna, Ilirska Bistrica, Pivka (3)		Cerknica, Bloke, Loška dolina (3)
9	Gorenjska (18 municipalities)	Bled, Cerklje na Gorenjskem, Jesenice, CM Kranj, Naklo, Gorje, Radovljica, Šenčur, Škofja Loka, Tržič, Žirovnica (11)				Kranjska Gora, Bohinj, Preddvor (3)	Žiri, Jezersko, Železniki, Gorenja vas - Poljane (4)
10	Goriška (13 municipalities)	Ajdovščina, Nova Gorica, Šempeter - Vrtojba, Vipava, Idrija (5)	Miren - Kostanjevica, Renče - Vogrsko, Kanal (3)			Brda (1)	Tolmin, Kobarid, Bovec, Cerkno (4)
11	Obalno-kraška (8 municipalities)	Sežana** (1)			M6: Hrpelje-Kozina, CM Koper*, Izola, Piran, Ankaran, Divača (6)	Komen (1)	
12	South-Eastern Slovenia (21 municipalities)	CM Novo mesto, Šentjernej, Škocjan (3)	Straža (1)	Šmarješke Toplice (1)	M5: Trebnje, Mirna Peč, Mirna R45: Metlika, Semič, Črnomelj (6)	Dolenjske Toplice (1)	Mokronog - Trebelno, Šentrupert, Žužemberk, Kočevje, Ribnica, Osilnica, Sodražica, Loški potok, Kostel (9)
	212	87	11	16	16	31	51

* The municipality already has a chosen DSO (Starše, Selnica ob Dravi, Jesenice, CM Koper). The connection of DSO of the Municipality of Vransko is in 2023.
** The DSO is connected to the system in the neighbouring country.

3.2.5 Comparison of the role of gas in Slovenia and Europe

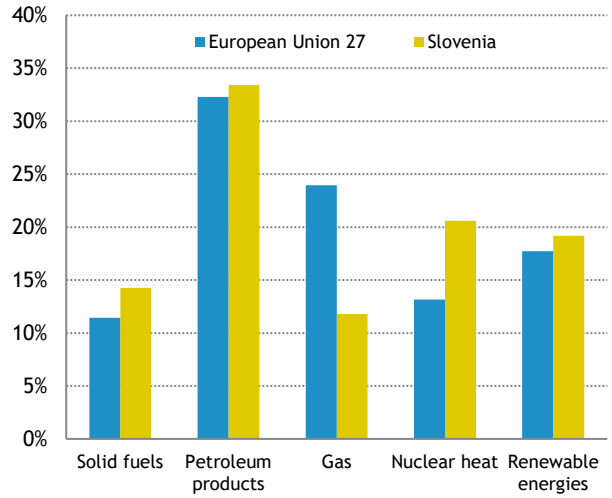
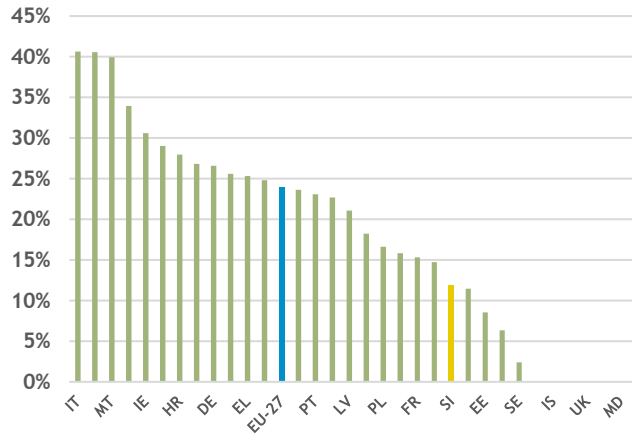


Figure 7. Primary energy in EU-27 and Slovenia

On the basis of the data for the year 2021, the Slovenian energy market differs from the EU-27 average in two out of five elements, namely: gas and waste heat. The share of gas in primary energy in the EU-27 countries is 2-times higher than in Slovenia, while the share of waste heat is much higher in Slovenia.

Data source: Eurostat, »*Energy balance sheets*«[10]

[10] https://ec.europa.eu/eurostat/databrowser/view/NRG_BAL_S__custom_5057838/default/table?lang=en



In the primary energy consumption structure in Slovenia, gas represented a 12% share in 2021. The average of EU Member States was 24%.

Data source: Eurostat, »*Energy balance sheets*«

Figure 8. The share of gas in primary energy in EU countries

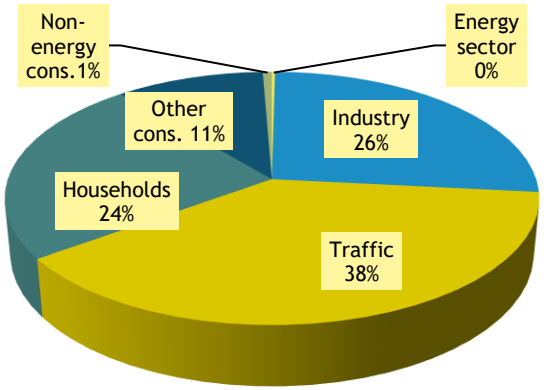


Figure 9. Energy consumption by sector (2022) in Slovenia (Data source: MzOPE-DE[11], data for the Energy Balance Sheet of the Republic of Slovenia 2022)

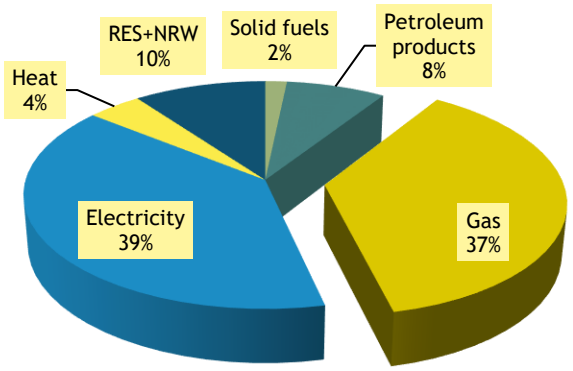


Figure 10. Energy sources in industry (2022) in Slovenia (Data source: MzOPE-DE, data for the Energy Balance Sheet of the Republic of Slovenia 2022)

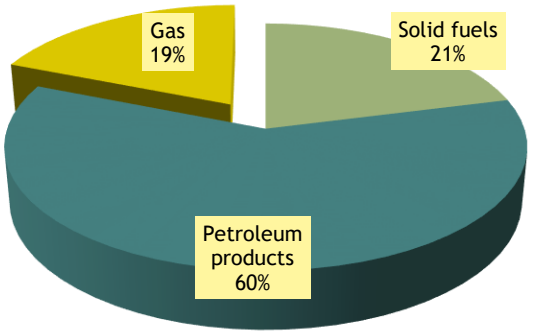


Figure 11. Non-energy consumption (2022) in Slovenia (Data source: MzOPE-DE, data for the Energy Balance Sheet of the Republic of Slovenia 2022)

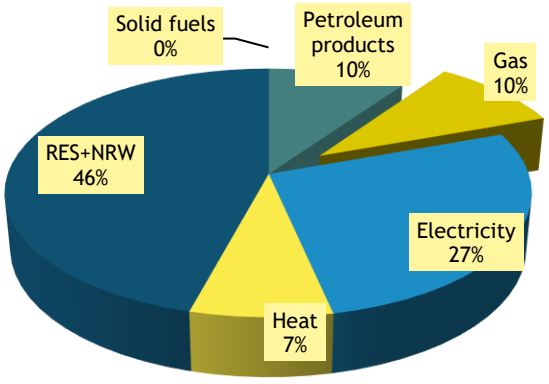


Figure 12. Energy sources in households (2022) in Slovenia (Data source: MzOPE-DE, data for the Energy Balance Sheet of the Republic of Slovenia 2022)

In the year 2022, the largest share of energy consumption was in transport. Industry and households represent an important segment of energy consumption, as well. These three sectors have consumed as much as 89% of all energy, with the remaining 11% in other consumption, non-energy consumption and the energy sector. In the year 2022, gas accounted for 37% of consumption in the Slovenian industry, which is 2 percentage points higher than in 2021. One of the most suitable uses for gas lies in households, because it is easy to use, safe, as well as the most environmentally friendly and competitive.

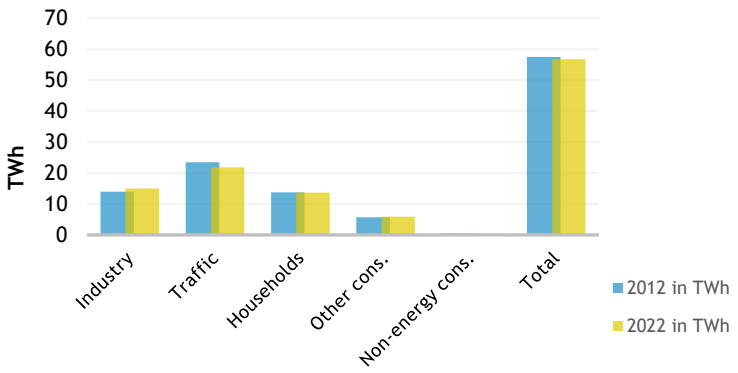


Figure 13. Comparison of energy consumption in 2012 and 2022

According to the energy balance sheet of the Republic of Slovenia for the year 2022, the final energy consumption in the year 2022 amounted to 57TWh, which is 1.3% lower than ten years ago (2012):

- Increased by 6.8% in industry,
- Reduced by 7.8% in traffic,
- Reduced by 1.4% in households,
- Increased by 4.2% in other consumption,
- Reduced by 42.1% in non-energy consumption.

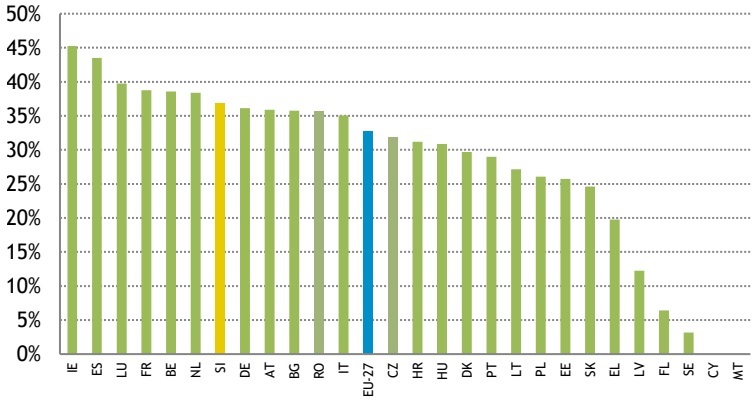


Figure 14. Share of gas among the energy sources in industry

Slovenia is comparable to other EU-27 countries when it comes to the consumption of gas in industry (Slovenia with 37% share in the year 2021, while the EU-27 with 32%). The reduction in energy consumption in the last ten years affected all energy sources, so gas retained a relatively high share. Ireland has the largest share among the Member States; namely, 45%.

Data source: Eurostat, *»Energy balance sheets«*

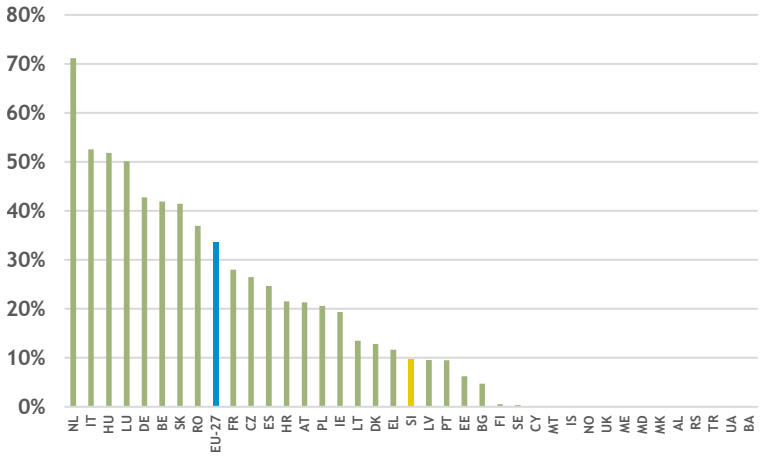


Figure 15. Share of gas among the energy sources in households

In terms of energy sources in households, gas has 10% share in 2021 in Slovenia, which is over three times less compared to 34% in EU-27 countries.

Data source: Eurostat, *»Energy balance sheets«*

[11] Ministry of the Environment, Climate and Energy, Energy Directorate

3.2.6 Past gas consumption in the country

The past consumption of gas represents an important indicator used for the future forecasting of the booking of transmission capacity. In the years to 2021, the gas consumption trend is positive in Slovenia; in 2021, the consumption exceeded 10 TWh for the first time since 2013, before decreasing again under 9 TWh in the year of 2022 and is comparable to the consumption in 2015. A drop in consumption in 2022 is a consequence of the war in Ukraine, which caused an increase in gas prices, reduction of Russian gas supply and implementation of the measure of voluntary consumption reduction from August on.

Compared to 2021, the gas consumption in industry in 2022 dropped by approximately 9%, which is attributed to high gas prices and lower consumption due to rationalisation in light of economic situation. The gas consumption in the industry sectors records several fluctuations according to the economic activity and the implementation of measures for efficient use of energy and optimisation of work-flow.

The segment of other consumption, including hospitals, utility services, distribution networks and CNG filling stations, recorded a somewhat higher drop in consumption in 2022, i.e. almost 18% compared to 2021 when the consumption in the respective segment was the highest in recent years. The TSO attributes the decrease mainly to high gas price and uncertainty in the supply of Russian gas. In the past, the gas consumption in the other consumptions segment usually recorded annual increase compared to the year before.

In the field of electricity production, both electric power facilities are quite unpredictable since they mainly operated according to the tertiary needs or reserve, while in recent years also for commercial needs. In 2022, the consumption was the highest in the last 9 years.

Since 2014, with the exception of 2018, the increase or growth in gas consumption has been recorded at the level of the entire transmission system. In 2021, the consumption in the industry sector and other consumption segment was the highest in the last 9 years, exceeding 10TWh for the first time, while it was somewhat lower in the electricity segment. Due to the consequences of the war in Ukraine, the gas consumption decreased in 2022 (by 11.3% compared to 2021). Regardless of the annual volume of gas consumed, from the TSO's perspective, the key is the capacity booked on the level of daily consumption, required for the transmission of gas to supply the network users, which remains at about the same level during peak loads.

Table 6. Gas consumption in Slovenia in the 2014 - 2022 period (GWh/year)

Sector	2014	2015	2016	2017	2018	2019	2020	2021	2022
Industry	4,774	5,064	5,187	5,209	5,050	5,004	4,880	5,274	4,793
Other consumption	3,311	3,767	4,058	4,291	4,335	4,470	4,466	4,760	3,909
Electricity	43	38	30	145	62	153	249	93	278
Total	8,128	8,869	9,275	9,645	9,447	9,627	9,595	10,127	8,980

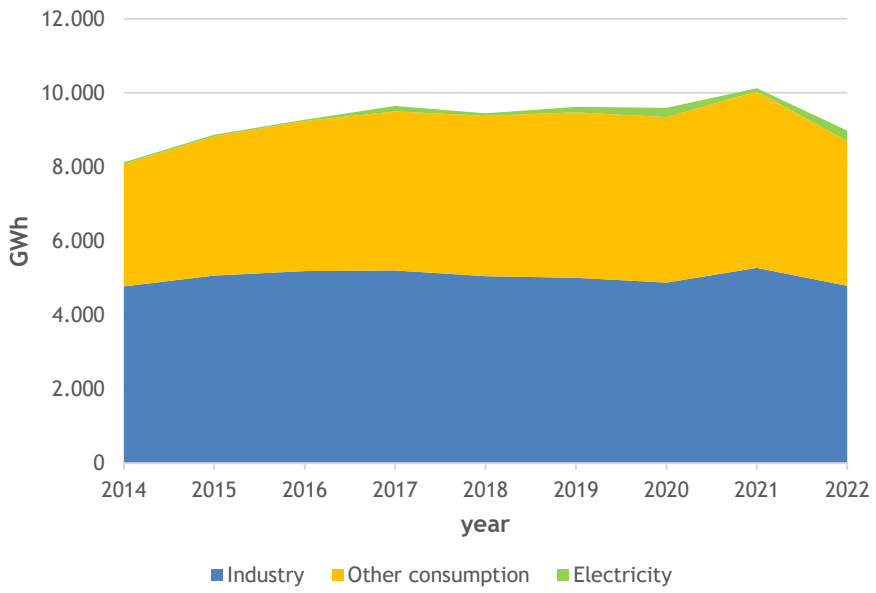


Figure 16. Gas consumption in Slovenia in the 2014 - 2022 period (million kWh/year)

3.2.7 Demand and anticipated supply of transmission capacity

The interest for being connected to the transmission system and demand for transmission capacities was somewhat lower in 2022 compared to 2021. In 2022, there were 45 queries, 9 decisions on the issuance of consents in connection procedures were issued and 6 connection contracts were concluded. The interest can also be seen in the graph below, which shows the persistent high level of interest on the basis of numerous queries, approvals/decisions issued, and connection contracts concluded in the last 10 years.

Connection projects are presented in detail *in Chapter 5.2 – Connection projects*.

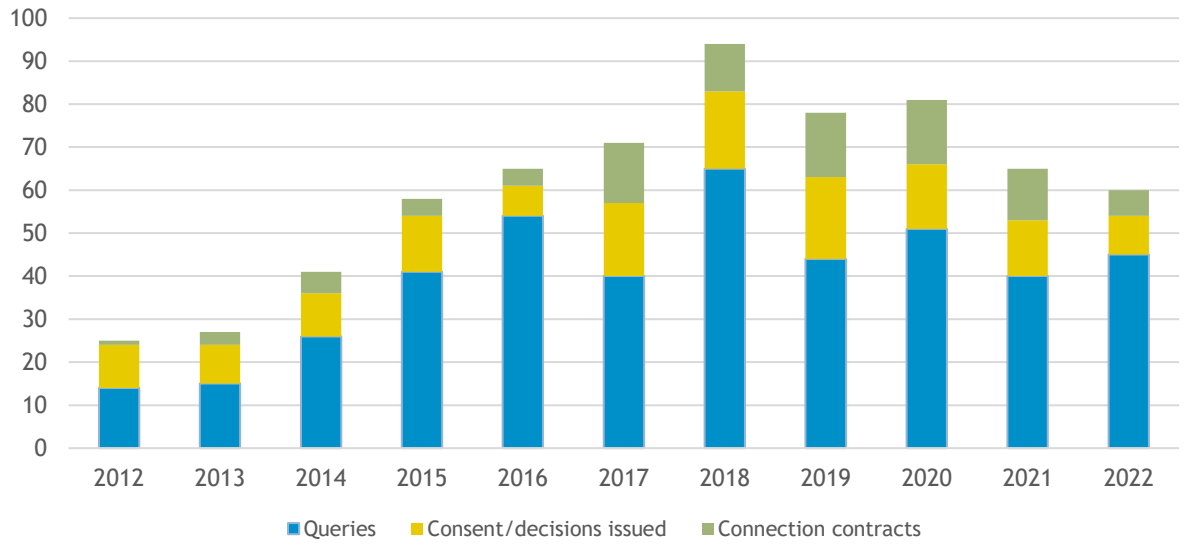


Figure 17. Number of queries, approvals/decisions issued and connection contracts concluded in the 2012-2022 period

3.2.8 Deployment of alternative fuels infrastructure for transport

The purposes of the Directive 2014/94/EU[12] on the deployment of alternative fuels infrastructure are minimising the dependence on petroleum products and mitigating the environmental impact of transport, and promoting the use of gas in road and maritime transport.

The gas transmission system with the requisite development is an important support infrastructure for transport. The national framework has been prepared where gas in transport is attributed adequate relevance due to its positive role that is already proving in many cases of good practice to reduce emissions of particulate matter and to a lesser extent CO_2, from transport. The framework allows for gas to become interesting for users, while suitable financial incentives can help advance the use of gas in transport. The importance of the filling station infrastructure is also recognised in the NEPN, where the introduction of renewable gases into motor traffic through filling stations for compressed and liquefied natural gas is planned, as well as a sustainable orientation to hydrogen.

There are currently six public compressed natural gas filling stations (CNG) operating in the Republic of Slovenia; namely, three in Ljubljana (Cesta Ljubljanske brigade, P + R Dolgi most, and Letališka cesta) and one in Celje (Bežigrajska cesta), in Maribor (Zagrebška cesta) and in Jesenice (Cesta železarjev). Compared to the previous year, the filling station in Letališka cesta, Ljubljana, progressed from the planning phase to the phase of use.

The quantity of compressed natural gas used for transport in the year 2022 for the first time exceeded 5 million Nm^3. The majority, i.e. approximately 82% of compressed natural gas, was used in Ljubljana, 13% in Maribor, and the rest in Celje and Jesenice. The gas consumption increased by approximately 5% or 0.25 million Nm^3 in 2022 compared to the year before. The main reason for this is the purchase of public transport CNG vehicles in Ljubljana. Taking into account the strategy in the field of alternative fuels in transport, which also includes gas, the number of public filling stations is expected to increase in the coming years to more than 10. Additional filling stations are estimated to be available first in Ljubljana (P + R Stanežiče), and later in Ptuj, Kranj, Novo Mesto, Nova Gorica, Koper, Murska Sobota, Slovenj Gradec, Velenje and in three Zasavje municipalities - Hrastnik, Zagorje and Trbovlje.

The gas consumption in transport has been increasing in recent years, with the exception of 2020 which was marked by the epidemics, and one of measures to curb it was to limit the operation of public transport, which is a major consumer of compressed natural gas. The greatest impact on growth was the change in the fleet of public transport, especially in Ljubljana; thus, the growth was sporadic and rapid, which can be expected in the future, as well.

Projects within the framework of connecting alternative fuels infrastructure are discussed in Point “B10 Supply to users and other connection projects”.

3.2.9 Forecast of transmission capacity booking and gas consumption, 2024 – 2033

The forecast of the booking of transmission capacities at the exit points in the Republic of Slovenia of the transmission system operator is a key element for reviewing the future development of the gas market. Future booking depends on the type of elements that the transmission system operator seeks to include in the forecast, taking into account the following:

[12] DIRECTIVE 2014/94/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014 on the deployment of alternative fuels infrastructure

- Concluded connection contracts to the gas transmission system, transmission contracts for auction capacity or exit capacity in the Republic of Slovenia;
- Information received from the existing users and demand and queries from potential users of the transmission system;
- Communication and visits to network users;
- Past experiences with system users and implementation of TSO's activities in terms of new connections;
- Monitoring of the energy development of regions and local communities;
- Future use of hydrogen, biomethane and synthetic methane,
- Forecasts for the construction of power facilities; and
- Increasing capacity booking optimisation using short-term transmission capacity products.

When making an estimate of gas consumption and transmission capacity booking forecasts, the transmission system operator divides network users into individual segments, thus ensuring appropriate monitoring of the development of individual segments, while giving a clear picture of the size of each segment.

The forecast for the booking of transmission capacity at the exit points in Slovenia for electricity production is provided in Table 7 and is based on the following assumptions:

- The existing contractual booking of the Šoštanj TPP is taken into account until then end of 2031, with the booking also anticipated afterwards;
- The estimate of booking for Brestanica TPP according to the existing commitment to book capacities;
- The start of operation of the first phase of the TE-TOL gas thermal energy plant in accordance with the provisions of the transmission contract and the connection contract, i.e. in 2021.

Table 7. Forecast for the booking of transmission capacity at the exit points in Slovenia for electricity production (GWh/day)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Šoštanj TPP	6.301	6.301	6.301	6.301	6.301	6.301	6.301	6.301	6.301	6.301
Brestanica TPP	0.580	0.580	0.580	0.580	0.580	0.580	0.580	0.580	0.580	0.580
TE-TOL	6.408	6.408	6.408	6.408	6.408	6.408	6.408	6.408	6.408	6.408
Total	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289

Table 8 provides an overview of the total estimated forecast of the booking of transmission capacity until the year 2033. The "Other consumption" segment includes the bookings of hospitals and distribution system operators in the forecast, for which the transmission system operator does not have a distribution between household and business gas consumption. The forecast indicates low growth in the booking of transmission capacity, which is in line with the company's development plans and the construction of additional transmission capacities.

Table 8. Forecast for the booking of transmission capacity at the exit points in Slovenia – total (in GWh/day)

Sector	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Industry	19.565	19.734	19.734	19.734	19.734	19.776	19.776	19.776	19.776	19.776
Other consumption	17.798	17.798	17.796	17.793	17.781	17.506	17.427	17.427	17.427	17.427
CNG	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Energy conversion	3.120	3.120	3.120	3.120	3.120	3.120	3.120	3.120	3.120	3.120
Electricity	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289
Total	54.036	54.205	54.203	54.200	54.188	53.955	53.876	53.876	53.876	53.876

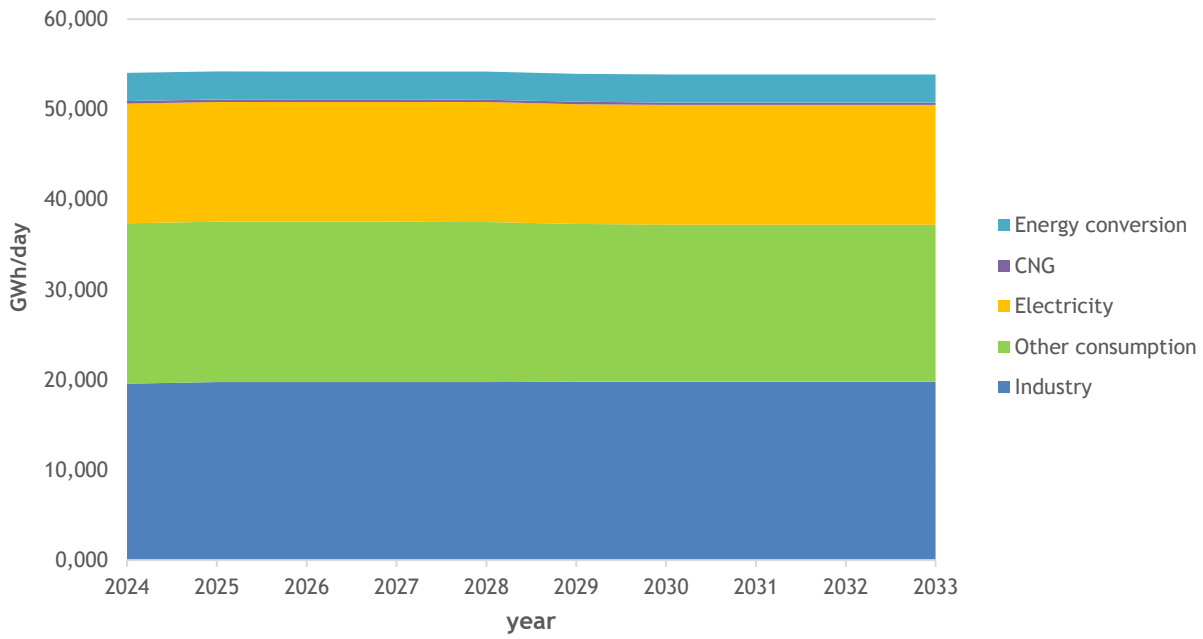


Figure 18. Estimate of the booking of transmission capacity at the exit points in Slovenia for the 2024 – 2033 period

The TSO, as in the preparation of the forecast of future gas consumption, takes into account a number of sources and factors when forecasting the booking of transmission capacities at exit points in the Republic of Slovenia. The gas market has become extremely dynamic in the recent years; therefore, the TSO underlines that long-term forecasts, i.e. forecasts exceeding 3 years, are in fact indicative forecasts that depend on various factors that cannot be directly influenced by the TSO. The most reliable source of forecasts used was the agreements and contracts that have already been signed. With this, the TSO observes an increasingly pronounced trend of additional booking of shorter-term transmission capacity, due to the fact that the network users were increasingly optimising seasonal surpluses using short-term services. In almost all cases, capacity booking was also oriented to a maximum of one year, with multi-year booking becoming the exception rather than the rule. The increasing liquidity and liberalisation of the gas market provides additional opportunities for system users, while increasing the flexibility of gas supplies and impacts the smaller reliability of the forecasts of transmission system operator bookings. Due to the epidemic of the Coronavirus Disease in the previous three years, less meetings were convened with the system users which are, in principle an important data source, and this also affects the forecast of future bookings of domestic system users. When preparing forecasts, the TSO also monitors the development of the domestic and foreign markets, especially regional energy markets and the construction of power facilities. The TSO continuously monitors the competitiveness of transmission routes in the region in order to ensure the proper competitiveness of the transmission route through Slovenia. The gas price in the recent period and serious economic situation due to war in Ukraine significantly affect the forecast of gas consumption in the coming period. In the gas consumption forecast, the TSO also took into account the future use of hydrogen, biomethane and synthetic methane from 2030 on.

Table 9 shows a forecast of gas consumption on the domestic gas market in the next ten years.

Table 9. Forecast of gas consumption on the domestic gas market (GWh/year)

Sector	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Industry	4,483	4,487	4,492	4,496	4,501	4,505	4,510	4,514	4,519	4,523
Other consumption	3,311	3,314	3,317	3,321	3,324	3,327	3,331	3,334	3,337	3,341
CNG	42	42	42	42	42	42	42	42	42	42
Energy	693	694	695	695	696	697	698	698	699	700
Electricity	1,593	1,593	1,593	1,593	1,593	1,593	1,593	1,593	1,593	1,593
Total	10,122	10,130	10,139	10,148	10,156	10,165	10,173	10,182	10,190	10,199

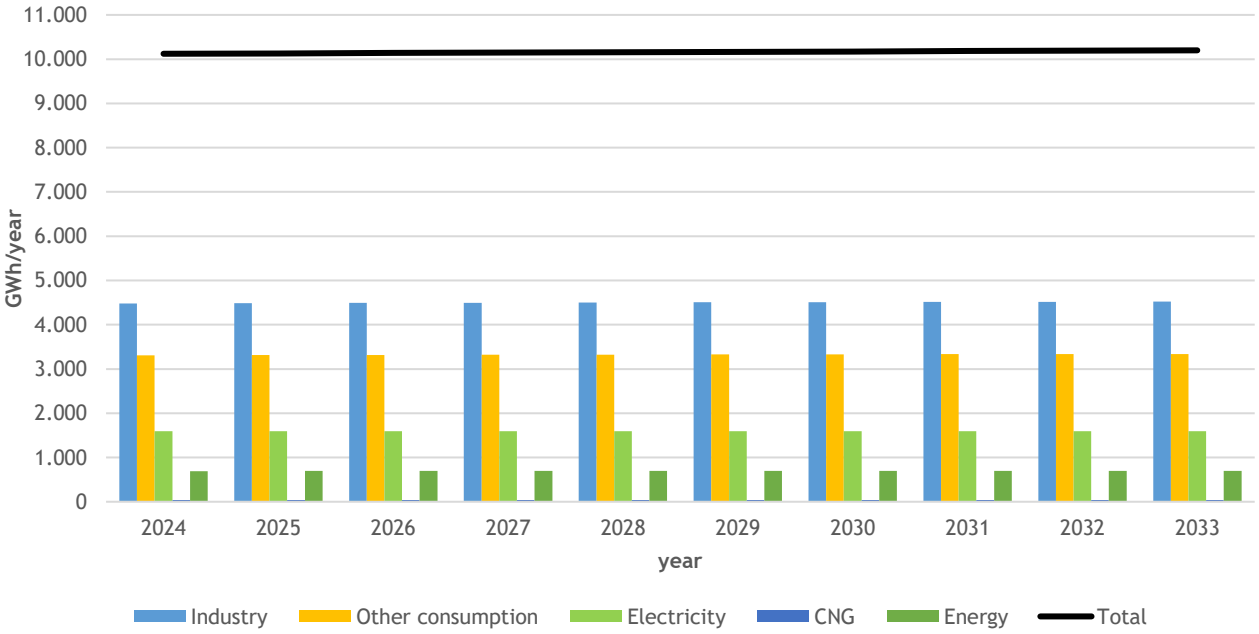


Figure 19. Forecast of gas consumption on the domestic gas market for the 2024 - 2033 period

In preparing forecasts for future consumption of gas, in addition to other elements, the TSO takes into account the individual forecasts of stakeholders on the gas market and the general forecasts of gas market development and economic growth. The forecasts have taken into account the energy efficiency measures, but the TSO estimates that their impact will be superseded by the increased use of the energy product and new connections. The forecast also takes into account the future use of hydrogen, biomethane and synthetic methane in the transmission system.

In line with the objectives of the REPowerEU plan and the package of legislative proposals Fit for 55, the TSO plans a gradual reduction and replacement of natural gas with renewable gases, such as hydrogen, biomethane and synthetic methane. In its forecast of gas source structure, the TSO took into account the indicative target in gas supply, as stated in the National Energy and Climate Plan. The indicative target is a 10% share of methane or hydrogen from renewable origin in the transmission and distribution network by 2030.

Figure 20 shows a forecast of gas source structure on the domestic gas market in the next ten years.

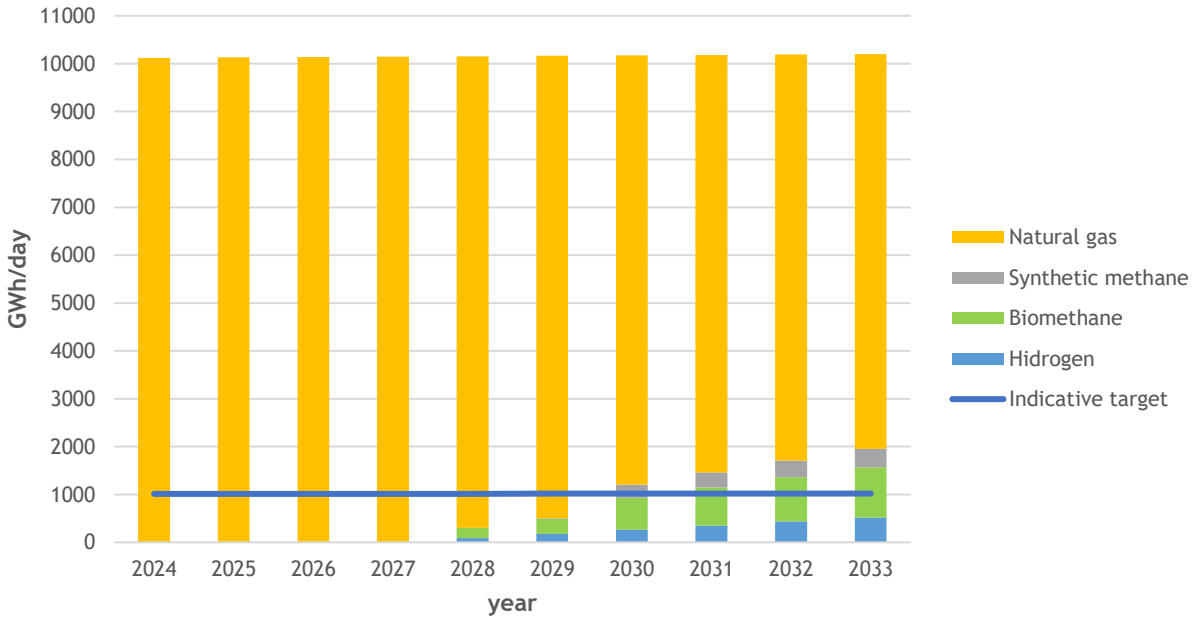


Figure 20. Forecast of gas source structure on the domestic gas market for the 2024 - 2033 period

Advanced booking forecast scenario and estimate of gas consumption in Slovenia

The transmission system operator also regularly cooperates and monitors the preparation of the European Ten-year Development Plan ENTSOG TYNDP. Currently, the pan-European Ten-year ENTSOG TYNDP 2022 plan is in the preparation phase, and will also include various scenarios for the long-term use of natural and renewable gases, sectoral integration and integration, as well as the use of new technologies.

On the basis of guidelines of the European Commission within the "Green Package" and national guidelines, the transmission system operator has drawn up and assessed the additional advanced scenario of booking and consumption of gas in Slovenia.

Table 10.1. Advanced forecast scenario for the booking of transmission capacity at the exit points in Slovenia – total (GWh/day)

Sector	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Industry	19.565	19.734	19.734	19.734	19.734	19.776	19.776	19.776	19.776	19.776
Other consumption	17.798	17.798	17.796	17.793	17.781	17.506	17.427	17.427	17.427	17.427
CNG	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264	0.264
Energy conversion	3.120	3.214	3.310	3.409	3.512	3.617	3.726	3.837	3.952	4.071
Electricity	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289	13.289
Total	54.036	54.299	54.393	54.489	54.580	54.452	54.482	54.593	54.708	54.827

Table 10.2. Advanced gas consumption forecast scenario on the domestic gas market (GWh/year)

Sector	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Industry	4,483	4,487	4,492	4,496	4,501	4,505	4,510	4,514	4,519	4,523
Other consumption	3,311	3,314	3,317	3,321	3,324	3,327	3,331	3,334	3,337	3,341
CNG	42	42	42	42	42	42	42	42	42	42

Energy	693	694	695	695	696	697	698	698	699	700
Electricity	1,593	1,593	1,593	3,593	3,593	3,593	3,593	3,593	3,593	3,593
Total	10,122	10,130	10,139	12,148	12,156	12,165	12,173	12,182	12,190	12,199

3.3 Cross-border transmission capacity and booking

The Slovenian gas transmission system is embedded in the European and global international environments and offers network users a choice. The system is connected with the gas transmission systems of the neighbouring countries via cross-border interconnection points that are managed by various TSOs. The cross-border interconnection points of the Slovenian TSO with the neighbouring transmission systems are made with:

- The connection with the Austrian TSO, Gas Connect Austria, at the Ceršak cross-border interconnection point,
- The connection with the Italian TSO SNAM at the Šempeter cross-border interconnection point, and
- The connection with the Croatian TSO, Plinacro, at the Rogatec cross-border interconnection point.

The infrastructure of the transmission system and the technical characteristics of the border metering and control station at the interconnection point determine the amount of cross-border (technical) transmission capacity at the individual cross-border interconnection point. On a daily basis, the TSO calculates the available transmission capacity at all cross-border interconnection points and regularly publishes them (website of the Plinovodi company, auction platform, ENTSOG Transparency Platform[13]). In accordance with the current model of entry-exit points, the network users have been provided with a separate and independent booking of transmission capacity at each cross-border interconnection point. In this way, the system user may carry out the cross-border gas transmission from the area of other country through the territory of Slovenia into a third country, which provides for and accelerates the establishment and operation of the internal market of the European Community. The booking of transmission capacity at cross-border interconnection points is carried out in accordance with the Commission Regulation, No. 2017/459[14] via the joint on-line PRISMA booking platform by the principle of auctioning.

Table 11. Existing and potential cross-border trading and transmission

	Direction	Existing supply		Planned supply
	Austria > Croatia	Yes		Yes
	Austria > Italy	Yes		Yes + increase
	Austria > Hungary		No	Yes(2)
	Italy > Austria	Yes(1)		Yes(1)
	Italy > Croatia	Yes		Yes
	Italy > Hungary		No	Yes(2)
	Croatia > Austria	Yes(1)		Yes + increase (1 + 3)
	Croatia > Italy	Yes		Yes + increase (3)
	Croatia > Hungary		No	Yes(2)
	Hungary > Italy		No	Yes(2)
	Hungary > Austria		No	Yes (1 + 2)
	Hungary >Croatia		No	Yes(2)

[13] https://transparency.entsog.eu/

[14] The Commission Regulation (EU) 2017/459 of 16 March 2017 establishing a Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems and repealing Regulation (EU) No 984/2013

> Direction of gas flow
(1) Interruptible upstream transmission capacity (not physical transmission)
(2) Conditional transmission – if the interconnector between Slovenia and Hungary is realised
(3) Conditional transmission – if pipeline interconnections with projects in Croatia are realised

3.3.1 Demand for booking at cross-border interconnection points

The requirement for carrying out cross-border transmission of gas is to book a suitable combination of transmission capacity at cross-border interconnection points. The TSO keeps the interested public informed of the available transmission capacity of the transmission system via its website, the PRISMA trading platform, and the ENTSOG transparency platform.

In 2022, the war in Ukraine had very strong impact on the execution of cross-border transmission and booking of transmission capacities. Very active filling of underground gas storages before the start of the winter season undoubtedly had a profound impact on the level of booked capacities and transferred quantities.

In 2022, the booking of exit capacities and gas transmission in the direction to Croatia increased, and at the same time the booking of capacities at the Rogatec entry point for the direction from Croatia to Slovenia also somewhat strengthened compared to 2021. The TSO finds that the number of bookings of transmission capacity depends primarily on changing conditions on the neighbouring has markets, increasing price fluctuations on neighbouring hubs and increased supply of LNG at the LNG terminal on the island of Krk.

Bookings of transmission capacity in the direction of Italy are mainly associated with extremely cold periods and periods of high electricity prices on the Italian and French market. The demand for transmission capacity in the exit direction at the Šempeter cross-border point was lower in 2022 than a year before. In particular in the last quarter of 2022, the booking of transmission capacity and transmitted volumes significantly increased in the direction of entry at the Šempeter cross-border point as a result of the adjustment of gas flow via European transmission networks due to a changed situation of gas supply from eastern gas sources.

In 2022, the booking and upstream transmission at the Ceršak exit point towards Austria increased by almost a factor of nine. The increased demand in the direction of Austria is also one of the adjustments of traditional gas transmission routes in Europe due to a limited supply of Russian gas. In addition to the situation on neighbouring gas markets, the implementation of the virtual point and trading platform in Slovenia is also affecting short-term bookings of transmission capacity. Members of the PRISMA trading platform are performing daily and intra-day transmission capacity bookings for transmission of purchased gas to neighbouring gas markets and for the purposes of ensuring the balance of the transmission system.

The model of entry-exit points and the possibility of transmission capacity booking via auctions on all gas markets in the region enables the network users a standardised and simplified procedure of transmission capacity booking that allows users of the transmission system greater flexibility and responsiveness to dynamic price changes on individual gas markets. The key role in the provision of transmission capacity booking at the cross-border points as seen by the stakeholders on the gas market is the situation on the gas market because users optimise their supply portfolios. By implementing short-term products, users were provided with additional possibilities of optimisation, while at the same time, the TSO notes the continuation of the transition trend from long-term bookings to short-term bookings of transmission capacities. All this suggests that the implementation of long-term forecasts for the booking of transmission capacity is unpredictable.

3.3.2 Booking of transmission capacity at cross-border interconnection points in the year 2022

Under the same and non-discriminatory conditions, network users can book capacity at cross-border interconnection points via the on-line PRISMA booking platform in accordance with the published auction calendar, the Commission Regulation (EU) 2017/459 and more detailed instructions of the PRISMA booking platform. The network users had the following capacities of various maturity at their disposal: intra-day, daily, monthly, quarterly, and annual transmission capacity. In the year 2022, the DSO calculated daily the available firm and interruptible capacities at the cross-border interconnection points and regularly published them on the on-line PRISMA booking platform in accordance with the ENTSOG auction calendar.

Similarly as in the previous years, the maximum occupancy for the cross-border transmission via Slovenia in the year 2022 was in the eastern transmission direction Austria – Slovenia – Croatia via the cross-border interconnection entry point Ceršak and cross-border interconnection exit point Rogatec. It was noticeable that in the recent years, the utilisation of booked capacity was high, and the network users thus reduced the costs associated with the capacity booking.

Figures 21, 22 and 23 show the dynamics of the transmission capacity bookings at cross-border interconnection points in the year 2022. The graphs show a more pronounced daily dynamics of bookings throughout the year. For the cross-border interconnection exit point Šempeter, the graphs show that the network users have been booking only short-term products (daily or intra-day capacity product) at this interconnection point. From the above, we can conclude that the trend of booking short-term products (especially daily and intra-day) transmission capacities continues.

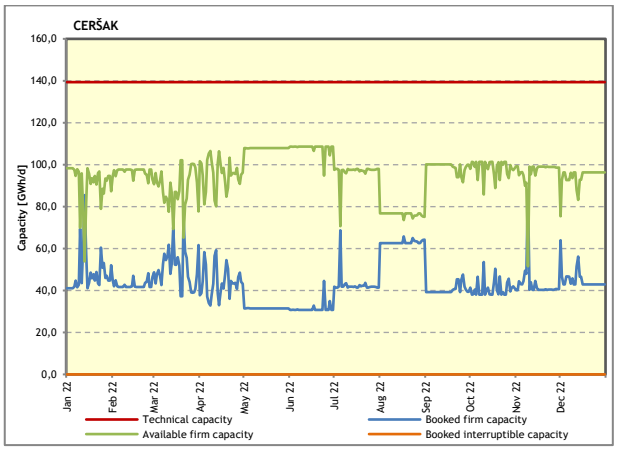


Figure 21. Transmission capacity and state at cross-border interconnection point Ceršak in the year 2022

Since the beginning of 2019, the Rogatec cross-border interconnection point additionally enabled the physical transfer of gas from Croatia to Slovenia, thus giving network users the opportunity to book guaranteed entry capacities for gas supply to Slovenia at three cross-border interconnection points. In 2022, the flow via the Rogatec cross-border interconnection entry point was at the same level as a year before, while the flow via the Rogatec cross-border interconnection exit point is somewhat reduced. At the start of the year, the technical capacity at the Rogatec cross-border interconnection exit point was reduced due to maintenance work on the Kidričevo compressor station.

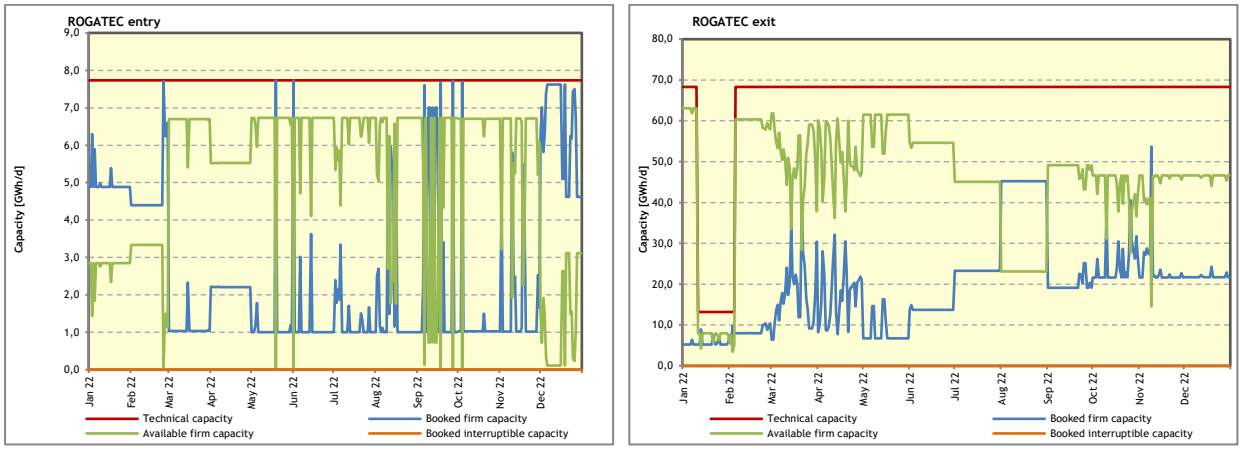


Figure 22. Transmission capacity and state at cross-border interconnection point Rogatec in the 2022

At the cross-border interconnection point Šempeter in the direction from Italy to Slovenia, long-term bookings were at the level of previous years. In 2022, an increased booking of capacities was detected in the respective direction, and upon the upgrade of the Šempeter cross-border station, the increase of technical capacity was executed in the transmission direction from Italy to Slovenia. In the opposite direction, there were less short-term bookings, while daily bookings mainly did not reach full technical capacity of the Šempeter cross-border interconnection exit point. At the start of the year, the technical capacity at the Šempeter cross-border exit point was reduced due to the necessary maintenance work on the Ajdovščina compressor station, where its operation is required for the transmission of gas from Slovenia to Italy. A similar situation was also from the end of August to the end of September, where the system operator provided interrupted capacity at the Šempeter interconnection exit point.

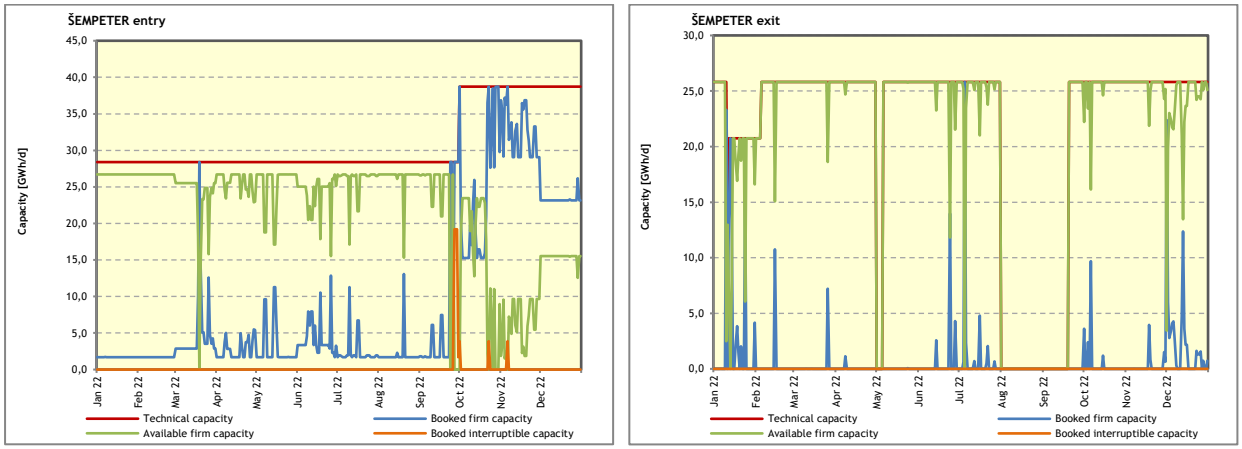


Figure 23. Transmission capacity and state at cross-border interconnection point Šempeter in the year 2022

In 2022, the physical transfer of gas was performed through all cross-border interconnection points in the direction of entry to or exits from Slovenia. In 2022, the highest transmitted volumes at the Ceršak cross-border point were somewhat higher than in 2021, and the same applies to the monthly transmitted volumes. At the Rogatec interconnection exit point, the transmitted volumes were significantly higher than a year before, while the dynamics of transmission capacity booking and gas volume from the direction of Croatia to Slovenia stayed at the similar level as the year before. In 2022, the gas transmission via the Šempeter interconnection point increased and amounted to approximately one quarter of the gas supplied. The respective interconnection point provides a selection of an alternative

supply route of gas for Slovenian consumers and is one of the entry points for executing the reliability of supply in the event of crisis and enables the cross-border transmission in the direction of Italy.

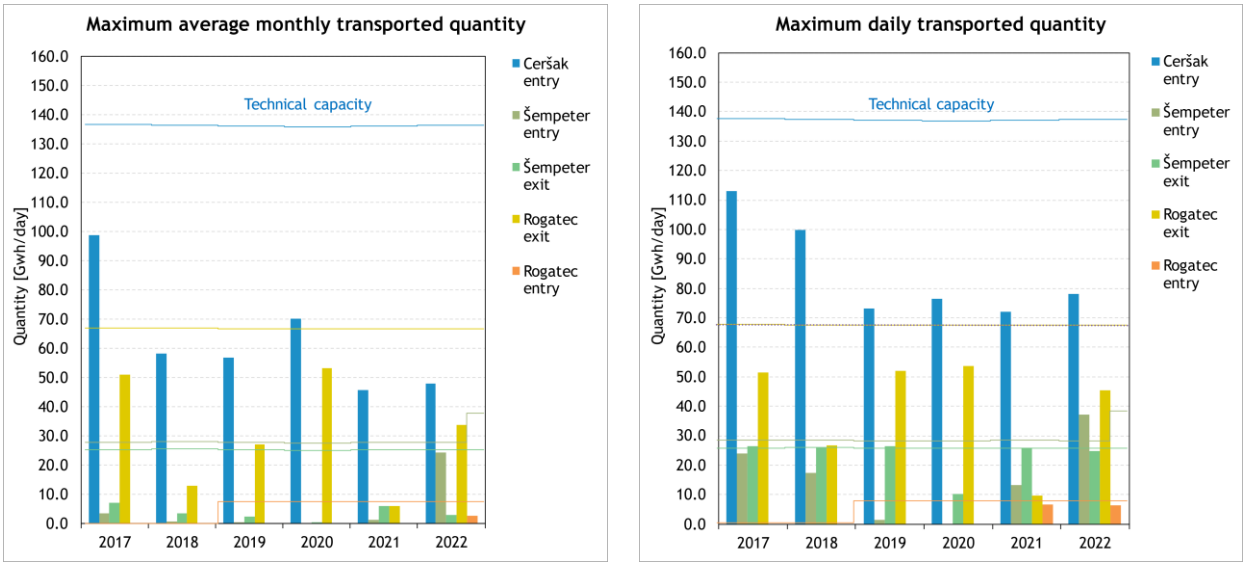


Figure 24. Maximum daily and monthly occupancy at cross-border interconnection points

3.3.3 Booking forecast and estimates

Forecasts and estimates of transmission capacity booking are based on the available past and current data, and the estimates of the planned upgrades of the transmission system in Slovenia and in the region, as well as on other estimates performed by the transmission system operator.

The development of the Slovenian transmission system has been intense in the past period and we have achieved the adequate transmission capacity at all interconnection points. With the implementation of the European legislation, the transmission system users have gained more possibilities of implementing short-term bookings of transmission capacity, which the transmission system operator has detected in the total amount of bookings as well. Namely, the transmission system users increasingly utilise short-term booking of the transmission capacity.

Table 12 presents the realisation and an estimate of transmission capacity booking for the needs of cross-border natural gas transmission in the 2020 – 2027 period. When preparing forecasts for the booking of transmission capacity for the needs of cross-border transmission, the TSO takes into account the realisation of previous years and the estimate for booking at cross-border exit points. Due to the diversification of supply sources and changed liquidity of the neighbouring gas markets, the TSO finds that the conditions on the natural gas markets in the region have changed significantly and are still changing, which further complicates the performance of the estimate of the forecast of transmission capacity booking over a longer period of time. Uniform and simplified implementation of transmission capacity bookings with the EU rules has led to additional competition between transmission routes. The network users in Slovenia have optimised the booking of transmission capacity and adjusted it with the actual needs. The TSO notes that also a new terminal of liquefied natural gas LNG Krk has a notable impact on the booking of transmission capacities at the Rogatec cross-border interconnection point, as the booking of exit capacity in the direction of Croatia is lower, while the entry at the Rogatec cross-border interconnection point to Slovenia is higher. In 2021, the booking of exit capacity at the Ceršak cross-border interconnection point was first executed, and has additionally strengthened in 2022 in the direction from Slovenia to Austria.

With the implementation of provisions of the European Commission Regulation (EU) No. 2017/459 and the introduction of additional short-term transmission capacity products, including intra-day, the users have the option of booking transmission capacity for shorter periods, which is being increasingly utilised

by the users. The bookings presented in Table 12 for the 2024 - 2027 period are therefore only estimates due to the fact that the quantity of transmission capacity booked at an individual relevant point varies on a daily basis. The presented estimates are prepared for the annual daily average.

The TSO subsequently prepared two scenarios for forecasting and estimating the booking of transmission capacity at the relevant points of the transmission system. In the first scenario, the transmission system operator used the following for the forecasting and estimation:

- The concluded transfer contracts at relevant points;
- The received information from existing and the queries from potential network users;
- The prepared analysis of the competitiveness of transmission routes in the region (Austria, Hungary, Croatia, Italy);
- Increasing capacity booking optimisation using short-term transmission capacity products,
- Diversification of supply sources to replace the supply of Russian gas with other sources: Algeria, Norway, Qatar, the USA, etc.
- The estimate of the influence of the gas source in Croatia – liquefied natural gas terminal LNG Krk.

Table 12. Forecast and estimate of transmission capacity booking for domestic network users and cross-border transmission - baseline scenario (GWh/day)

Entry-exit points	2020	2021	2022	2023	2024	2025	2026	2027
Ceršak entry	51.892	38.516	43.705	39.903	28.161	28.248	28.248	28.246
Šempeter pri Novi Gorici entry	1.707	1.819	9.391	23.216	25.000	25.000	25.000	25.000
Rogatec entry	1.005	1.768	2.597	2.749	2.003	2.003	2.003	2.003
Total entry	**54.604**	**42.104**	**55.694**	**65.868**	**55.164**	**55.251**	**55.251**	**55.249**
Ceršak exit	0.000	0.158	2.485	6.482	0.500	0.500	0.500	0.500
Šempeter pri Novi Gorici exit	0.080	1.249	0.763	0.172	0.500	0.500	0.500	0.500
Rogatec exit	20.241	5.403	19.244	18.859	5.000	5.000	5.000	5.000
Slovenia exit	52.033	50.902	54.474	53.690	54.036	54.205	54.203	54.200
Total exit	**72.353**	**57.712**	**76.966**	**79.202**	**60.036**	**60.205**	**60.203**	**60.200**

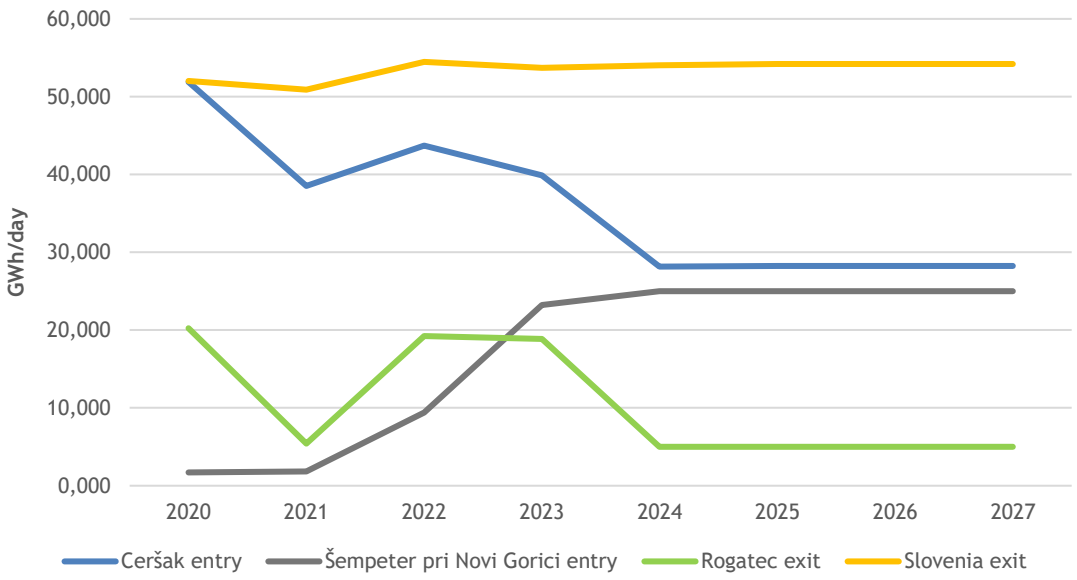


Figure 25. Booking of transmission capacity at the cross-border entry and exit points in Slovenia

In the second development scenario, in addition to the elements from the first scenario, the transmission system operator additionally took into account the following:

- The procedures for non-binding surveys on the booking of incremental capacity at the transmission system cross-border points (MDAR);
- The data from the process of preparing the European Ten-Year Development Plan ENTSOG TYNDP 2022.
- Capacity required for the provision of reliable supply.

The transmission system operator has complied with the provisions of the Commission Regulation (EU) No. 2017/459 and in the year 2022, and conducted a non-binding survey on the booking of incremental capacity at the cross-border points of the transmission system. As part of the survey, it received one non-binding query from an interested user in 2022. Given the result on the demand assessment, analysis of the past booking of interconnection points and results of the auctions in recent years, the TSO establishes that it will also consider the projects as hydrogen projects.

Table 13. Forecast and estimate of transmission capacity booking for domestic network users and cross-border transmission – development scenario (GWh/day)

Entry-exit points	2020	2021	2022	2023	2024	2025	2026	2027
Ceršak entry	51.892	38.516	43.705	39.903	28.161	28.248	28.248	28.246
Šempeter pri Novi Gorici entry	1.707	1.819	9.391	23.216	25.000	25.000	25.000	25.000
Rogatec entry	1.005	1.768	2.597	2.749	2.003	2.003	2.003	2.003
Pince entry	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.290
Total entry	**54.604**	**42.104**	**55.694**	**65.868**	**55.164**	**55.251**	**55.251**	**56.539**
Ceršak exit	0.000	0.158	2.485	6.482	0.500	0.500	0.500	0.500
Šempeter pri Novi Gorici exit	0.080	1.249	0.763	0.172	0.500	0.500	0.500	1.790
Rogatec exit	20.241	5.403	19.244	18.859	5.000	5.000	5.000	5.000
Pince exit	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.290
Slovenia exit	52.033	50.902	54.474	53.690	54.036	54.205	54.203	54.200
Total exit	**72.353**	**57.712**	**76.966**	**79.202**	**60.036**	**60.205**	**60.203**	**62.780**

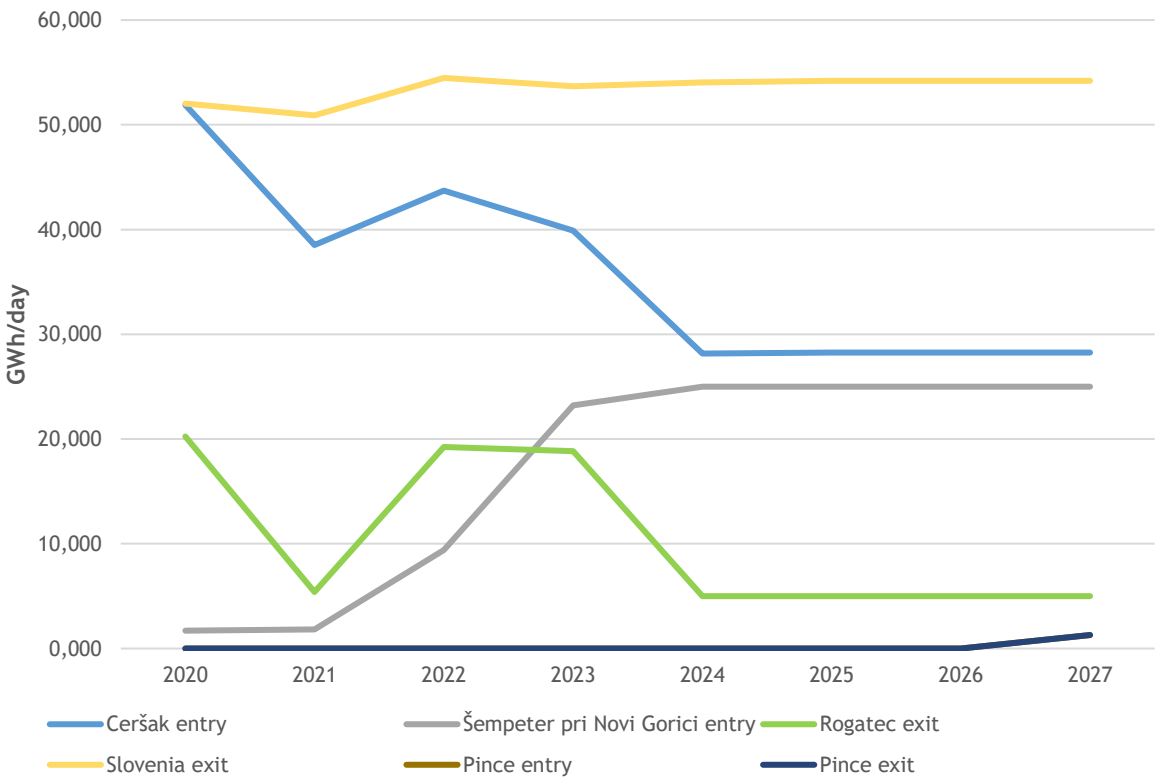


Figure 26. Booking of transmission capacity at the cross-border entry and exit points in Slovenia - development scenario

Table 14 shows a potential development of technical capacity in the next five-year period. Due to the possible new major gas pipeline projects in the region, the capacity and timing of which are not yet known but at the same time could affect the development of the capacity of the Slovenian transmission system at the cross-border interconnection points, a longer period has not been considered.

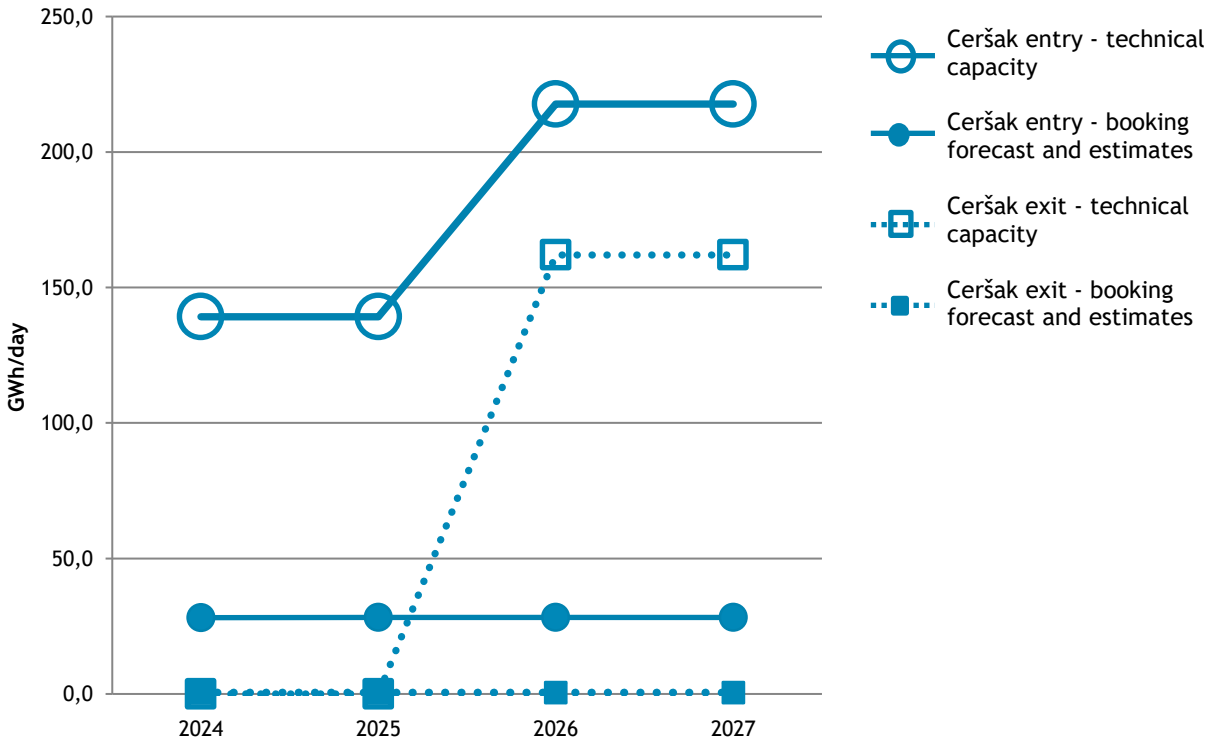
Table 14. Potential development of technical capacities of the gas transmission system (GWh/day)

Transmission system operator	Interconnection points		2024	2025	2026	2027	2028	2029
Pipelines	Ceršak	entry	139.2	139.2	217.7*	217.7*	217.7*	217.7*
		exit	0.0	0.0	162.0*	162.0*	162.0*	162.0*
GCA[(i)]	Murfeld	entry	0.0	0.0	0.0	0.0	0.0	169.5
		exit	112.5	112.5	112.5	112.5	112.5	221.6
Pipelines	Rogatec	entry	7.7	7.7	169.7**	169.7**	169.7**	169.7**
		exit	68.9	68.9	230.3**	230.3**	230.3**	230.3**
Plinacro[(ii)]	Rogatec	entry	53.9	53.9	171.9	171.9	171.9	171.9
		exit	32.5	32.5	70.2	70.2	70.2	70.2
Pipelines	Šempeter pri Gorici	entry	39.0	49.0****	49.0****	49.0****	49.0****	49.0****
		exit	26.0	49.0****	49.0****	49.0****	49.0****	49.0****
Snam Rete Gas[(iii)]	Gorizia	entry	43.0	43.0	43.0	43.0	43.0	43.0
		exit	43.0	43.0	43.0	43.0	43.0	43.0
Pipelines	Pince	entry	0.0	0.0	0.0	6.4***	49.0***	49.0***
		exit	0.0	0.0	0.0	6.4***	49.0***	49.0***
FGSZ[(iv)]		entry	5.2	12.9	12.9	12.9	12.9	12.9

	Tornyiszent miklós	exit	5.2	49.0	49.0	49.0	49.0	49.0
Note *	Upon realisation of the upgrade of the interconnection Rogatec - C12 project (TRA-N-390) and stage 2 of the CS Kidričevo – C5 project (TRA-N-94).							
Note **	Upon realisation of the upgrade of interconnection Rogatec – C12 project (TRA-N-390).							
Note ***	Upon realisation of the interconnection with Hungary with stage 3 (or 2) of expanding KPK - C17 project (TRA-N-112) or C5 (TRA-N-94).							
Note ****	Upon the realisation of unit 3 of CS Ajdovščina and BMCS Vrtojba – project in progress.							
Source:	(i) 2021 Coordinated Network Development Plan for the Gas Transmission System Infrastructure in Austria for the period 2022 - 2031 (GCA, February 2022) (ii) DESETOGODIŠNJI PLAN RAZVOJA PLINSKOG TRANSPORTNOG SUSTAVA REPUBLIKE HRVATSKE 2021 - 2030 (Plinacro, May 2020) (iii) Piano decennale di sviluppo della rete di trasporto del gas naturale 2022 - 2031 (Snam Rete Gas) (iv) 10-year network development plan (FGSZ. October 2022)							

The TSO will approach the implementation of projects to increase the available technical capacity of the transmission gas pipeline system and the capacity at the cross-border interconnection points in case of appropriate requirements and needs for the capacity increase. The capacity increase will be coordinated and implemented by the TSO in agreement with the neighbouring transmission system operators at the cross-border interconnection points, thus ensuring the coordination of the construction of new transmission capacities on both sides of the cross-border interconnection points. Data in Table 14 reflect the latest information and agreements with neighbouring transmission system operators, and was included in the European Ten-Year Development Plan, which is in its final place with the ENTSOG.

The Figure 27 below gives a graphic presentation of a possible development of technical capacity for three existing cross-border interconnection points, and one planned for the following four-year period. During and after this period, the capacity development of the Slovenian transmission system at cross-border interconnection points may already be significantly affected by the route of some of the new major pipeline projects in the region. In Table 14, the increased capacities and deadlines after the year 2024 are recorded in accordance with the currently available information and data.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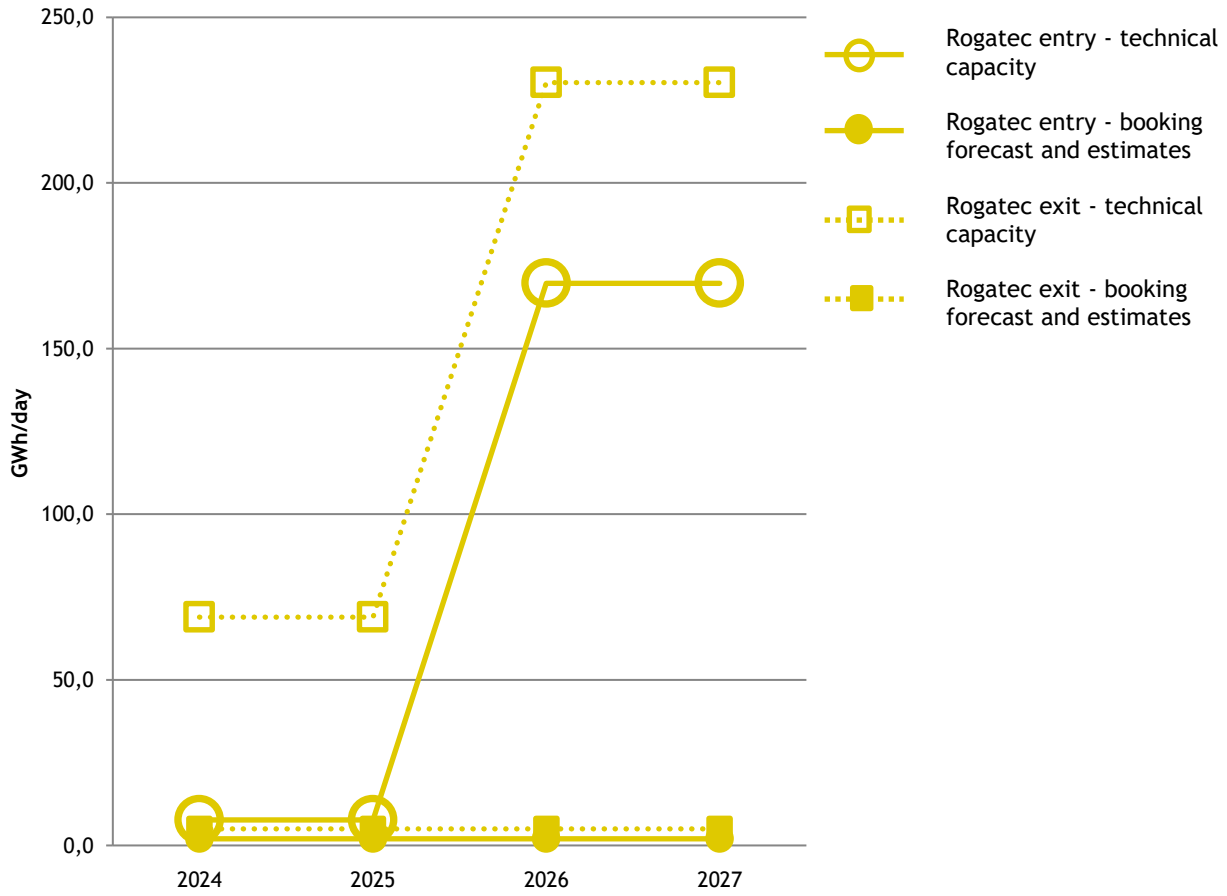
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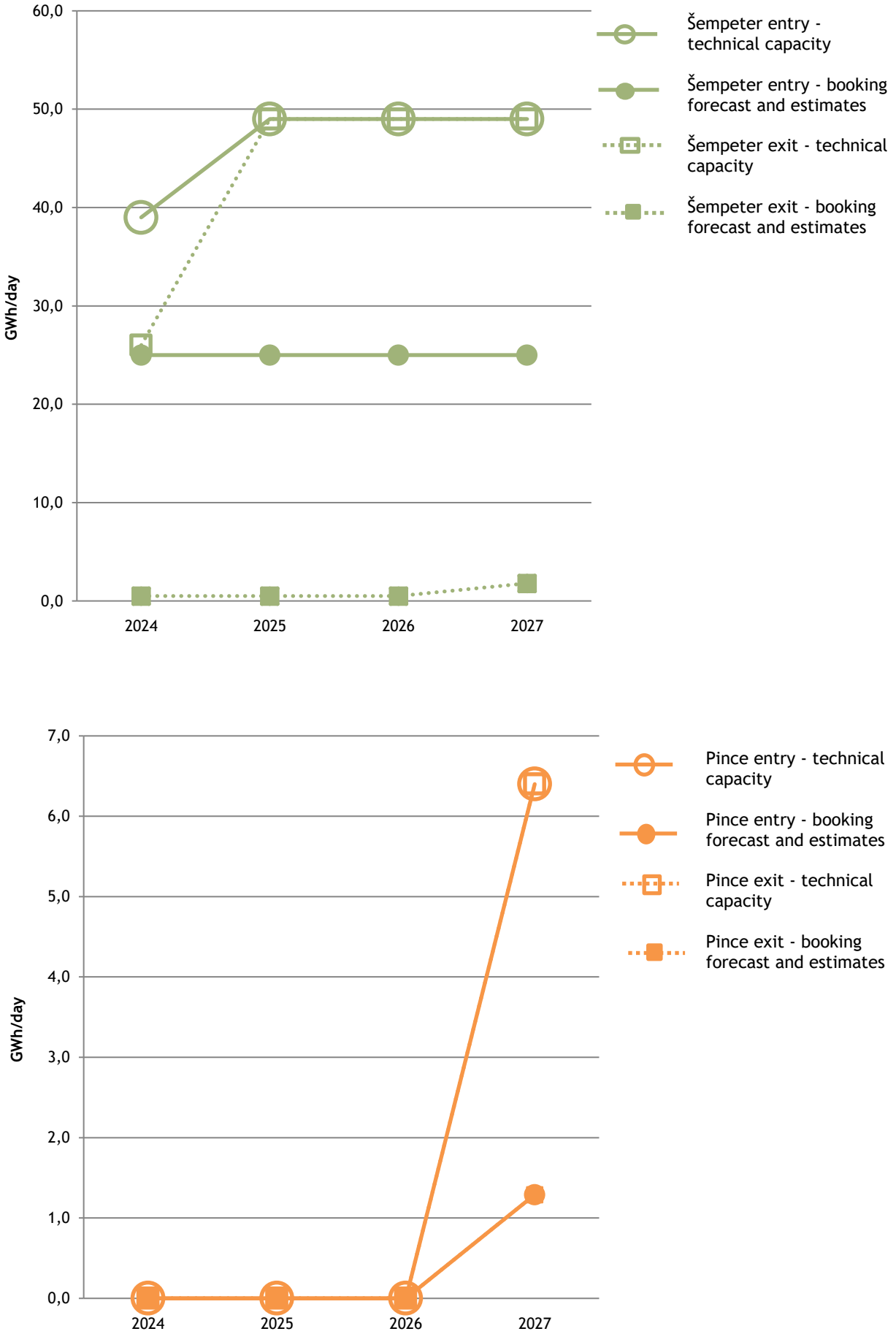

Figure 27. Possible scenarios of the development of technical capacity, booking forecast and estimate at interconnection points

3.4 Development needs of the transmission system

3.4.1 Remote control system and monitoring system

The TSO uses both business and process information systems in its operations. A key process information system, the SCADA (Supervisory Control And Data Acquisition) system is used centrally to control and directly manage the transmission system. At key locations of the transmission system, local DCS (Distributed Control System) systems are installed.

The SCADA system consists of several subsystems:

- The core part of the control system, which is installed in the server room and also includes workstations in the dispatch centre;
- The final data capture stations (RTU - Remote Terminal Unit) that are installed in the metering and regulation stations of the transmission system;
- The communication system that is designed for the connection between the metering and regulation stations and the central monitoring system;
- The on-line connection with other control systems (local control systems, telereading system, pipeline section valve control system, and other systems).

The existing SCADA system currently still complies with the technological standards of reliability and availability of operation, and TSO needs, as the core control system was updated a few years back. In the light of developments in information technology and standards in the field of control systems, increase in the volume of data and operations within the system, increasingly important provision of information security also relating to the existing and new TSO content, the investment into the SCADA is planned to be made in the following years with the view to overhauling system technology and substance.

Local DCS monitoring systems are installed at key stations. Local DCS control systems are connected to the SCADA system via RTU terminals and exchange data with each other from sensor equipment installed at each station. In addition to this type of data exchange, remote control of key metering and regulation stations and compressor stations is also carried out from the SCADA system via DCS control systems. Due to the fact that local control systems are installed at stations that are crucial for the operation of the transmission system, the reliable operation of these systems is very important. Therefore, we will continue to carry out regular technological updates of individual control systems (hardware and system software), and if necessary, also make functional additions.

The TSO has joined the project of implementing a Control Centre in a newly built facility, which will meet stricter requirements to ensure safe and reliable operation and enable long-term development of both remote control systems and business information systems. The facility will meet the latest requirements for reliability of electricity supply and requirements for electromagnetic, fire and flood protection of equipment. The spatial planning will also take into account the possibility of longer operation of the Management Centre in the conditions of full isolation of operating personnel in the event of emergency situation. In the future, the Management Centre will gain in importance also due to the introduction of new technologies and the functionality of the gas transmission system.

3.4.2 Intelligent network services

The field of services for transmission system users has been greatly enriched and supported by the introduction of EU codes for gas networks in the last decade. As a transmission system operator, the Plinovodi company defines its services in more detail in the System Operating Instructions (Network Codes), which it updates and supplements in accordance with its needs (legislative, technological, market). In the recent years, the TSO has established or supplemented several intelligent network services for transmission system users, which are based on strong information support and "real-time" information exchange. Such services are the following:

- The on-line booking of capacity at cross-border points via an on-line auction platform with different maturities (including hourly within the day);
- The increased scope of possible products, digitalisation of booking of capacity at exit points within the Republic of Slovenia via the TSO on-line solution (EPUS platform), and consequently the reduction of processing times from the request for access to the transfer contract with the implementation of the TSO information solution (digitally signed contract);
- The establishment of a virtual point that allows users to trade on the free and balancing market;
- The establishment of a system for the preparation of forecasts, based on the adopted methodology and information solution, both prepared at the Plinovodi company and coordinated with the TSO.

In 2022, the amendment to the Gas Supply Act (ZOP) stipulated that the TSO shall establish, manage and maintain the Uniform Information System (UIS) necessary for the gas market operation and the provision of reliable gas supply. In line with the respective Act, the TSO included all stakeholders of the Slovenian gas market to participate in the preparation of the UIS; they contributed to the design of the UIS content. Based on the Gas Supply Act and information received, the TSO developed and put into service the “UIS” information solutions by the end of the year; the solution, in addition to the applicative part of the system, establishes and also provides a uniform database of all consumption points, distributors and suppliers in the field of gas in Slovenia, as well as associated daily/monthly gas consumption volumes.

In the future, the TSO will further develop the mentioned information solutions and supplement them in terms of content. Information solutions will be even more conceptualised and adapted to the needs of the TSO service users than before. By further digitalisation of business processes within the TSO, which will be based on a renewed application information architecture, by planned implementation and control of the company's business continuity, by integrating modern information security systems and approaches, the TSO will be able to offer and enable its users further development and optimisation of their business using the intelligent TSO network services.

A key guideline in the provision of intelligent network services will be an even stronger information connection between the TSO and the existing and new gas market stakeholders (TSO - balancing group leader, TSO - final user, TSO - DSO, sectoral integration of electricity and gas stakeholders). An essential component of such services will be the "real-time" exchange of data and information, where these will be designed according to the needs of users. In this way, we plan to further develop the uniform EPUS platform introduced in 2022 and its UIS system for transmission system users, holders of balance groups, gas traders and distribution system operators, and provide solutions for gas sector in compliance with the legislation and as required or expected by users.

The TSO joined a multi-annual project of introducing a modern asset management system (EAM) which combines functionalities for managing and maintaining assets of the company throughout their useful life, and is used in planning, executing and optimising necessary maintenance activities for an individual asset at the company level.

3.4.3 Gas quality measurement and analysis systems

In the coming years, the TSO will analyse the possibility of measuring the transmitted quantities in a sequential manner at individual measuring points where larger quantities of gas are transmitted and take into account a detailed analysis of the measurement uncertainty. Based on the determination of the influence parameters and the analysis of measurements, the objective will be to set up an experimental model for the measuring point. The TSO also intends to upgrade the measuring system for measuring the quality of gas by installing additional gas chromatographs that will be able to detect and measure the molar concentrations of individual components in gas. It will compare the concentrations of gas components with the measurements of the neighbouring transmission system operators. The aim of these measurements is to study the impact of renewable and low carbon gases on the Wobbe index and the upper calorific value of Group H gas transmitted in the transmission system. It will pay special attention to the methane number, relative density, and dew point of hydrocarbons. The study will be guided by the latest findings of the European Committee for Standardisation (CEN) and working groups, such as TC-234 / WG-11, and the compliance with the applicable standard for gas quality EN 16726.

3.4.4 Controlling methane emissions in the transmission system

The Regulation on reducing methane emissions in the energy sector, presented by the European Commission under the “Fit for 55” package as a legislative proposal stipulates the introduction of a complex system to control methane emissions in the gas transmission systems that will present a relatively big challenge to systems operators in terms of establishing efficient provision and control of methane emissions.

In 2022, Plinovodi also set a baseline for greenhouse gas emissions in accordance with the Greenhouse Gas Protocol (GHG), under which also the methane emissions will be controlled in the transmission system. The company carried out reporting in line with the indicators of Global Reporting Initiative (GRI) that addresses methane emissions in terms of direct emissions (Chapter 305:1-3, Scope 1). Within the scope of the ISO 14001 environmental standard in Plinovodi, the company sets and implements environmental goals that currently include the replacement of gas-powered regulation valves with power operated units and all regulatory monitoring procedures.

As other system operators, Plinovodi will also have to provide necessary technical measures to meet the requirements of direct measurement of emissions within the process of establishing and controlling emissions. Requirements of direct measurement of emissions will be provided in the Regulation on the reduction of emissions stipulating the start of emission measurements, installations and systems and permissible errors of emission measurement. To control the emissions, Plinovodi will introduce solutions to reduce gas emissions from regular operation, emissions from ordinary and extraordinary maintenance, and emissions due to leakage. Based on monitoring the development of methodologies and regulatory requirements, Plinovodi plans investments in the following areas:

1. Analyses and preparation of a program to detect and eliminate leakages (Leak Detection And Repair, LAR),
2. Development and establishment of the emissions monitoring system,
3. Introduction of a code system and link with the Enterprise Asset Management system (EAM),
4. Purchase of additional equipment for detecting emissions (infra-red detectors, flame detectors, containers),

5. Additional process instruments and data transfer to the control system (positioners, gas detectors, flow meters), and
6. Equipment for gas re-pumping and incineration.

The proposed measures for reducing methane emissions will be introduced gradually, from the most efficient and the least expensive to the most expensive and complex with relatively low impact. In drawing up and implementing projects, Plinovodi will monitor domestic and European tenders to obtain subsidies for the dedicated tools and installations for emission reduction.

3.4.5 Transmission capacity booking platform, system operation monitoring platform and market transaction platform

a. Transmission capacity booking platform

Since the beginning of implementing auctions for capacity at interconnection points, Plinovodi in accordance with the provisions of the Commission Regulation (EU) 2017/459 uses the PRISMA capacity booking platform for transmission capacity auctions. The PRISMA platform is used at interconnection points with Slovenia by all neighbouring transmission system operators, i.e. by the Austrian, Italian, and Croatian ones. The legislative requirement for the joint offer of joint capacities on both sides of the border can be fulfilled only by using the same platform on both sides of the state border or an interconnection point between the two neighbouring operators. The transmission capacity at interconnection points may be booked exclusively through auctions, which may be conducted exclusively through the capacity booking platform.
The PRISMA platform ensures high operational reliability, effective data protection and protection against Internet intrusions, as well as adequate responsiveness in resolving problems and upgrades due to changes in the legislative framework. The transmission system operator regularly monitors the development and operation of the on-line reservation platform.

b. System operation monitoring platform and market transaction platform

The transmission system operator has in accordance with the provisions of the System Operating Instructions for the Gas Transmission System and the Commission Regulation (EU) No. 312/2014 on establishing a Network Code on Balancing of Transmission Networks as of 1 October 2015 established a virtual point for the exchange of gas quantities in the Slovenian transmission system. Within the virtual point, the transmission system operator offers the following three services: The execution of transactions, a trading platform, and a bulletin board. At the virtual point, members of the virtual point can perform gas transactions for the purpose of balancing their portfolios, transactions for the needs of gas supply to system users or gas resale transactions. The platform is IT supported by the web application VTP (Virtual Gas Point). In communication with the network users, the transmission system operator encourages the use of virtual point services and thus increases the liquidity of the gas market in Slovenia.

3.4.6 Backup Management Centre

In the management centre, information systems of the transmission system operator are developing fast. In 2022, in accordance with the requirements of the Gas Supply Act, the transmission system operator developed UIS that provides central data processing for all gas consumption points in the Republic of Slovenia. Based on the provisions of the Information Security Act, the Government of the Republic of Slovenia appointed Plinovodi d.o.o. to act as an operator of essential services in the field of energy who must also fulfil the obligation of a backup location under the respective act. The existing backup location of the management centre does not allow for further development to ensure redundancy to the management centre in Ljubljana. The transmission system operator prepares an analysis to determine a

backup location while taking into account the recommendations of the ISO 23301 standard referring to the selection and implementation of the backup management centre. The backup management Cvntre will be equipped with a fully redundant process system to control and manage the gas transmission system and a redundant management information system of Plinovodi d.o.o. The facility of the backup management centre will meet the requirements for reliability of electricity supply and requirements for electromagnetic, fire and flood protection of equipment. Within the scope of a uniform information environment, the standardisation of installations, communication and data protocols will be provided. The backup management centre will allow a possibility of a complete isolation of the operating staff in the event of epidemics and provide independent management of the gas transmission system as well as the implementation of all business functions of the transmission system operator. The backup management centre is a strategic decision required to introduce a high standard in the redundancy of ICT systems and the reliability of the transmission system operations, as well as the implementation of future regulatory obligations for the transmission system operator, and to provide a long-term development of Plinovodi d.o.o. information systems.

4 The adjustment plan to admit gas into the system

4.1 Technical requirements for gases and mixtures, including hydrogen

Over the next 10 years, we expect the cross-border transmission of already injected renewable gases and injecting renewable gases produced in Slovenia to the gas transmission system to be established. These gases include biomethane, synthetic gas and green hydrogen. Biomethane (purified biogas) and synthetic gas are very similar to natural gas in terms of their composition. The permitted ranges of gas component concentrations are already defined in network codes (SON), and will also apply for biomethane and synthetic gas. Since, in line with SON, the composition of synthetic gas and biomethane is very similar to gas in the transmission system in terms of their composition, the injection at an individual point in the transmission system is limited only with the transmission capacity of the pipeline injected with the renewable gas.

According to its chemical and transport characteristics, hydrogen differs from natural gas; it is usually not present in gas or is present in negligible quantity. Hydrogen has a great impact on transmission system capacity and its integrity due to effects on materials it comes in contact with. Therefore, the permitted concentrations of hydrogen in gas are usually capped to provide safe and reliable transmission in the system. The limit relates to the concentrations of hydrogen, where the elements of transmission system are still able to operate safely within the expected parameters. The quantity of hydrogen that can be injected at a point in the transmission system depends of flow-through conditions at the respective point. The injection of hydrogen thus needs to be adjusted to the actual flows in the transmission system. Hydrogen injected into the transmission system may contain oxygen, which is a by-product in the production of hydrogen by electrolysis, but the concentration of oxygen should be lower than the value specified in network codes.

The quality of H Group gas is described in the SIST EN 16726:2015+A1:2018 standard which is a baseline for monitoring the quality of renewable gases. The requirements of the standard are provided in Table 15.

Table 15. Permissible limits of H Group gas parameters based on EN 16726:2015+A1:2018.

Parameter	Unit	Limits at standard reference conditions 15°C/15°C		Limits at standard reference conditions 25°C/0°C		Reference standards for test methods
		Minimum	Maximum	Minimum	Maximum	
Relative density	/	0.555	0.700	0.555	0.700	EN ISO 6976 EN ISO 15970
Total sulphur	mg/m^3	Not prescribed	20	Not prescribed	21	EN ISO 6326-5 EN ISO 19739
	In high-pressure gas pipelines, the permitted concentration of total sulphur of odourless gas is 20 mg/m^3. If the gas is odorised, the permitted concentration of total sulphur is 30 mg/m^3. The values of total sulphur are determined by national regulations.					
Hydrogen sulphide and carbonyl sulphide	mg/m^3	Not prescribed	5	Not prescribed	5	EN ISO 6326-1 EN ISO 6326-3 EN ISO 19739
Mercaptan sulphur without odorant	mg/m^3	Not prescribed	6	Not prescribed	6	EN ISO 6974-3 EN ISO 6974-6 EN ISO 6975
Oxygen	mol/mol	Not prescribed	0.001% or 1%	Not prescribed	0.001% or 1%	EN ISO 6974-3 part 1 to 6

						EN ISO 6975
	0.001% refers to a 24-hour moving average at entry and exit points. 1% refers to the entry, e.g. in underground tanks.					
Carbon dioxide	mol/mol	Not prescribed	2.5% or 4%	Not prescribed	2.5% or 4%	EN ISO 6974 part 1 to 6 EN ISO 6975
	The concentration at entry and exit points may not exceed 2.5%. Higher concentration is permitted if it refers to the entry, e.g. in underground tanks.					
Hydrocarbon dew point (at any absolute pressure from 0.1 to 7 MPa)	°C	Not prescribed	-2	Not prescribed	-2	ISO 23874 ISO/TR 12148
Water dew point (at any absolute pressure from 0.1 to 7 MPa)	°C	Not prescribed	-8	Not prescribed	-8	EN ISO 6327 EN ISO 18453 EN ISO 10101 Part 1 to 3
Methane number	/	65	Not prescribed	65	Not prescribed	Annex A
Contaminants	Gas must not contain other components that would prevent the parameter values within the limits prescribed in Table 1 to be reached.					

The new version of the standard for gas quality, EN 16726, is drawn up by the CEN/TC234 Technical Committee, WG11 Work Group. The Technical Committee SIST TC DPL – Gas Supply, successfully presided over by Plinovodi d.o.o. For many years, it also participates in drawing up the standard. The new version of the standard will take into account the lessons learned on the quality of gas that can be injected with hydrogen. In general, a gas mixture composed of natural gas and up to 5% of hydrogen (hydrogen % volume) can be used in majority gas applications and for end users. As indicated in the proposal for a Directive of the European Parliament and of the Council on common rules for the internal markets in renewable and natural gases and in hydrogen (COM2021/804 final), from 1 October 2025, the maximum concentrations of hydrogen in natural gas up to 5% will be allowed at interconnection points between EU Member States. On this basis, a version of the EN 16726 standard will be published in 2025. Table 16 provides values that take into account a possibility of concentrations of injecting up to 5% hydrogen into the natural gas and will be also observed in the new version of the EN 16726 standard. Currently, the CEN members are deciding on whether the concentrations of hydrogen in natural gas should be 2% or 5%. The majority of sources of natural gas entering the transmission systems in Europe has the methane number higher than 70. Thus, the lower limit of methane number at exit points could be higher, which is also advocated by Plinovodi d.o.o.

Table 16. Permissible limits of changed gas parameters in the mixture of natural gas and a maximum of 5% of hydrogen at exit points.

Parameter	Unit	Limits at standard reference conditions 15°C/15°C		Limits at standard reference conditions 25°C/0°C	
		Minimum	Maximum	Minimum	Maximum
Relative density	/	0.45	0.700	0.45	0.700
Methane number	/	70	Not prescribed	70	Not prescribed

Based on the respective algorithm to calculate the methane number described in the EN 16726 standard, the methane number of biomethane may be higher than 90 (100).

4.2 Monitoring gas quality

The Slovenian gas transmission network currently operates with five chromatographs, of which three are already suitable for measuring hydrogen concentrations, while the other two are expected to be upgraded to enable measuring these concentrations. Renewable gases, with the exception of hydrogen, do not pose any issues in monitoring gas composition, as the permitted ranges of individual gas components are defined in the network codes, and renewable gases, with the exception of hydrogen, will have to meet these criteria.

To monitor the composition and quality of gas and hydrogen mixtures, 6 additional chromatographs are expected to be installed to provide measurements of hydrogen concentrations. The chromatographs will be installed at cross-border points and also in all relevant stations within the Slovenian gas transmission network. A chromatograph will have to be installed also at all internal entry points to enable the injection of domestically produced hydrogen into the transmission system.

By increasing the permitted concentration of injected hydrogen into the transmission system the need of tracking resolution of gas composition will have to be enhanced. In line with the current gas transmission system operator's practice, the provisions of determining an average daily calorific values for the exit to the Republic of Slovenia, published on the website of the operator, will be taken into account when the gas is mixed with hydrogen. In accordance with the provisions, in the event of significant deviations between the calorific values at different points of the transmission system, calorific values and other key parameters of gas quality will be determined using analytical procedures and additional measurement, if required. Time scale for determining calorific value and other parameters of the gas quality will be adjusted to the location and dynamics of injecting hydrogen into the transmission system.

4.3 Adjustment plan to admit and transmit gases of renewable or non-fossil origin and hydrogen

4.3.1 Analysis of possibilities and interest for the production of gases of renewable or non-fossil origin

The production of gases of renewable origin is driven by the guideline and commitment of the European Union to reach carbon neutrality by 2050, therefore phasing out the use of fossil fuels. It is expected that gas will be a transitional fuel in phasing out coal and heavy liquid fuels, while at the same time its composition will gradually change to become constantly more renewable. Additional stimulus for producing renewable gases are also increasingly higher prices of CO2 coupons and gas, the price of which approaches the levelised cost of producing hydrogen and other renewable gases, while on the other hand the lowering of levelised cost of producing hydrogen, resulting from the reduction of the cost of electrolysis and hydrogen technologies. Additionally, the European Commission adopted a delegated act in 2022, by which the natural gas, under certain conditions, acquired the status of sustainable and green energy product up to and including 2031, which further consolidates its role of transitional fuel in enhanced introduction of and replacement with renewable gases. The introduction of gases of renewable origin will be also accelerated by the decision of the European Union on the cessation of the import of Russian gas into the Member States, as a response to the Russian aggression in Ukraine.

The main raw material for producing green hydrogen are surpluses of renewable electricity, in particular from intermittent sources, such as the sun and wind. Intermittent sources will be at the forefront of

renewable electricity mostly due to the incapacity of production regulation, while the production from permanent sources, such as hydropotential, is usually possible to regulate.

According to several projections of the production of renewable electricity from intermittent RESs (the sun and wind) in Slovenia amounting to 1688 GWh in 2030, between 400 GWh and 540 GWh of surpluses of electricity is expected. A part of these surpluses can be currently stored only by conversion into hydrogen.

In line with the scenario "ambitious additional measures" (DUA), which is also the basis of the National Energy and Climate Plan (NEPN), 118 GWh of surpluses of electricity is reachable in 2030 to produce green hydrogen. According to the projections, these surpluses of renewable electricity will be concentrated on the annual production of approximately 1200 hours. To convert the respective surpluses of electricity, an electrolysis of approximate capacity 100 MWel will be needed. Green hydrogen produced in this way can be used as hydrogen or to produce synthetic gas (SNP) by adding CO2 of renewable origin, which is the same as gas in terms of composition and is renewable due to the renewable origin of raw materials.

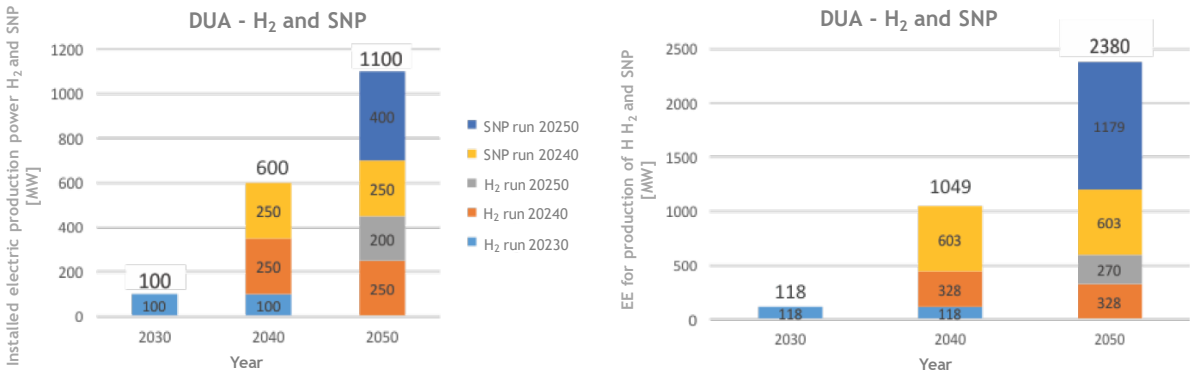

Figure 28. Rated electrical power and energy according to the NEPN scenarios to produce H2 and synthetic gas

The NEPN update is in the preparation phase and it is expected to include even more ambitious goals with regard to renewable gases in Slovenia, and thus also a high volume of surpluses that can be stored in the form of hydrogen and synthetic gas.

The interest for the production of renewable or non-fossil gas in Slovenia has been already demonstrated by several players, whereby these are mainly cases of captive production, in particular in industry. Several players also demonstrated interest in injecting surpluses of renewable gases from own production into the gas transmission system with a view of fully exploiting the available production potential. The interest in producing renewable gases of large volume with a view of supplying end consumers with renewable gases due to required high investment cost and the economics that would require a large share of co-financing has not been expressed in concrete terms so far. However, due to increased prices of energy in the European Union, major projects, in particular in the industry sector, intended for own energy supply are already being prepared and implemented, whereby hydrogen surpluses can be stored in the transmission system. Nevertheless, it is expected that the major part of renewable gas supply to end consumers in the period up to 2030 is mainly covered by import.

4.3.2 Possibilities and capacities of connection points for injecting gases of renewable or non-fossil origin

Physico-chemical characteristics of hydrogen are significantly different from the characteristics of gas or its main component (methane), therefore the share of hydrogen in the transmission system is limited. With a view to ensuring safe and reliable transmission of gas and mixture of gas and hydrogen, locations are addressed below having the highest potential for injecting hydrogen into the transmission system. The selected locations meet two criteria in particular:

1. Section on main gas pipeline with the highest flow rates;
2. Proximity of hubs on the electricity transmission system.

The injection into sections of the gas transmission system with the highest flows, taking into account the maximum permitted hydrogen concentration, provides the maximum volume of hydrogen in the system and thus the highest capacity of storing surpluses of renewable electricity. As the hydrogen will be produced from the surpluses of renewable electricity generated in a distributed way across the Republic of Slovenia, the proximity of hubs of electricity transmission system is of significant importance for collecting surpluses at the production locations.

Upon the established production at an individual location, the transmission system operator will set up the injection infrastructure that will comprise all necessary measuring and control equipment and the equipment for mixing and compressing hydrogen with all required pipeline connections between a station for injecting hydrogen and the existing gas pipeline system. The established production and injection at selected locations provides minimisation of costs to establish the injection infrastructure and easier management of transmission system. The established injection at selected locations will ensure better control of the injection dynamics within a day to reduce variations in gas composition, and thus reduce negative impact of hydrogen on the system operation and system users. Production and injection are possible also at the locations of the transmission system, but due to dead-end pipeline branches not cross-linked, the hydrogen injection in such pipeline branch is limited in terms of hydrogen quantity being injected as well as in terms of the gas consumption dynamics of consumers connected to the respective pipeline branch. The injection dynamics must be adjusted to actual flows and if they fluctuate considerably, this can affect the production dynamics and thus the possibility to store electricity surpluses in the form of hydrogen, and the optimum compressor operation. The injection at locations with the highest and constant flows enables continuous hydrogen injection, and also the production without interruption resulting in a maximum utilisation of the surpluses of renewable electricity.

On the basis of the criteria indicated above, the operator determined 4 locations as shown in Figure 29.

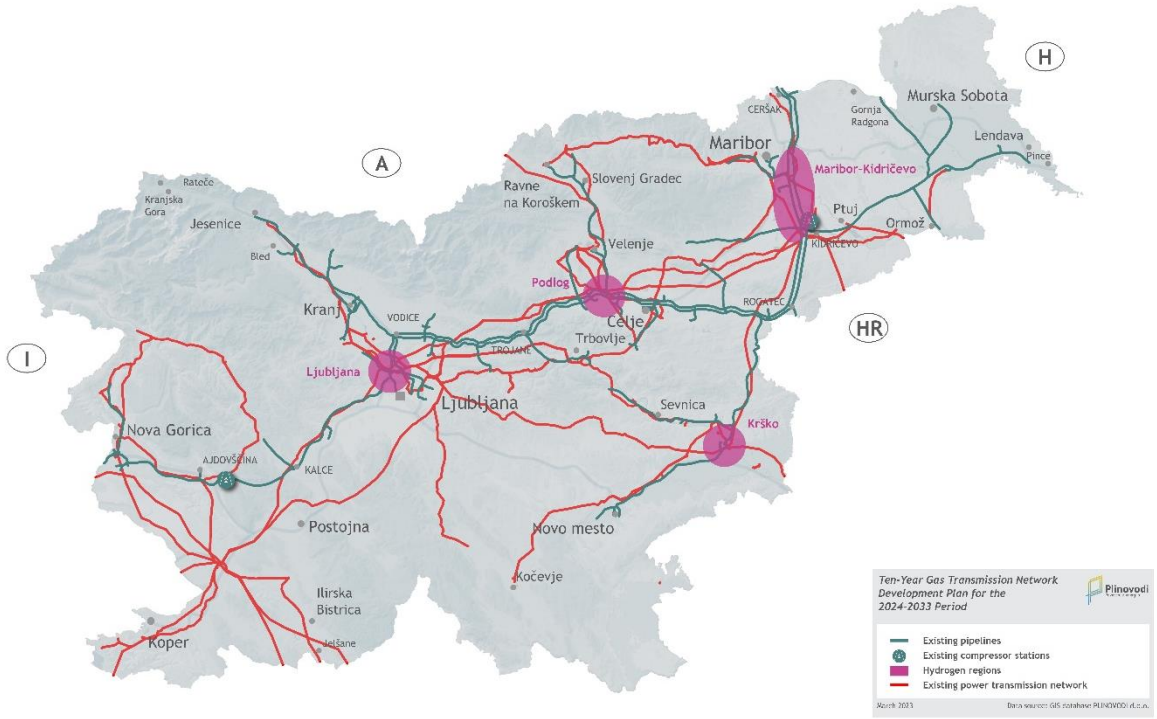

Figure 29. Optimum locations for injecting hydrogen into the transmission system

Table 17 shows maximum rated power of electrolysis on the assumption that surpluses of electricity produced with photovoltaics are used to produce hydrogen. The respective rated power presumes that an electrolyser operates at the rated power in the period of anticipated surpluses of RES electricity and thus produces a volume of hydrogen that is in line with the above-stated concentration of hydrogen at average flows at the location of production and injection into the transmission system during the period of surpluses of RES electricity.

The rated powers of electrolysis are provided for different levels of permitted hydrogen concentration in the transmission system. The permitted concentration is defined in the network codes and will increase in accordance with the requirements of the European and national legislation and regulations as well as demand, whereby the condition of the increase of permitted concentration is the implementation of measures described in Chapter 4.3.4.

Table 17. Maximum rated power of electrolysers for optimum locations for injecting hydrogen at different permissible concentrations of hydrogen in natural gas

Location	Rated electrical power of the production of hydrogen taking into account the capped concentration of H2 [MW]			Comment
	2%	5%	10%	
Maribor-Kidričevo	6.5 to 13	17 to 33	35 to 69	Location in the vicinity of MRS Maribor and Maribor Substation or in the vicinity of CS Kidričevo and Cirkovce Substation
Krško	Under 0.25	Under 0.65	Under 1.5	Location in the vicinity of MRS Krško and Krško substation
Podlog	3 to 6	8 to 15.5	17 to 32.5	Location in the vicinity of MRS Podlog and Podlog substation

Ljubljana	Under 4	Under 10	Under 21	Location in the vicinity of MRS Ljubljana and Kleče substation

The rated powers of electrolysis can increase if a hydrogen tank is installed at the injection or production location with the capacity that corresponds to the share of electrolysis higher than the rated power indicated in the table. In this case the rated power of electrolysis can be no more than doubled. During the period of hydrogen production, the system will be injected with the share of hydrogen that will raise the hydrogen concentration in the system to the maximum permitted limit, while the rest will be stored in the tank. The hydrogen from the tank will be injected into the transmission system during night-time when the there is no hydrogen production due to the unavailability of the electricity surpluses from photovoltaics.

The total rated powers of electrolysers will be increased when the planned M3/1, M6 and R15/1 gas pipelines start to operate. The total rated power will be updated upon the system upgrades.

Injecting hydrogen into the transmission system and mixing it with gas is reasonable only to the maximum permitted value that is currently not defined and depends on the system capacity to operate within the anticipated areas and capacities for a safe transmission of hydrogen and gas mixture, and also to the maximum permitted value of hydrogen in gas in terms of gas consumption unit operations. When this limit is reached, the increase of limit hydrogen concentration is no longer appropriate, but the transmission of pure hydrogen and new consumption points operating with pure hydrogen should be provided. A transmission of pure hydrogen in Slovenia will be established with the execution of two hydrogen corridors that will use the existing gas infrastructure that has been adequately converted and upgraded. In this case, the injection capacity into the hydrogen pipeline system and also electrolysis capacities are significantly increased as the injection into the system is no longer limited with the flow dynamics, i.e. the transit and domestic consumption, but only with the transmission capacity of the hydrogen pipeline. If the volume that exceeds the demand is produced, the hydrogen pipeline allows the hydrogen to be exported to neighbouring countries. It will also be possible to import hydrogen from abroad and transit it through Slovenia. In the case of hydrogen pipeline system, the hydrogen production and injection are not limited in terms of location, but only with the transmission capacity of the system. Taking into account the capacity of the projected hydrogen pipeline system at cross-border points, the maximum possible total electrolysis capacity significantly exceeds the available electricity sources that could be used for hydrogen production.

In terms of the composition, synthetic methane and biomethane are very similar to natural gas and if all their parameters are within the allowed range defined by the Network codes, they can be injected into the main gas pipelines of the transmission system without any particular restrictions. The interest in the injection into regional gas pipelines is addressed individually according to the specificities nd characteristic of a selected location, such as the need to provide two-way flow, etc. Due to the optimisation of investments in the infrastructure for injecting biomethane and synthetic methane into the transmission system, the producer(s) must provide the injection capacity of biomethane or synthetic methane of at least 10,000 Nm3/day .

4.3.3 Assessment of the pipeline system potential to be connected with other systems

The gas transmission system is currently connected with Italian, Austrian and Croatian system, while the connection with the Hungarian transmission system via a new R15/1 pipeline is in the preparation phase. The existing connections with neighbouring transmission systems have been planned for gas transmission, while a new potential connection with Hungary is designed for transmitting a mixture of hydrogen and gas with hydrogen concentrations from 0% to 100%, as one of the current hydrogen corridors runs through

Hungary. Also a new parallel pipeline from Vodice to Italy will be suitable for transmitting up to 100% hydrogen.

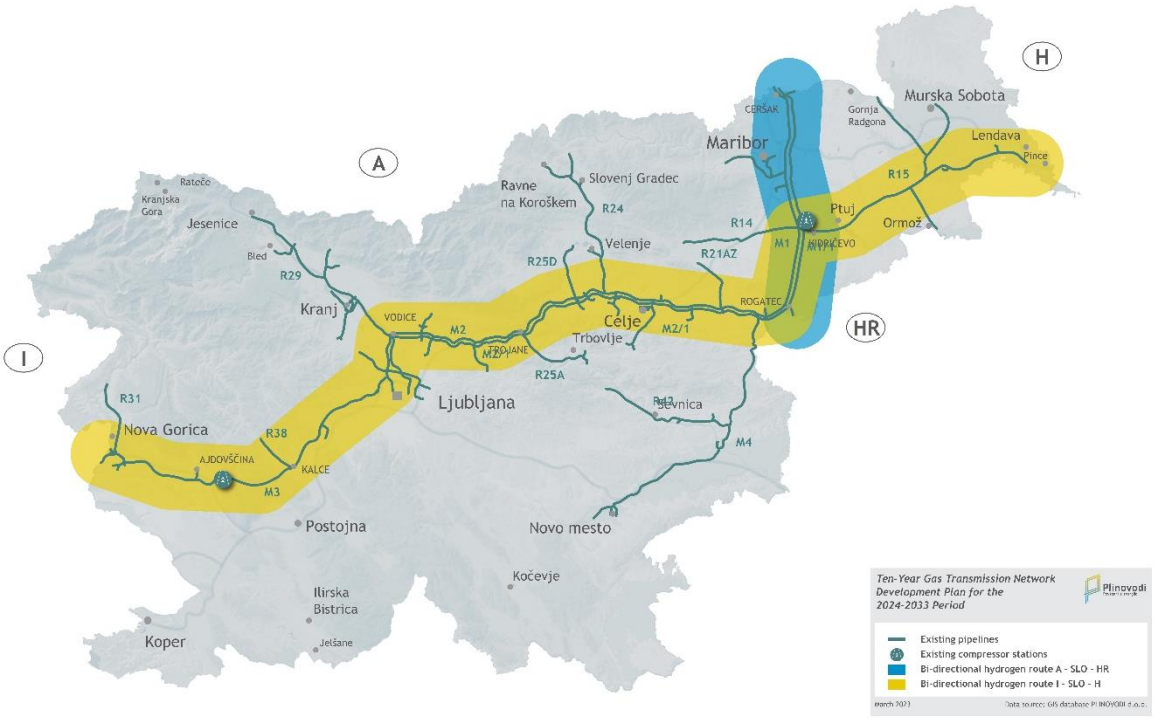

Figure 30. Envisaged upgrade of the Slovenian hydrogen transmission system

The main gas pipelines of the Slovenian transmission system between the cross-border point with Austria and Croatia are doubled, while the same applies to the transmission pipeline to Vodice; the construction of the M371 pipeline will also double the pipeline from Vodice to Italy. The duplication of the Slovenian gas pipeline backbone provides a simultaneous development of the system to transmit mixtures of hydrogen and gas, potentially up to 100% hydrogen, where a part of the system capacity still remains available for the transmission of gas without hydrogen.

This approach makes it possible to selectively introduce hydrogen into the Slovenian transmission system and supply consumers with a mixture of hydrogen and gas, allowing them to operate safely and efficiently, while consumers sensitive to hydrogen, such as gas turbines and CNG filling stations, remain connected to the hydrogen-free part of system. In this way, a connection can be established with neighbouring operators through cross-border points intended for gas transmission, and also cross-border points designed for transmitting gas and hydrogen.

Together with projected new pipelines, doubled pipelines will form two corridors for bidirectional hydrogen transmission between Austria, Italy, Croatia and Hungary. Both corridors are part of the ENTSOG Ten-year Development Plan and candidates to obtain a PCI (Projects of Common Interest) status.

With appropriate upgrades, the existing infrastructure is also suitable for transmitting a hydrogen-gas mixture. The permitted share of hydrogen ad-mixed with gas will be consolidated with neighbouring partners of transmission systems with a view to providing interoperability and supply with the mixture of gas and hydrogen from abroad. The basis for determining or changing the maximum permitted hydrogen concentration will be European and national legal and regulatory frameworks, as well as demand for hydrogen in Slovenia and demand for transit capacities.

4.3.4 Analysis of requirements, adaptation of materials and elements, and necessary measures in the gas pipeline system for admitting gas

4.3.4.1 Introduction

In the framework of the analysis of requirements, adjustment of materials and elements and necessary measures to admit gases into the gas system, the focus is on the impact of hydrogen admittance in the gas transmission system. In admitting synthetic gas and biomethane into the gas pipeline system it is considered that they comply with the permitted specification and have no specific effect on the system operation.

In admitting hydrogen, it is generally established that it may lower mechanical properties of metal materials in different ways, mostly taking the form of hydrogen embrittlement and the issue of chemical compatibility of materials and hydrogen leakage or permeation. In addition to its impact on the materials, hydrogen also affects the operational safety of the system as a whole and its elements, and also the measures that must be implemented by the transmission system operator.

4.3.4.2 Materials

Brittle materials are more susceptible to hydrogen embrittlement, as are microstructures with many inserts where hydrogen is concentrated. In contrast, fewer residual stresses in the material have positive effect on the resistance to hydrogen embrittlement. By increasing the load also the sensitivity of hydrogen embrittlement is increased as the hydrogen has more time for diffusion. Hydrogen also accelerates material fatigue. Namely, the high pressure increases the material susceptibility to hydrogen embrittlement, while at the same time the range of normal ambient temperature is the most unfavourable, as at lower temperatures diffusion and solubility decrease, while high temperature cause higher ductility of the materials. An important characteristic of hydrogen is also the size of molecule which is small and easily leaks through fissures (leakage) and through the material structure (permeation). Compared to methane, hydrogen demonstrates 2.8-times higher laminar volumetric leakage flow due to its characteristics. In terms of metal materials, the permeation through material can be ignored, while the focus should be mainly on leakage at joints – gaskets, fittings, threads etc. Due to their structure, polymer materials demonstrate a significantly higher level of permeation that depends on the degree of crystallinity or structural cross-linking. A degree of crystallinity is more resistant to permeation, and therefore materials with the highest cross-linking possible are used for hydrogen atmospheres.

In general, the admixing of up to 10% of volumetric share of hydrogen is completely feasible and possible on the existing gas pipeline infrastructure. In terms of materials, steels for pipelines of low classes are recommended in current hydrogen injection applications. By increasing the share of hydrogen in gas pipelines, the necessary compressor power at compressor stations increases, assuming equal transmitted energy flows.

The current situation at the level of the European Union in introducing new gases into the gas pipelines networks and using materials is still in the phase of preparation. There are no harmonised standards as regards limit values and associated harmonised technical specifications. Also, there is not regulatory or legislative definition concerning possible European and national guidelines for developing infrastructure to introduce new gases, while studies show the importance of the right selection of material and methods of producing pipes for pipelines intended for transporting respective gases, and the same applies to adequate dimensioning and construction of these pipelines, in particular in the segment of pipe welding and installation of elements and equipment, the components of which will provide long-term suitability for operation with these gases. Given that the whole European pipeline system is interconnected, harmonised and unified specifications for hydrogen are required along with the regulation of certificates of their origin.

4.3.4.3 Operating safety

Hydrogen in the gas pipeline system causes security issues due to increased explosion power and expanded ignition thresholds. In low concentrations, this effect is easier to control, but if the concentrations are high (e.g. over 40 vol.%) the explosion potential and area of its impact are significantly increased. As a result, security zones and measures need to be adjusted to provide safe operation. Measuring gas mixture parameters (flow, composition) also presents a room for additional applied research and development. High concentrations will require re-calibration of meters and resetting of calibration constants. Measurement accuracy will thus depend on the compliance of the actual gas mixture with the mixture used for calibration.

By introducing new gases, with the focus on hydrogen which is injected in the gas pipeline system at different shares, also the composition and characteristics of such gas mixture are changed. These have further impact on the Wobbe index change and a change in thermodynamic and transport characteristics. Due to its low viscosity and density compared to gas, hydrogen causes minor pipe erosion. The criterion of the maximum permitted rate may increase due to all these characteristics of gas-hydrogen mixture. However, it needs to be taken into account that due to increased hydrogen concentration there is a change of the compressibility factor and the Joule-Thomson coefficient. All this affects the compression of such mixtures. The transmission system operator uses the GERG-2008 standard to simulate and calculate these characteristics.

4.3.4.4 Measurements and transport

In the field of transport, measurements, odorisation and simulations, it generally applies that measuring installations are adjusted to high share of hydrogen in gas. Adding up to 10% of hydrogen to gas has practically no effect on the safety characteristics of gas meters. In facilities designed for gas, the mixtures up to 25% of hydrogen do not pose technical obstacles in terms of explosion protection. Hydrogen embrittlement is the main cause for the breakdown of metal elements in gas meters, and therefore the same guidelines are recommended for selecting materials as they apply to gas pipelines injected with hydrogen. Producers found that turbine and rotary gas meters available in the market usually provide adequate safety, but with currently unknown long-term reliability and increased uncertainty of operation in low flow. Also some long-term changes of metrological characteristics of membrane and rotary gas meters have been established. In general, up to 10 vol.% of hydrogen in gas does not present any important deviations in measuring gas flows. In the field of odorisation for the household applications it was established that standard gas odorants are suitable for hydrogen odorisation. However, sulphur-based odorants have negative impact on the use of hydrogen in fuel cells and are therefore not appropriate to be used in these applications.

4.3.4.5 Sensitivity assessment and measures

With the purpose to establish the sensitivity of materials to hydrogen, a HEE index is calculated *(Hydrogen Environmental Embrittlement*). This provides a ration of tensile strength, ductility or concentration of material before or after the exposure to hydrogen.

Based on the preliminary results of the sampled part of the Slovenian gas transmission system, the following conclusions and required measures are possible:

- High pressure in the gas pipeline system leads to high sensitivity of gas pipeline system materials to hydrogen. By admitting hydrogen into the gas pipeline system also a more frequent control of the hydrogen-injected pipeline integrity has to be in place taking into account its operating pressure and temperature range.

- Volumetric concentration of hydrogen in the pipeline affects the expected useful life of gas pipeline system elements. It will have the most significant impact on the materials with high or extreme sensitivity to hydrogen. In addition, an aspect of load dynamics causing fatigue of system materials in the long-term is also important. The transmission system operator approaches the preparation of the programme of measures for timely replacement of the most sensitive parts of the system.
- Based on the analysis of the sampled part of the Slovenian gas transmission system, it has been preliminary established that volumetric concentrations of hydrogen up to 10% do not require major replacements of key parts of the transmission system. By initiating the admittance of hydrogen, the transmission system operator should start with preventive replacements of system parts that are highly or extremely sensitive to hydrogen. Replacements are carried out using elements that can operate with hydrogen. More frequent visual inspections of system parts are initiated in this period according to a more detailed specification (once every 3 months, once a month). Also more frequent controls of hydrogen leakage (once to four-times a year) are required at critical sites using hydrogen detector.
- In planning large volumetric concentrations of hydrogen in the transmission system, i.e. 10% or more, the system operator must plan the replacement of all elements in the transmission system that are critically or highly sensitive to hydrogen. The replacements are carried out with elements designed for safe operation with 100% hydrogen. Also, elements with low and medium sensitivity to hydrogen and the whole integrity of the gas transmission system need to be analysed in detail, including the measurements of weld strength.
- For more complex systems, such as compressor units with gas turbines, gas chromatographs, etc., the respective manufacturer must provide conditions and appropriateness and safety of operation in terms of different shares of hydrogen.
- For volumetric shares of hydrogen higher than 10%, and especially for shares exceeding 20%, the existing pipes of the gas pipeline system must be controlled at a high risk level due to the composition of pipe material and strength and fragility of welds. The welding conditions and recommendations must be taken into account. The highest recommended steel and weld strength in the gas pipeline system is 22 HRC or 248 HV, or 250 HB with a maximum equivalent tensile strength of 800 MPa. Welded areas often demonstrate higher strength than the basic material, and thus welds are more sensitive to hydrogen.
- In maintaining transmission system, in addition to more frequent controls, a special attention must be also paid to the cathodic protection of the gas pipeline system as to prevent an excessive negative cathodic potential that causes an increased hydrogen embrittlement of materials (the limit is 0.85 V).
- For the new constructions, the conditions to be met by the installed materials and individual parts of the transmission system must be defined so they provide safe and reliable operation with the mixtures of gas and hydrogen, incl. up to 100% of hydrogen.
- To avoid the admittance of a large volume of hydrogen into the weld during the welding process, the welding of systems must be carried out according to the relevant specified procedures and adequate thermal processing of the weld must be ensured for the diffusion of the hydrogen from the material.
- In terms of the selection of materials of gas pipes, it is recommended to use steels having the basic tensile strength under 500 MPa and that underwent a heat treatment process that consisted of normalisation and tempering creating a fine-grain micro-structure.

Elements of the new gas pipeline should be dimensioned in a way that tensions in the material walls during operation are less than 30% of the lowest permitted material yield strength $R_{p0.2}$ or less than 20% of the lowest permitted tensile strength of the material R_m.

4.3.5 Measures and activities to enable safe operation of the gas pipeline system and installations with foreseen investment cost and timetable

On the basis of the conducted analysis, the transmission system operator approaches the preparation of a preliminary programme of measures and activities for ensuring a safe operation of the gas pipeline system for admitting renewable gases, including hydrogen.

The programme is drawn up with regard to the expected hydrogen concentration in the gas transmission system and is divided into the initial activities and measures, as well as activities and measures for 2%, 5% and 10% of hydrogen in the transmission system. The division conceptually follows the one set by ENTSOG for drawing up the assessment of European transmission systems.

4.3.5.1 Preparation for admitting hydrogen in the system, initial activities

The preparations to admit hydrogen in the gas transmission system are already under way and, accordingly, this implementation will continue to further analyse the already established major critical points and determine all elements of the transmission system that are extremely or highly sensitive to hydrogen.

Then, using detailed material analysis and testing of the elements recognised for extreme and high sensitivity, it needs to be determined at which high share of hydrogen their replacement is required. At the same time, the scope and timeline of necessary and preventive replacements must be established.

Measures and activities are determined for the elements of transmission system recognised as having intermediate or low sensitivity to hydrogen in order to provide their reliable and safe operation by conducting more frequent inspections or a respectively adjusted method of maintenance or other established measures.

Within the preparation of the transmission system to admit hydrogen, the transmission system operator anticipates the following activities:

- The expansion of the analysis of the sampled part of the transmission system with hydrogen to include the analysis of elements of the whole transmission system and the implementation of tests for the parts which cannot be replaced without major interventions and system downtime. The creation of a detailed replacement programme.
- Measurements of the hardness and embrittlement of welds and materials of installed pipes.
- The plan of monitoring the operation, the maintenance and provision of safe operation of the gas pipeline infrastructure with hydrogen.
- The upgrade of the risk model taking into account the admittance of hydrogen into gas.
- Technical guidelines for planning and implementing gas pipeline infrastructure with hydrogen.
- The implementation of a mobile connection unit for injecting hydrogen in the gas transmission system.

The timeline of the implementation of envisaged activities is by the end of 2025.

4.3.5.2 Measures and activities in the event of 2% hydrogen in the system

Based on the analysis of the sampled part of the existing transmission system it was established that at a hydrogen share of 2% in the transmission system, this can operate without any significant replacements or upgrades. Nevertheless, the transmission system operator anticipates a limited scope of preventive activities and measures. These are planned as a continuation of the initiated activities, described in the previous chapter, and a combination with preventive measures and replacement programmes. All with the aim that the gas transmission system is prepared in time for expected shares of hydrogen in the system.

To this end, the transmission system operator anticipates the following preliminary activities for 2% of hydrogen in the transmission system:

- The project processing of the replacement of the oldest equipment in the system with the new one which is certified to operate with higher hydrogen concentrations.
- The establishment of the connected operating system of chromatographs.
- Coordination with neighbouring operators with a view to providing smooth transition of gas with up to 2% share of hydrogen.
- Cooperation with system users in testing the compatibility of their consumption units with different concentrations of hydrogen in gas, including the CNG filling stations for vehicles.
- The update of network codes according to the permitted compositions and characteristics of gas mixtures and 2% hydrogen.

The timeline of the implementation of envisaged activities is by the end of 2027.

4.3.5.3 Measures and activities in the event of 5% hydrogen in the system

Based on the analysis of the sampled part of the existing transmission system it was established that at a hydrogen share of 5% in the transmission system, this can operate without any significant replacements or upgrades. Nevertheless, the transmission system operator, anticipates further implementation of preventive measures and activities, described in the previous chapter, and a combination with preventive measures and replacement programmes. All with the aim that the gas transmission system is prepared in time for expected large shares of hydrogen in the system.

To this end, the transmission system operator anticipates the following activities for 5% of hydrogen in the transmission system:

- Preventive replacement of estimated 15% of the oldest elements and elements extremely or highly sensitive to hydrogen at the stations with new elements compatible with the highest shares of hydrogen in gas. Preventive replacements are foreseen to take place together with the following groups of elements:
    - Locking elements,
    - Regulators,
    - Gas heaters at pressure reductions,
    - Flanges and fittings.
- The upgrade of the connected operating system of chromatographs.
- Coordination with neighbouring operators with a view to providing smooth transition of gas with up to 5% share of hydrogen.
- Analysis of the impact of 5% hydrogen on local changes in calorific values in the system, and, if required, preparation of information and control systems for tracking gas composition, and regional determination of calorific value.

- The commission of an inspection of the existing compressor units in terms of the operation with a 5% share of hydrogen together with the equipment manufacturer and, if required, and the existing compressor units to allow operation with high hydrogen shares.
- Harmonisation of measures for operating the consumption units sensitive to 5% of hydrogen with transmission system users, including CNG filling stations for vehicles.
- The update of network codes according to the permitted compositions and characteristics of gas mixtures and 5% hydrogen.

The timeline of the implementation of envisaged activities is by the end of 2029.

4.3.5.4 Measures and activities in the event of 10% hydrogen in the system

Based on the analysis of the sampled part of the existing transmission system it was established that the shares of hydrogen in the transmission system that reach 10% need to be prepared in advance with the replacement or prior detailed analysis of the sections extremely and highly sensitive to hydrogen. The transmission system operator therefore envisages the implementation of activities and measures that are a continuation of already implemented measures described in previous chapters for hydrogen shares up to 5%. All with the aim that the gas transmission system is prepared in time for expected large shares of hydrogen in the system.

To this end, the transmission system operator anticipates the following further activities for 10% of hydrogen in the transmission system:

- Preventive replacement of estimated 25% of the oldest elements and elements extremely or highly sensitive to hydrogen at the stations with new elements compatible with the highest shares of hydrogen in gas. Preventive replacements are foreseen to take place together with the following groups of elements:
    - Regulators,
    - Gas heaters at pressure reductions,
    - Flanges and fittings,

  A replacement is also planned for 35% of the oldest locking elements at stations.
- Coordination with neighbouring operators with a view to providing smooth transition of gas with up to 10% share of hydrogen.
- Analysis of the impact of 10% hydrogen on local changes in calorific values in the system, and, if required, preparation of information and control systems for tracking gas composition, and regional determination of calorific value.
- The upgrade of the connected chromatograph system and installation of additional chromatographs at the most relevant points in the system, which will be used also in the model of tracking gas composition in Slovenia, in addition to measuring hydrogen concentration.
- The installation of additional chromatographs at the cross-border points and other relevant points in the system to provide the measurement of hydrogen concentration; they will be also included in the model of tracking gas composition in Slovenia.
- The upgrade of compressor units in order to be suitable for operation with high hydrogen shares.
- Harmonisation of measures for operating the consumption units sensitive to 10% of hydrogen with transmission system users.

- The update of network codes according to the permitted compositions and characteristics of gas mixtures and 10% hydrogen.

The timeline of the implementation of envisaged activities is by the end of 2030.

5 Set of planned gas infrastructure for the 2024–2033 period

Based on the preliminary analyses, the transmission system operator further defines the gas transmission infrastructure that needs to be built or upgraded in the next ten years for a reliable supply of gas. The operator also defines the time dynamics and the estimated financial resources for the implementation of the planned investments.

Depending on its purpose, the planned infrastructure is broken down into the following: projects for increasing operational security and expansion of the transmission system, projects for connecting new gas transmission system users or changing the operational characteristics of gas infrastructure, projects for developing interconnection points, and development of hydrogen transmission projects.

Table 18. Status and level of treatment as of 01/01/2023 – summary table

Investments 2024 - 2033		Number	Level of treatment 1 January 2023			
			Conceptual designs	NSP in preparation	NSP	GD, construction
A	Increase of the operational security and expansion of the transmission system	33	20	1	11	1
B	Connections	97	85	2	8	2
C	Development of interconnection points	17	3	5	9	
D	Development of hydrogen transmission projects	8	8			
Total		**155**	**116**	**8**	**28**	**3**

5.1 Projects to increase the operational security and expansion of the transmission system

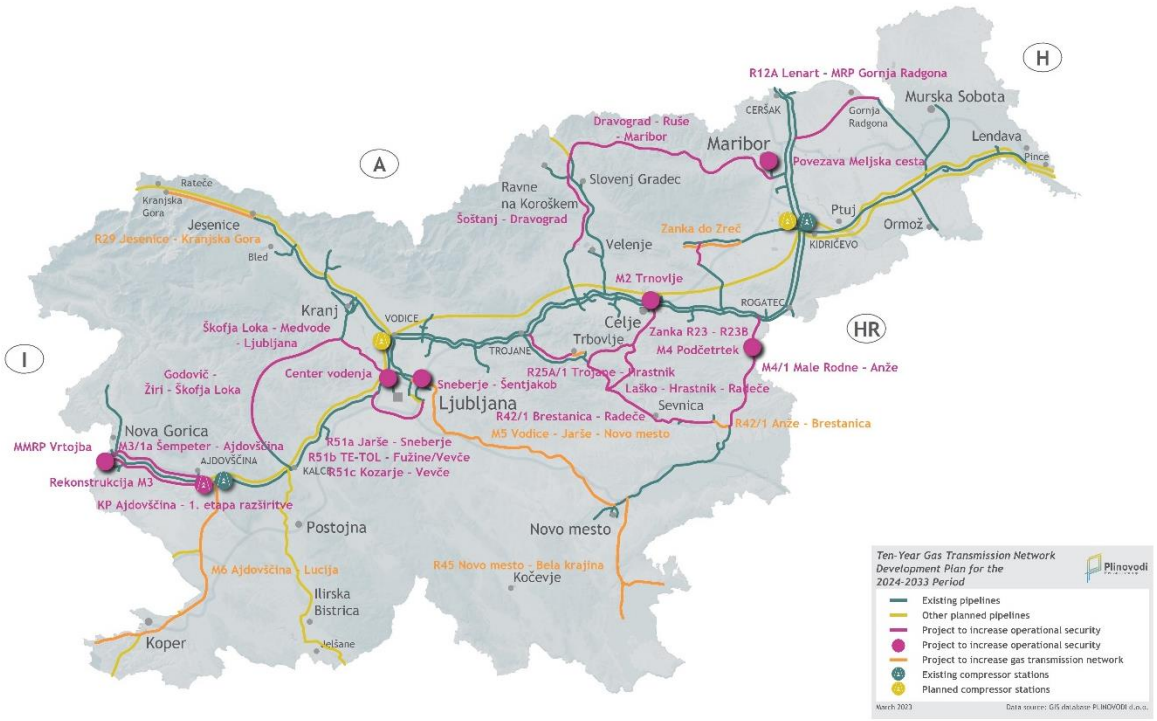

Figure 31. Locations of the projects to increase operational security and expansion of the transmission system

The group of projects that allow the increase of operational security and expansion of the transmission system includes system pipelines, energy loops, displacements of pipeline sections due to specific settlement modifications, and prevention of landslides. The system pipelines are designed for expanding the transmission system and connecting new municipalities, and in some cases also for the increase of the operational security of the existing transmission system.

The estimate of the operational security for an individual part of the transmission system is based on the flow-pressure calculation under the peak load conditions, which determines the load on the gas infrastructure and the exposure of users in case of failure of individual parts of the transmission system. The flow-pressure calculation checks the solutions (e.g. a system loop) to ensure a sufficiently powerful redundant transmission of gas to the exposed part of the transmission system.

As a consequence of the war in Ukraine and its resulting need of increasing the capacity at the interconnection with the Italian transmission system, at the interconnection with the Croatian transmission system for gas supply from the terminal on the island of Krk, and the access to gas storage facilities in Hungary, these investments are also included in Table 19 under the projects to increase operational reliability.

Table 19. Projects to increase the operational security and expansion of the transmission system

A	Project name	Purpose	Planned start of operations
A1	Loop to Zreče		
	Stage one: R21AZ Konjiška vas – Oplotnica	Increase of the operational security with the system loop	2024
	Stage two: R21AZ Oplotnica – Zreče	Expansion of the pipeline system	after 2026
	Stage three: P21AZ1 Oplotnica - Slovenska Bistrica	Expansion of the pipeline system	after 2026
A2	R51a Jarše – Sneberje	Increase of the operational security with the system loop	after 2026
A3	R51b TE-TOL Fužine/Vevče	Increase of the operational security with the system loop and the possibility of connection of DSO to MOL	2025
A4	R51c Kozarje – Vevče	Increase of the operational security with the system loop	2026
A5	Dravograd – Ruše – Maribor		
	Stage one: Dravograd - Ruše	Increase of the operational security with the system loop and the possibility of connection of new municipalities	nd
	Stage two: Ruše - Maribor	Increase of the operational security with the system loop	nd
A6	Kalce - Godovič – Žiri – Škofja Loka		
	Stage two: Godovič – Škofja Loka	Increase of the operational security with the system loop and the possibility of connection of new municipalities	nd
A7	Škofja Loka – Medvode - Ljubljana	Increase of the operational security with the system loop	nd
A8	Laško – Hrastnik – Radeče	Increase of the operational security with the system loop	nd
A9	R12A M1 - Lenart – MRS Gornja Radgona	Increase of the operational security with the system loop and the possibility of connection of new municipalities	nd
A10	Šoštanj – Dravograd	Increase in operational security by installing a system loop with the possibility to operate by using renewable gas and up to 100% hydrogen	nd
A11	M4 Podčetrtek section	Increase of the operational security with the displacement of pipeline	nd
A12	M2 Trnovlje section (Celje)	Increase of the operational security with the displacement of pipeline	nd
A13	M5 Vodice – Jarše – Novo mesto		

	Stage two: Jarše – Grosuplje	System pipeline; the expansion of the transmission system and the increase of the operational security	after 2026
	Other stages: Grosuplje – Novo mesto	System pipeline; the expansion of the transmission system and the increase of the operational security	after 2026
A14	M6 Ajdovščina – Lucija	System pipeline; the expansion of the transmission system and the increase of the operational security	2024–2026
A15	Management Centre	Facility, development of information systems, digitalisation, and content upgrade	2027
A16	Backup Management Centre	Facility, development of information systems at the back-up site	after 2026
A17	Data transmission network	Increase of the operational security	2026
A18	R45 Novo mesto – Bela Krajina	System pipeline; the expansion of the transmission system and the increase of the operational security	nd
A19	R25A/1 Trojane – Hrastnik		
	Stage one: Trojane - Trbovlje	Increase in operational security with the possibility to operate by using renewable gas and up to 100% hydrogen	after 2026
	Third stage: TTPP branch	Expansion of the transmission system with the possibility to operate by using renewable gas and up to 100% hydrogen	nd
A20	R29 Jesenice - Kranjska Gora		
	Stage two	System pipeline; the expansion of the transmission system with the possibility of connection of DSO and the increase of the operational security	nd
A21	R42/1 Anže - Brestanica	Expansion of the pipeline system	2027
A22	R42/1 Brestanica - Radeče	Increase of the operational security	nd
A23	Research and innovation projects	Innovations on gas transmission infrastructure	nd
A24	Relocation of part of the P29134 gas pipeline in the Kranj area	Increase of the operational security	2025
A25	Transmission pipeline system Sneberje - Šentjakob	Increase in operational security and connection of user	nd
A26	Connection Meljska cesta (Maribor)	Increase of the operational security	nd
A27	CS Ajdovščina extension		
	Stage one	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows	2024
A28	Reconstruction of M3 at section CS Ajdovščina – Miren with branches	Adjustment to the operational parameters of the Italian TSO's transmission system (73.9bar)	nd
A29	BMCS Vrtojba	Adjustment of the two-way operation regime to the operating parameters of the Italian TSO transmission system	2025
A30	R23-R23B loop (Celje-Štore-Laško)	Increase of the operational security with the system loop	after 2026
A31	M4/1 Male Rodne - Anže	Increase of the operational security	nd
A32	M3/1a Šempeter – Ajdovščina	System line to increase operational security by enhancing cross-border transmission capacity from the western direction. Provision of adequate transmission capacity in the event of a shortfall from the eastern supply direction, and also harmonisation with the existing capacity and operating pressures of the Italian transmission system, the integration into the gas pipeline corridors.	2028
A33	System and equipment for controlling methane emissions	Establishment of the system to detect and control methane emissions in the transmission system	2026

5.2 Connection projects

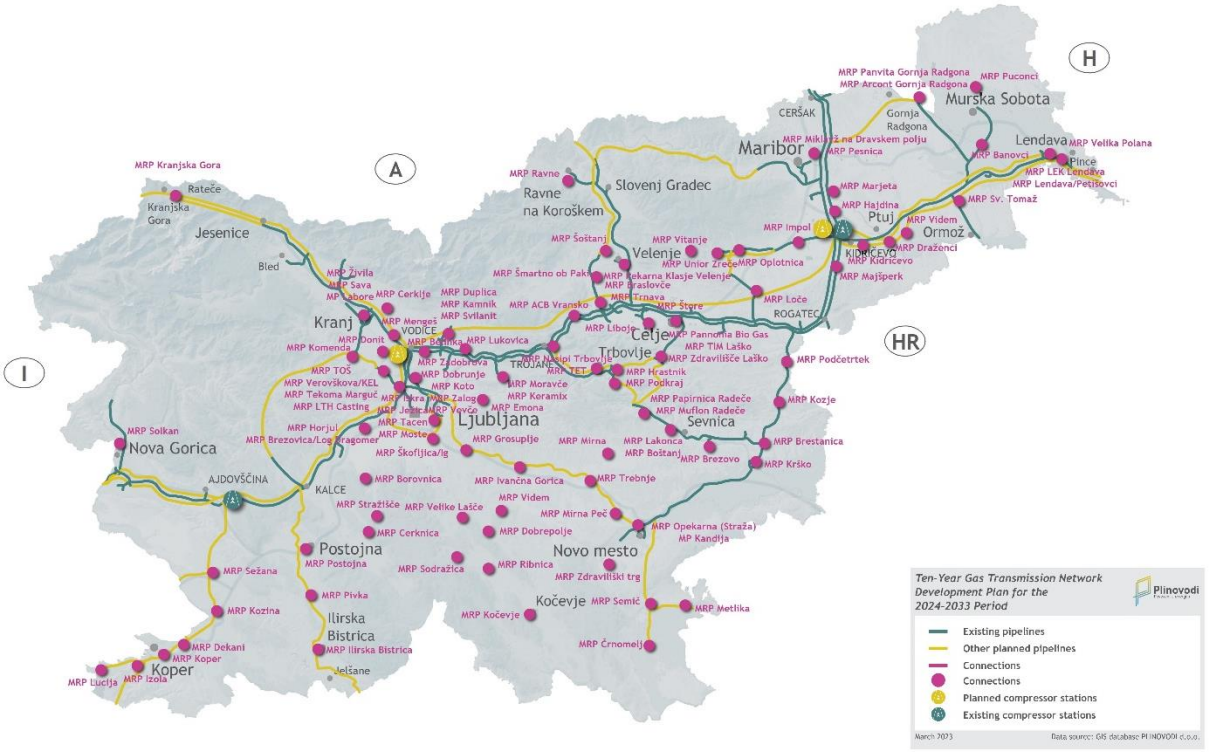

Figure 32. Locations of projects for new connections

The connections group includes projects for connections of new users, changes in the operational characteristics at pipeline structures for existing users, and the connection of a gas producer. These projects have been included on the list based on queries, connection approvals, and / or connection contracts. Connection projects also include projects for connection of users establishing an infrastructure of CNG filling stations – compressed natural gas for powering vehicles.

5.2.1 Connection contracts

Table 20 includes the projects for the future network users who have concluded a connection contract with the TSO and are envisaged for implementation in the coming period.

Table 20. Connection contracts (as of 01/01/2023)

#	Project name	Purpose	Planned start of operations
B1	MRS Brestanica; R42/1 Anže - Brestanica	Change in connection of final user	2027
B2	MRS Miklavž na Dravskem polju	Connection of DSO	2024[15]
B3	MRS Velika Polana	Connection of DSO	nd[16]
B4	R25A/1 Second stage Trbovlje – Hrastnik with MRS Hrastnik and MRS Podkraj	Change in connection of three final users	2025
B5	MRS Duplica	Change in connection of DSO	2024
B6	MRS Kamnik-center	Change in connection of DSO	2024

[15] The envisaged start of operation depends on the adoption of the planning document by the municipality.

[16] The envisaged start of operation depends on the DSO selection by the municipality.

B7	MRS Sava with a pipeline	Change in connection of final user	2025
B8	MRS Verovškova/KEL	Change in connection of final user	2025
B9	MRS Koto	Change in connection of final user	2025
B10	MRS Dobrunje	Connection of DSO	2024
B11	MRS Emona	Connection of final user	2024[17]
B12	MRS Donit	Change in connection of final user	2024
B13	MRS Impol	Change in connection of final user	2026[18]

5.2.2 Connection approvals

Table 21 includes projects for users of transmission capacities who were issued connection approvals and have been sent a connection contract, which is not yet concluded.

Table 21. Connection approvals (as of 01/01/2023)

#	Project name	Purpose	Planned start of operations
B14	MRS Banovci	Connection of final user	2024
B15	MRS Tekoma Marguč	Change in connection of final user	2025
B16	MRS Litostroj Power	Change in connection of final user	2025
B17	MRS LtH Castings	Change in connection of final user	2025
B18	MRS Draženci	Connection of final user	2025

5.2.3 Queries

Queries include the initial activities of the TSO, potential network users and existing network users for connections that the TSO recorded as current and were addressed as queries in the year 2022. This group also includes the previous activities of potential users for which a connection approval had been issued, but has expired and, hence, no connection contract has been concluded, or connection contract has been concluded but not implemented, yet the TSO still considers them as possible customers. For the following projects, the TSO considers that the potential or existing users have expressed interest for connections.

Table 22. Queries (as of 01/01/2023)

	Project name	Purpose	Planned start of operations
B19	MRS Sežana, MRS Kozina, MRS Dekani, MRS Koper, MRS Izola, MRS Lucija	Connection of DSO in municipalities of Sežana, Hrpelje-Kozina, Koper, Izola, Piran; connection with the system pipeline M6	2024–2026
B20	MRS Lendava Petišovci	Connection to the production of gas	nd
B21	MRS Trnava	Connection of final user	nd
B22	MRS Loče	Connection of DSO	nd
B23	MRS ACB Vransko	Connection of final user	nd

[17] The envisaged start of operation depends on the user.

[18] Envisaged start of operation depends on the implementation of the A1 project First stage: R21AZ Konjiška vas – Oplotnica.

B24	MRS Belinka	Change in connection of final user	nd
B25	MRS Cerklje; R297B Šenčur – Cerklje	Connection of DSO	nd
B26	MRS TTPP; R25A/1 Trojane - TTPP	Connection of thermal power station	nd
B27	MRS Marjeta (Municipality of Starše)	Connection of DSO	nd
B28	MRS Lakonca	Connection of final user	nd
B29	MRS Nasipi Trbovlje	Connection of final user and DSO	nd
B30	Supply to users and other connection projects	Connection of new users with mobile systems, connection of filling stations for compressed natural gas and adjustment of existing connection points	2024–2033
B31	MRS Braslovče	Connection of DSO	nd
B32	MRS Kidričevo	Change in the connection and/or new connection of final user	nd
B33	MRS Podčetrtek	Connection of DSO and/or final users	nd
B34	MRS Borovnica	Connection of DSO and/or final users	nd
B35	MRS Šmartno ob Paki	Connection of DSO	nd
B36	MRS Boštanj	Connection of DSO and/or final users	nd
B37	MRS Opekarna (Straža)	Connection of DSO and/or final users	nd
B38	MRS Moravče	Connection of DSO	nd
B39	MRS Cerknica	Connection of DSO and/or final users	nd
B40	MRS Videm	Connection of ODS and/or final user	nd
B41	MRS Vitanje	Connection of DSO and/or final users	nd
B42	MRS Šoštanj	Connection of final users	nd
B43	MRS Živila	Change in connection of final user	nd
B44	MRS Panvita Gornja Radgona	Change in connection of final user	nd
B45	MRS Papirnica Radeče	Change in connection of final user	nd
B46	MRS Muflon Radeče	Change in connection of final user	nd
B47	MRS Stražišče	Change in connection of DSO	nd
B48	MRS Pekarna Klasje Velenje	Change in connection of final user	nd
B49	MRS Lek Mengeš	Change in connection of final user	nd
B50	MRS Lek Lendava	Change in connection of final user	nd
B51	MRS Unior Zreče	Change in connection of DSO	nd
B52	MRS Labore	Connection of DSO	nd
B53	MRS Pesnica	Connection of DSO	nd
B54	MRS Sveti Tomaž	Connection of DSO	nd
B55	MRS Štore	Change in connection of final user	nd
B56	MRS Lukovica	Connection of ODS and/or final user	nd
B57	MRS Svilanit	Connection of DSO	nd
B58	MRS Horjul	Connection of DSO	nd
B59	MS Kandija	Change in connection of final user	nd
B60	MRS Krško	Change in connection of DSO	nd
B61	MRS Solkan	Change in connection of final user	nd
B62	MRS Kozje	Connection of DSO and/or final users	nd
B63	MRS Moste	Connection of DSO and/or final users	nd
B64	MRS Keramix	Connection of final user	nd
B65	MRS Majšperk	Connection of final user	nd
B66	MRS Liboje	Connection of DSO and/or final users	nd
B67	MRS Brezovo	Connection of DSO and/or final users	nd
B68	MRS Puconci	Connection of DSO and/or final users	nd

B69	MRS Iskra	Change in connection of final user	nd
B70	MRS Arcont Gornja Radgona	Change in connection of final user	nd
B71	MRS Ravne	Change in connection of final user	nd
B72	MRS Hajdina	Connection of DSO and/or final users	nd
B73	MRS Vevče	Change in connection of final user	nd
B74	MRS Ilirska Bistrica	Connection of ODS and/or final user	nd
B75	MRS Zdraviliški trg	Change in connection of DSO	nd
B76	MRS TIM Laško	Change in connection of final user	nd
B77	MRS Zdravilišče Laško	Change in connection of final user	nd
B78	MRS TUS NTU	Change in connection of final user	nd
B79	MRS Ježica	Change in connection of DSO	nd
B80	MRS Tacen	Change in connection of DSO	nd
B81	MRS Panonia biogas	Connection of final user	nd
B82	MRS Centrex LNG	Connection of final user	nd

** In addition to the station, each MS / MRS also includes a pipeline connecting the station to the transmission pipeline.*

5.2.4 Potential connections

Potential connections are projects that the TSO estimates will have to be carried out considering the expected development of the transmission system, distribution systems and network users' needs for connections to the transmission system in the next ten-year period, but the interest in connection has not yet been expressed by existing or potential users, or has ceased.

Table 23. Potential connections (as of 01/01/2023)

#	Project name	Purpose	Planned start of operations
B83	MRS TOŠ; R52 Kleče – TOŠ	Connection of thermal energy plant	nd
B84	MRS Oplotnica	Connection of DSO	nd
B85	MRS Grosuplje, MRS Ivančna Gorica, MRS Trebnje, MRS Mirna Peč, MRS Mirna	Connection of DSO in the municipalities of Grosuplje, Ivančna Gorica, Trebnje, Mirna Peč, Mirna; connection with the system pipeline M5	nd
B86	MRS Škofljica/Ig	Connection of DSO	nd
B87	MRS Komenda	Connection of DSO	nd
B88	MRS Brezovica/Log Dragomer	Connection of DSO	nd
B89	MRS Semič MRS Metlika MRS Črnomelj	Connection of DSO; connection with the system pipeline R45	nd
B90	MRS Dobrepolje	Connection of DSO	nd
B91	MRS Velike Lašče	Connection of DSO	nd
B92	MRS Sodražica	Connection of DSO	nd
B93	MRS Ribnica	Connection of DSO	nd
B94	MRS Kočevje	Connection of DSO	nd
B95	MRS Postojna	Connection of DSO	nd
B96	MRS Pivka	Connection of DSO	nd
B97	Gas transmission connection MRS Dekani – Port of Koper	Connection of the Port of Koper to supply port mechanisation	nd

5.3 Development of interconnection points with the neighbouring transmission systems

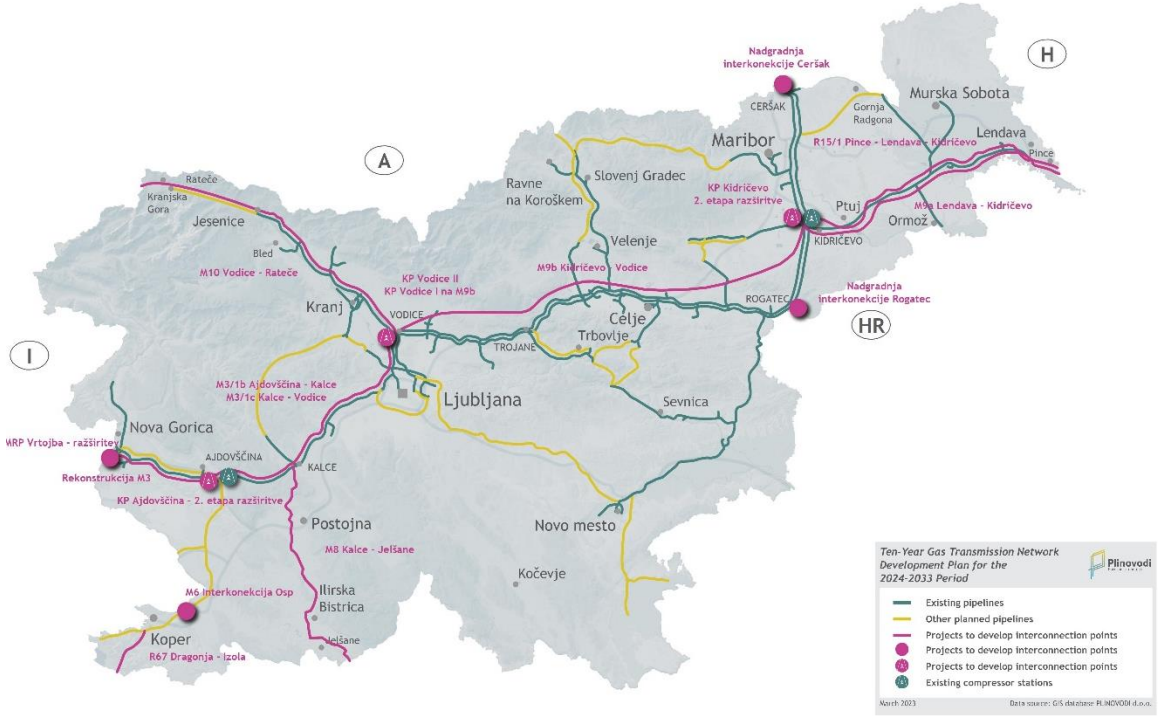

Figure 33. Projects for the development of interconnection points with the neighbouring transmission systems

Table 24. Development of interconnection points with neighbouring countries

C	Project name	Purpose	Planned start of operations	Status PCI 2021
C1	CS Ajdovščina extension			
	Stage two	Evacuation of the natural gas from the LNG terminal at Krk and from the IAP project (Ionian Adriatic Pipeline)	nd	-
C2	Reconstruction of M3 at section CS Ajdovščina – Miren with branches			
	Adjustment of the two-way operation regime to the operating parameters of the Italian TSO transmission system		nd	-
C3	R15/1 Pince – Lendava – Kidričevo			
	BMCS Pince	Bi-directional connection of the Hungarian and Slovenian transmission systems	2027	-
	Stage one: Pince – Lendava		2027	
	Stage two: Lendava – Ljutomer		2027-2029	
	Stage three: Ljutomer – Kidričevo		2027-2029	
C4	Upgrade of interconnection Ceršak (M1/3 interconnection Ceršak)	Adjustment of operating parameters of the Austrian and Slovenian transmission systems and the provision of reverse flows within the bi-directional gas route Austria-Slovenia-Croatia	after 2026	-
C5	CS Kidričevo – stage 2 of extension	Improvement of operating parameters in M1/1 and M2/1 in the framework of the bi-directional gas route Austria - Slovenia - Croatia	after 2026	Status PCI 2021

C6	CS Vodice II	Improvement of operating parameters in M2, M2/1, M3, M3/1, M5, M10 in the framework of the bi-directional gas route Italy - Slovenia - Hungary and bi-directional gas route Austria - Slovenia - Croatia	nd	-
C7	BMCS Vrtojba, extension	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows due to the evacuation of the natural gas from the LNG terminal at Krk and from the IAP project or the corridor for the transmission of large volumes IT - SI - HU	nd	-
C8	M3/1b Ajdovščina – Kalce	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows due to the evacuation of the natural gas from the LNG terminal at Krk and from the IAP project or due corridor for the transmission of large volumes IT - SI - HU	nd	-
C9	M3/1c Kalce – Vodice	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows due to the evacuation of the natural gas from the LNG terminal at Krk and from the IAP project or the corridor for the transmission of large volumes IT - SI - HU	nd	-
C10	M8 Kalce – Jelšane	Evacuation of the natural gas from the LNG terminal at Krk and from the IAP project, as well as the connections of new municipalities in Slovenia	nd	-
C11	R67 Dragonja – Izola	Interconnector with the Croatian TSO	nd	-
C12	Upgrade of interconnection Rogatec (M1A/1 Interconnection Rogatec)	Interconnector with the Croatian transmission system: construction of cross-border pipeline and extension of BMCS Rogatec		
	First phase: Extension of BMCS Rogatec	Increase of the operational security	2026	Status PCI 2021
	Second phase: Construction of the cross-border pipeline	Expansion of the pipeline system	after 2026	
C13	M9a Lendava – Kidričevo (and extension of CS Kidričevo)	Cross-border transmission - extension of the bi-directional gas route Italy-Slovenia-Hungary	nd	-
C14	M9b Kidričevo – Vodice and CS Vodice I	Cross-border transmission - extension of the bi-directional gas route Italy-Slovenia-Hungary	nd	-
C15	M10 Vodice – Rateče	Cross-border transmission	nd	-
C16	M6 Interconnection Osp	Interconnector with the Italian transmission system	nd	-
C17	CS Kidričevo – stage 3 of extension	Improvement of operating parameters R15/1	2027–2029	-

The planning of new gas transmission routes, their capacities and the increase of existing transmission capacities of connections with the neighbouring transmission systems dictate the following:

- The criteria for the security of gas supply in accordance with Regulation (EU) 2017/1938[19], which in fact requires an interconnection between the Slovenian transmission system with multiple gas sources by more routes, and the possibility of storing and using the gas in underground storage facilities in the region, which is formally linked to the fulfilment of the N-1 infrastructure standard and the establishment of reverse flows,

[19] Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard security of gas supply and repealing the Regulation (EU) 994/2010.

- An increasingly dynamic gas market in the region, which is characterised by the need of its stakeholders to transmit the gas, whose quantities cannot be reliably predicted, while the tendency for the use of underground gas storage facilities and LNG terminals in the region is increasing,
- New directions of gas inflows into the region, deviating from the hitherto traditional directions (north-south) for which the transmission systems were designed and built;
- The adaptation of the transmission systems of countries to the gradual convergence of gas markets in the countries or support to a more integrated natural gas market in the region, which is also the purpose of modelling the gas market in the direction of searching for "ACER - target model of the gas market".

The above tendencies and changes are already followed by the physical flows of the gas in transmission systems in the region. An analysis of regional development strategies and plans, as well as operating conditions of transmission systems shows the opportunity to establish **bi-directional** gas routes between:

i. Croatia and Slovenia, and
ii. Italy and Hungary via Slovenia.

In the first case, the already existing Slovenian transmission system is mainly to be upgraded, and in the second case, the existing transmission system is being upgraded and a new regional gas pipeline is being built.

5.3.1 Bi-directional gas route Italy - Slovenia - Hungary

A planned project between Hungary and Slovenia is enabling the establishment of gas flows between Italy and Hungary via Slovenia, and thus the direct interconnection between these three gas markets. The purpose of the project is to connect the unconnected Slovenian and Hungarian transmission systems, managed by the Hungarian system operator, the FGSZ Ltd. company.

In the first phase, a new interconnection of the Hungarian and Slovenia transmission system will be established to build the R15/1 pipeline at the first section Pince - Lendava, which will provide:

- The interconnection of previously unconnected transmission systems and, consequently, the interconnection of Slovenian and Hungarian gas markets,
- Access to the Hungarian trading platform and Hungarian underground storage facilities,
- The access of Hungarian suppliers to the western gas markets and to the LNG sources in Italy and North Adriatic, as well as
- The increase in the security of supply in Slovenia and the improvement of the infrastructure standard N-1.

Below, the impact of the establishment of the Hungary – Slovenia connection on the infrastructure standard N-1 is graphically depicted. To build the first phase of the R15/1 project (Pince - Lendava - Kidričevo), which includes BMCS Pince and the R15/1 pipeline at the Pince - Lendava section, planned in 2026, the basic capacity of connection will be provided, making the infrastructure standard N-1 to improve by approximately 10 percentage points. In the planned next phase of the project, an additional increase of the infrastructure standard N-1 for 9 percentage points could be provided due to the construction of the R15/1 gas pipeline from Lendava to Kidričevo (presented in the Figure below).

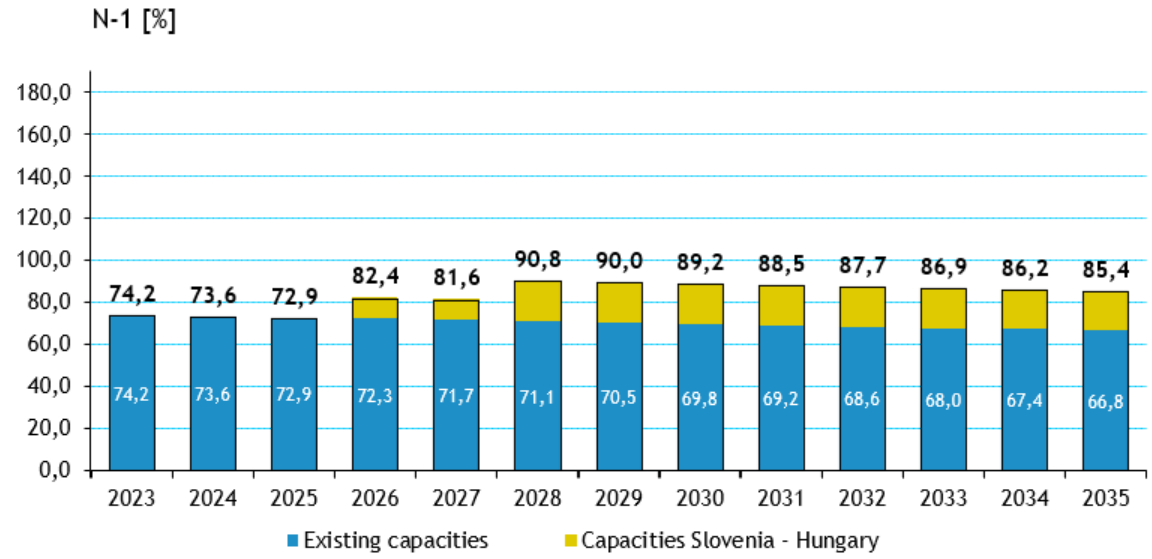

Figure 34. The impact of the Hungary – Slovenia connection to the improvement of the infrastructure standard N-1

The establishment of a bi-directional gas interconnection between Hungary and Slovenia in the context of the bi-directional gas route Italy - Slovenia - Hungary will:

- Enable the bi-directional interconnection of the Hungarian gas market with the Italian gas market, thereby increasing the presence of several gas sources in the region,
- Provide better access to the gas storage facilities and more efficient use of the storage facilities,
- Increase the responsiveness and flexibility of the operation of transmission systems to the situation on the gas market in the region,
- Contribute to the increase in the security of supply throughout the region due to better access and exploitation of natural gas supply sources, natural gas supply routes, and gas storage facilities,
- Contribute to the interconnection of gas markets to the west and east of Slovenia, which are currently considered very varied in price; the interconnection will therefore contribute to the convergence of the gas prices, i.e. to the increasing of competitiveness.

The project of establishing a bi-directional gas route Italy - Slovenia - Hungary envisages the construction of a 74.5km long R15/1 gas pipeline from the cross-border point with Hungary to the Kidričevo compressor station including the Pince border metering and regulation station, the installation of an additional compressor unit at the Ajdovščina compressor station and the border metering and regulation station Vrtojba.

5.3.2 Bi-directional gas route Croatia - Slovenia

The project of bi-directional gas route Croatia - Slovenia has a status of the project of common interest (PCI).

It is an upgrade of the capacities of existing transmission systems and establishment of reverse flows with the system operated by the Croatian transmission system operator, Plinacro d.o.o.

Within the Slovenian transmission system, this project envisages the following:

- The reconstruction of the Rogatec interconnection point, and
- The expansion of the Kidričevo compressor station.

5.4 Development of hydrogen transmission projects

5.4.1 Hydrogen and renewable gas transmission system preparation projects

As is detailed in Chapter 4.3.3 below, one of Slovenia's key objectives by the year 2030, in accordance with the National Energy and Climate Plan adopted by the Government of the Republic of Slovenia on 27 February 2020, is to reduce the use of fossil energy sources and dependence on their imports, especially through the implementation of pilot projects for the production of synthetic methane and hydrogen with an indicative target of up to 10% share of methane or hydrogen of renewable origin in the transmission and distribution network by the year 2030.

The gas transmission system operator already carries out activities to prepare the gas transmission system to be injected and operate with hydrogen and renewable gases. In this way, the transmission system operator will provide a gas transmission infrastructure that will allow the injection of gases from RES, such as hydrogen and synthetic methane and biomethane, into the transmission gas system, and testing the operation of consumption units of end users connected to the transmission system with different mixtures of renewable gases. However, the transmission system operator will not carry out market activities and will not own any facilities for carrying out market activities, so that there would be no unauthorised subsidisation of market activities or breaches of certification provisions.

At the same time, with these projects, the TSO will strive to draw co-financing opportunities within the framework of open opportunities for cooperation, incentives for innovation and cross-border RES projects and related mechanisms, due to the fact that in this way, it approaches the implementation of sustainable projects for decarbonisation achieving the objectives of climate neutrality of community members. Through development activities, the TSO will pursue the activities of European TSOs in incentives and planning a future decarbonisation of the supply from transmission gas systems, cross-border connections, and drawing up plans for the European Hydrogen Backbone (EHB).

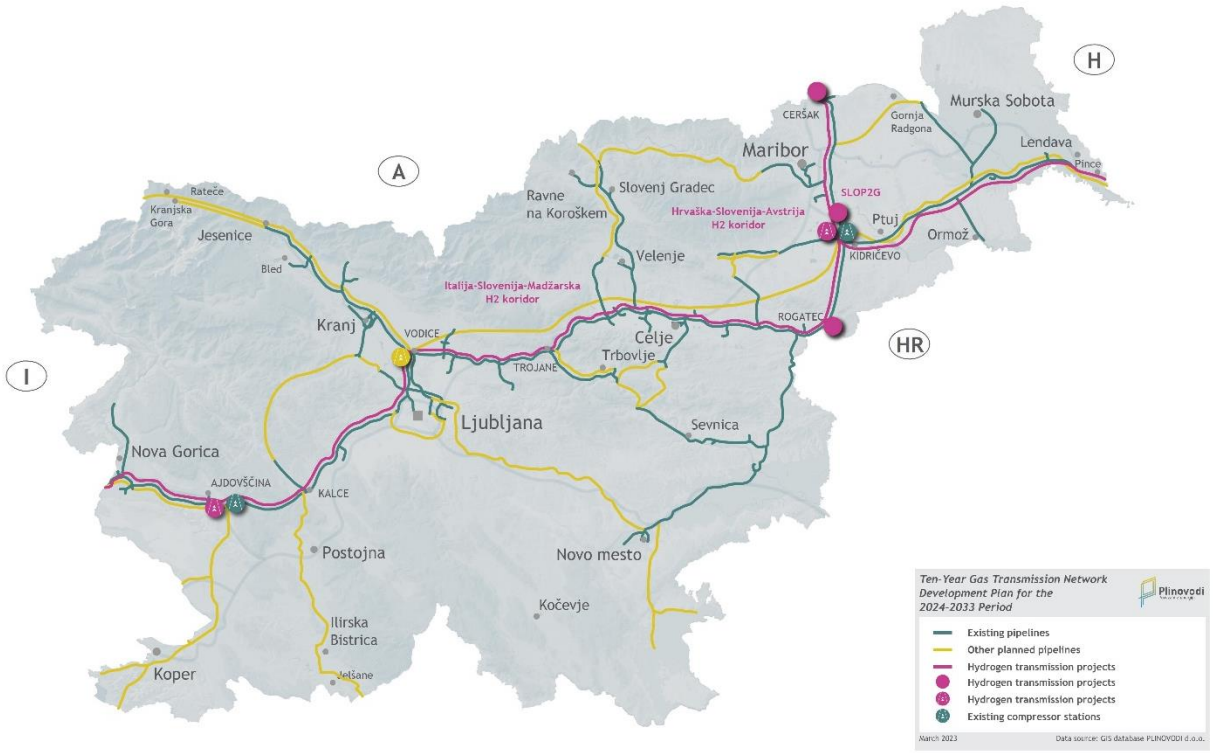

Figure 35. Hydrogen transmission projects

Table 25. Development of hydrogen transmission projects

D	Project name	Purpose	Planned start of operations
D1	Italy – Slovenia – Hungary H2 corridor		
	R15/1 Pince - Lendava - Kidričevo	New pipeline for the transmission of hydrogen from the SI-HU border to CS Ajdovščina, including the new BMCS Pince for new H2 IP-SI-HU Pipeline technical parameters: L=75 km, D=500 mm, P=100 bar.	2035
	M1/1 repurposing	Repurposing of the existing pipeline from CS Kidričevo to BMCS Rogatec, including the necessary updates of the existing BMCS Rogatec to allow measurements and regulation of the hydrogen flow. Section technical parameters: L=20 km, D=800 mm, P=70 bar.	2029
	M2/1 repurposing	Repurposing of the existing pipeline from BMCS Rogatec to MRS Vodice. Section technical parameters: L=109 km, D=800 mm, P=70 bar.	2029
	M3/1 Vodice - Šempeter	New pipeline for transferring hydrogen from MRS Vodice to the SI-IT border (BMCS Vrtojba), including necessary upgrades to BMCS Vrtojba and MRS Vodice to allow measurements and regulation of hydrogen flow. Pipeline technical parameters: L=101 km, D=800 mm, P=100 bar.	2035
	CS Ajdovščina, stage 2 of extension	Additional compressor unit and necessary upgrades at the location of the existing CS Ajdovščina.	2035
	CS Kidričevo, stage 3 of extension	New hydrogen compressor units at the location of the existing CS Kidričevo.	2035
D2	Croatia – Slovenia – Austria, H2 corridor		
	Upgrade of interconnection Ceršak	Upgrade of the existing BMCS Ceršak to allow measurements and regulation of hydrogen flow.	2035
	M1/1 repurposing	Repurposing of the existing pipeline from BMCS Ceršak (SI-AT Ip) to BMCS Rogatec (SI-CRO IP). Pipeline technical parameters: L=58 km, D=800 mm, P=70 bar.	2029
	CS Kidričevo, stage 2 of extension	Additional compressor unit and necessary upgrades at the location of the existing CS Kidričevo.	2035
	Upgrade of interconnection Rogatec	Upgrade of the existing BMCS Rogatec to allow measurements and regulation of hydrogen flow.	2035
D3	Analyses, studies and testing with the gases from the renewable energy sources	Analyses and studies of the transmission network and its parts for the acceptance of renewable gases and testing to determine the acceptable shares, volume and composition of renewable gases in the gas transmission system for safe, reliable and effective operation of the gas transmission system.	2024 and after 2024
D4	Hydrogen and renewable gas transmission system preparation projects	Location analysis and planning of transmission pipeline system upgrades for the preparation for injection and operation with hydrogen and renewable gases. Mobile connection unit for injecting hydrogen	2024 and after 2024
D5	SLOP2G	Gas transmission part of the project to connect the gas and electricity sectors and production of green hydrogen by TSO for its own needs with an emphasis on the connection of facility to produce green hydrogen via the connection system for admixture and injection of hydrogen into the gas transmission system with all pertinent systems for remote control and management of injection process. The TSO may use the green hydrogen produced within the project for the purposes of own use.	nd
D6	SLOH2 Backbone	Repurposing of a part of transmission system for pure hydrogen that comprises the analysis of necessary	nd

		upgrades, and a part for redesigning the existing duplicated gas pipeline system from Ceršak to Vodice into the hydrogen pipeline system to transfer pure hydrogen. Analyses will be carried out within the scope of the projects that are necessary to obtain a relevant certificate from the accredited European institution and that will define the scope of work and upgrades physically executed as a part of repurposing of gas pipeline facilities into the hydrogen pipeline buildings.	
D7	R25D-H Šoštanj - Šentrupert	Drawing up scientific bases for planning and siting the new pipeline for transferring up to 100% hydrogen from Šoštanj to Šentrupert via injection into the M2/1 transmission pipeline.	nd
D8	CS Šoštanj	Drawing up scientific bases for planning and siting the compressor unit for compressing up to 100% hydrogen at the Šoštanj location	nd

5.5 Projects in preparation and planning in the 2024 – 2026 period and projects in implementation

The TSO estimates to have a total of 25 projects in preparation and planning in the 2024 – 2026 period and to carry out (construct or begin construction on) 22 of those projects, while 17 will remain in the planning phase with envisaged investments in studies, spatial and investment documentation in the next three years. Although most of them did not have the FID status on 01/01/2023, the TSO assesses the appropriate maturity of projects in relation to the achieved level of processing both on the side of the TSO and on the side of the neighbouring transmission system operators or potential network users. The implementation of projects, due to the fulfilment of the legislative provision of proportionality of costs, will not have an impact on the possible increase of tariffs.

Table 26. Projects planned in the 2024 - 2026 period

#	Project name	Purpose	Level of treatment 01/01/2023	Planned start of operations
A1	Loop to Zreče			
	Stage two: R21AZ Oplotnica - Zreče	Expansion of the pipeline system	NSP prepared	after 2026
	Stage three: P21AZ1 Oplotnica - Slovenska Bistrica	Expansion of the pipeline system	NSP prepared	after 2026
A13	M5 Vodice – Jarše – Novo mesto			
	Stage two: Jarše - Grosuplje	System pipeline; the expansion of the transmission system with the possibility of connection of municipalities and the increase of the operational security	Conceptual designs	after 2026
	Other stages: Grosuplje - Novo mesto	System pipeline; the expansion of the transmission system with the possibility of connection of municipalities and the increase of the operational security	Conceptual designs	after 2026
A16	Backup Management Centre	Facility, development of information systems at the back-up site	Analyses	after 2026
A19	R25A/1 Trojane - Hrastnik			
	Stage one: Trojane - Trbovlje	Increase in operational security with the possibility to operate by using renewable gas and up to 100% hydrogen	NSP prepared	after 2026
A30	R23-R23B loop (Celje-Štore-Laško)	Increase of the operational security with the system loop	Analyses	after 2026
A32	M3/1a Šempeter - Ajdovščina*	System line to increase operational security by enhancing cross-border transmission capacity from the western direction. Provision of adequate transmission capacity in the event of a shortfall	NSP prepared	2028

		from the eastern supply direction, and also harmonisation with the existing capacity and operating pressures of the Italian transmission system, the integration into the gas pipeline corridors.		
C3	R15/1 Pince – Lendava – Kidričevo			
	Stage two: Lendava – Ljutomer	Bi-directional connection of the Hungarian and Slovenian transmission systems	NSP in preparation	2027-2029
	Stage three: Ljutomer – Kidričevo			2027-2029
C4	Upgrade of interconnection Ceršak (M1/3 Interconnection Ceršak)	Interconnector with the Austrian TSO, adjustment to operating parameters of the transmission system of Austrian TSO	NSP prepared	after 2026
C5	CS Kidričevo – stage 2 of extension	Improvement of operating parameters in M1/1 and M2/1 in the framework of the bi-directional gas route Austria - Slovenia - Croatia	NSP prepared	after 2026
C12	Upgrade of interconnection Rogatec, Phase 2: Construction of the cross-border pipeline	Expansion of the pipeline system	NSP prepared	after 2026
C17	CS Kidričevo – stage 3 of extension	Improvement of operating parameters R15/1	Conceptual designs	2027-2029
D1	M1/1 repurposing	Repurposing of the existing pipeline from CS Kidričevo to BMCS Rogatec, including the necessary updates of the existing BMCS Rogatec to allow measurements and regulation of the hydrogen flow. Section technical parameters: L=20 km, D=800 mm, P=70 bar.		2029
	M2/1 repurposing	Repurposing of the existing pipeline from BMCS Rogatec to MRS Vodice. Section technical parameters: L=109 km, D=800 mm, P=70 bar.		2029
D2	M1/1 repurposing	Repurposing of the existing pipeline from BMCS Ceršak (SI-AT Ip) to BMCS Rogatec (SI-CRO IP). Pipeline technical parameters: L=58 km, D=800 mm, P=70 bar.		2029
D3	Analyses, studies and testing with the gases from the renewable energy sources	Analyses and studies of the transmission network and its parts for the acceptance of renewable gases and testing to determine the acceptable shares, volume and composition of renewable gases in the gas transmission system for safe, reliable and effective operation of the gas transmission system.	Analyses	2024 and after 2024
D4	Projects to prepare transmission System to operate with hydrogen and renewable gases	Location analysis and planning of transmission pipeline system upgrades for the preparation for injection and operation with hydrogen and renewable gases. Mobile connection unit for injecting hydrogen.	Analyses	2024 and after 2024
D7	R25D-H Šoštanj - Šentrupert	Drawing up scientific bases for planning and siting the new pipeline for transferring up to 100% hydrogen from Šoštanj to Šentrupert via injection into the M2/1 transmission pipeline.	Conceptual designs	nd
D8	CS Šoštanj	Drawing up scientific bases for planning and siting the compressor unit for compressing up to 100% hydrogen at the Šoštanj location	Conceptual designs	nd

Table 27. Projects in preparation in the 2024 – 2026 period

#	Project name	Purpose	Level of treatment 01 01 2023	Planned start of operations
A2	R51a Jarše – Sneberje	Increase of the operational security with the system loop	NSP prepared	after 2026

A15	Management Centre	Facility, development of information systems, digitalisation, and content upgrade	Conceptual designs	2027
A21	R42/1 Anže – Brestanica	Expansion of the pipeline system	NSP in preparation	2027
A24	Relocation of part of the P29134 gas pipeline in the area of Kranj	Increase of the operational security	Conceptual designs	2025
B1	MRS Brestanica; R42/1 Anže - Brestanica	Change in connection of final user	NSP in preparation	2027
B30	Supply to users and other connection projects	Connection of new users with mobile systems, connection of filling stations for compressed natural gas and adjustment of existing connection points	Conceptual designs	2024–2033
C3	R15/1 Pince – Lendava – Kidričevo			
	BMCS Pince	Bi-directional connection of the Hungarian and Slovenian transmission systems	NSP prepared	2027
	Stage one: Pince – Lendava			2027
C12	Upgrade of interconnection Rogatec (M1A/1 Interconnection Rogatec)	Interconnector with the Croatian TSO: construction Of the cross-border pipeline and extension of BMCS Rogatec		
	First phase: Extension of BMCS Rogatec	Increase of the operational security	NSP prepared	2026

Table 28 presents all projects that have been approved by the Energy Agency and are in the implementation phase and which have connection contract concluded.

Table 28. FID projects

#	Project name	Purpose	Level of treatment 01/01/2023	Planned start of operations
A1	Loop to Zreče			
	Stage one: R21AZ Konjiška vas – Oplotnica	Increase of the operational security with the system loop	NSP prepared	2024
A3	R51b TE–TOL Fužine/Vevče	Increase of the operational security with the system loop and the possibility of connection of DSO to MOL	NSP prepared	2025
A4	R51C Kozarje – Vevče	Increase of the operational security with the system loop	NSP prepared	2026
A14	M6 Ajdovščina – Lucija	System pipeline; the expansion of the transmission system with the possibility of connection of municipalities and the increase of the operational security	NSP prepared	2024–2026
A15	Management Centre	Facility, development of information systems, digitalisation, and content upgrade	Conceptual designs	2027
A17	Data transmission network	Increase of the operational security	Conceptual designs	2026
A27	CS Ajdovščina extension			
	Stage one	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows	NSP prepared	2024
A29	BMCS Vrtojba	Adjustment of the two-way operation regime to the operating parameters of the Italian TSO transmission system	NSP prepared	2025
A33	System and equipment for controlling methane emissions	Establishment of the system to detect and control methane emissions in the transmission system	Construction and partial planning	2026

B2	MRS Miklavž na Dravskem polju	Connection of DSO	OPN in the adoption phase	2024[20]
B3	MRS Velika Polana	Connection of DSO	GD (operating permit)	np[21]
B4	R25A/1 Second stage Trbovlje – Hrastnik with MRS Hrastnik and MRS Podkraj	Change in connection of three final users	NSP prepared	2025
B5	MRS Duplica	Change in connection of DSO	Conceptual designs	2024
B6	MRS Kamnik-center	Change in connection of DSO	Conceptual designs	2024
B7	MRS Sava with a pipeline	Change in connection of final user	OPPN adopted	2025
B8	MRS Verovškova/KEL	Change in connection of final user	Conceptual designs	2025
B9	MRS Koto	Change in connection of final user	OPPN adopted	2025
B10	MRS Dobrunje	Connection of DSO	NSP prepared	2024
B11	MRS Emona	Connection of final user	Conceptual designs	2024[22]
B12	MRS Donit	Change in connection of final user	OPPN phase	2024
B13	MRS Impol	Change in connection of final user	NSP prepared	2026[23]
B19	MRS Sežana, MRS Kozina, MRS Dekani, MRS Koper, MRS Izola, MRS Lucija	Connection of DSO in municipalities of Sežana, Hrpelje-Kozina, Koper, Izola, Piran; connection with the system pipeline M6	NSP prepared	2024–2026

Note *	Based on a detailed analysis, the TSO found that a part of FID project A28, Reconstruction of M3 at the section CS Ajdovščina – Miren with branches, Adjustment to the operational parameters of the Italian TSO's transmission system (73.9bar) is not executable due to new conditions in the region and in the transmission system. For this reason, the TSO must replace the construction of the project A32 M3/1a Šempeter – Ajdovščina.

5.6 Assessment of options for the increase of energy efficiency

In accordance with Article 6 of the Gas Supply Act (ZOP), the development plan must include an assessment of the potential for the increase of energy efficiency of gas and electricity infrastructure by means of load balancing and interoperability, connection with gas production plants, and define time dynamics and financial evaluation of planned investments and actual measures for cost-effective improvements in the network infrastructure. The TSO is carrying out a number of activities in these areas, some of which are legally binding, but most of them are a result of the innovation process that has been introduced in the company in recent years and has already been showing encouraging success. We are constantly upgrading the innovation process, while also motivating employees for their participation.

5.6.1 Load management and interoperability of the transmission system

In order to provide sufficient capacity for the required transmission system load and its interoperability with the neighbouring transmission systems, the TSO ensures coordinated development of the transmission system and interconnection points with the neighbouring transmission systems. By upgrading the backbone of the transmission system and upgrading the compressor station in Kidričevo, the TSO has provided the necessary transmission capacities in recent years and significantly improved the operational characteristics of the transmission system. At the end of 2018, the TSO ensured the possibility of bi-directional operation of the connection between Slovenia and Croatia by upgrading the border metering and control station in Rogatec, which represents an important contribution from the point of view of

[20] The envisaged start of operation depends on the adoption of the planning document by the municipality.
[21] The envisaged start of operation depends on the DSO selection by the municipality.
[22] The envisaged start of operation depends on the user.
[23] Envisaged start of operation depends on the implementation of the A1 project First stage: R21AZ Konjiška vas – Oplotnica.

interoperability of the Slovenian and Croatian transmission systems, and in 2021 the first gas transmission from Croatia to Slovenia took place. Due to the war in Ukraine, the TSO prioritised the implementation of activities required for increasing flow-pressure characteristics from the western supply direction, including the projects of new BMCS Vrtojba and expansion of the CS Ajdovščina with the third compressor unit. In the sense of ensuring energy efficiency, the TSO devotes a lot of attention to the regime of compressor station operation and the balancing of the transmission system, where both the number of operating hours and the operating settings of the compressor units are optimised. The above-mentioned upgrades, which provided the required transmission capacity and enabled further development of the transmission system, within the meaning of Article 15 of the Regulation 2018/1999[24] on energy efficiency, represent a very important contribution to increasing the efficiency of gas infrastructure.

After the upgrades, the transmission system can, from the perspective of ensuring interoperability, enable the handling of transmission capacities according to the model of entry-exit points, where users can independently book the entry and exit capacities. After the upgrades, there are no more internal bottlenecks on the main trunk gas pipelines, and gas can be transmitted from one entry point practically to any exit point. The independent treatment of transmission capacity at entry and exit points has enabled the introduction of a virtual point of gas trading on the Slovenian transmission system, which represents an additional contribution to the effectiveness of balancing the deviations between the takeover and delivery of gas to the holders of balance groups, and to ensuring the balance of the transmission system. The TSO has established a virtual point of gas trading and has been its operator since 2015. The connection between the Slovenian and Hungarian transmission systems will also contribute to increased interoperability of the Slovenian gas infrastructure, which is being planned by both neighbouring transmission system operators in several phases, taking into account the gradual increase in transmission capacity.

5.6.2 Connection with energy production plants, including microproduction

On the gas transmission system, cooling of the gas occurs during pressure reductions, and it is therefore necessary to provide heating to prevent the formation of unwanted condensate or freezing. Gas heating is performed by a hot water heating system, where hot water for heating is prepared in the boiler room with gas boilers and associated safety and control equipment, and only gas heating is performed in heat exchangers in the reduction part of the metering and regulation stations (hereinafter referred to as: the "MRS").

The modernisation of the heating system in the MRS on the gas transmission system was carried out in such a way that the built-in condensing gas boilers regulated the outlet temperature of gas from the MRS according to the actual dew point temperature of the outside air, thus preventing the formation of condensate and in winter also its freezing on the safety and regulation equipment, therefore preventing improper operation of the equipment. Based on detailed knowledge of the legality of the heating system and the functionality of the subject equipment, it was achieved that by regulating the gas temperature according to the dew point temperature of outdoor air ensures the minimum required temperature of heated water in the boiler part and the minimum required gas outlet temperature from the MRS and thus also lower heat losses. So far, the heating system has been modernised at 37 MRSs, which have higher flows at the annual level in order to increase gas savings, and the Plinovodi company will continue with its modernisation in the future and thus increase the energy efficiency of the gas transmission system.

[24] REGULATION (EU) 2018/1999 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 on the Governance of the Energy Union and Climate Action. (ES) No. 663/2009 and (EC) 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No. 525/2013 of the European Parliament and of the Council

In terms of ensuring energy efficiency, the Plinovodi company took advantage of the possibility of using the electrical equipment of the gas transmission system in connection with the electricity network. To ensure reliable operation of the systems and subsystems, a spare diesel generator was installed at both Plinovodi's compressor stations, which provides backup power supply to the compressor station in the event of a power failure in the distribution network.

In accordance with the Electricity Supply Act, the ELES d.o.o. company as a system operator of the transmission electricity network provides system services, including the provision of the manual process for frequency recovery. To perform this service, the ELES d.o.o. company needs regulation units that are in standby mode and are able to deliver the contractual amount of electricity to the transmission network at the agreed time upon request. The Plinovodi company has also decided to participate in the implementation of the manual process for frequency recovery, where we have previously upgraded the equipment and electrical connection and signed a contract with the power aggregator, which stipulates that the Plinovodi company will remotely start the spare diesel units at the location of the compressor stations in Ajdovščina and Kidričevo and thus respond to a request for electricity production. Thus, from June 2016 to the end of 2021, 18.6MWh of electricity was produced on the basis of the operation of spare diesel generators at both compressor stations for the needs of performing the service in question.

In order to increase energy efficiency, the Plinovodi company also decided to build a small 63 kW photovoltaic power plant at the company's headquarters in Ljubljana. The power plant was built in the year 2011. The Plinovodi company has signed a contract with the Borzen company on the provision of support as a guaranteed purchase of electricity produced from renewable energy sources in a photovoltaic power plant. Based on this contract, all electricity produced is taken over and purchased in the network of the distribution system operator by the Borzen company.

The electricity produced in the photovoltaic power plant at the Plinovodi company from December 2011 to December 2022 inclusive amounts to 691,325kWh and represents a contribution to energy efficiency, which the Plinovodi company will have at its disposal in the coming years.

With the aim of possible cogeneration of heat and electricity (CHP) on the natural gas transmission system, a pilot project of installing a CHP plant at the MRS Maribor, which is located within the Maribor Maintenance Centre, was carried out by the TSO. Thus, at the MRS Maribor, the entire heat produced from the CHP plant is used to provide part of the necessary technological heat for the operation of the MRS Maribor, part of the electricity produced from the CHP plant is used to cover the needs of the Maribor Maintenance Centre for electricity, while the remaining part of the produced electricity is taken over and purchased into the network of the distribution system operator by the Borzen company on the basis of a signed contract on the provision of support as a guaranteed purchase of electricity with the Borzen company. Thus, in the period from March 2017 to the end of 2022, the total amount of electricity produced was equal to 367.9MWh.

In the context of microproduction, connections of biomethane production devices to distribution networks or gas transmission systems on gas networks in Western Europe are expanding. The Plinovodi company monitors the intensity of the connection of green hydrogen, synthetic gas, and biomethane production devices in Europe and supports the first projects that are being prepared in Slovenia.

5.6.3 The activities of the TSO in the processes of decarbonisation in the Republic of Slovenia and in the field of the use of alternative gas energy products

The TSO is monitoring the processes of decarbonisation towards the fulfilment of the objectives of the low-carbon society. Gas will play an important role in the processes of decarbonisation due to lower greenhouse gas emissions in comparison with the fossil fuels. Therefore, the TSO is encouraging the connection of devices for cogeneration of heat and electricity, as well as the use of gas connectors in the transport sector. It also promotes the use of gas heat pumps to increase energy efficiency and relieve the electricity system.

The TSO also monitors and engages in the development in the field of application of gas transmission systems for transmission of alternative gaseous fuels (e.g., biomethane, synthetic methane, hydrogen) or the storage and transmission of surpluses of renewable energy sources in the form of alternative gaseous fuels. The TSO monitors the interest in domestic production of renewable gases. According to the interest shown, the TSP will adequately upgrade and prepare the transmission system for the injecting process and operation with renewable gases (Chapter 4). Given the national and EU climate objectives and commitments, it is expected for the interest in domestic production and injection of renewable gases to increase; the biggest challenge will be hydrogen that has a great impact on the security, integrity and operation of the transmission system. Due to specificities introduced by hydrogen into the transmission system operation, the TSO will mainly focus on the hydrogen in preparing the transmission system for renewable gases.

In the process of decarbonisation, the share of renewable energy sources is going to increase in the energy balance sheets. In the future, it will be necessary to take advantage of natural opportunities of obtaining alternative sources of gas, as well. The TSO monitors the development of technologies and legislation in the field of injection and transmission of alternative gaseous fuels. The legislation of the entire European Community has not been prepared yet, but there are already several guidelines, standards, and laws at the level of individual Member States. The TSO monitors the development of the EU regulations and legislation at the level of the European Community as a whole, and on the basis of which it will adequately prepare the transmission system to anticipate permissible shares of hydrogen in transmission systems of EU Member States and thus provide a smooth transition and monitoring of the gas or gas mixtures and hydrogen from the neighbouring countries. Moreover, the NEPN also provides for the increase in the share of renewable gas energy in the gas infrastructure, thereby renewable energy sources become accessible to a wide circle of users.

5.6.4 Investments and actual measures for cost-effective improvements in the network infrastructure

The TSO monitors the energy efficiency by tracking environmental indicators within the framework of the established Environmental Management System according to the ISO 14001 standard. In addition to the comprehensive management of the environmental aspects of Plinovodi's activities, the system also includes cost control and efficient use of resources. Environmental indicators are set up to express the environmental and economic performance of business processes as clearly as possible, while the TSO through individual investments provides for even better exploitation of energy products based on the performed analyses of environmental indicators. The measures for cost-effective improvements are linked to regular periodic evaluation of the following environmental indicators in the company Plinovodi: consumption of gas for own use, and cooling and heating of business premises, flue gas emissions, noise emissions, water consumption, electricity consumption and generation, heat energy consumption, fuel consumption, flue gas quantity, carbon footprint of the company, and the amount of disposed waste. With the aim to additionally optimising energy consumption, the TSO started initial activities in 2023 to introduce the energy management system.

6 European dimension of gas supply

The 2022/2023 heating season was highly influenced by the war in Ukraine and resulting adjustments of the European energy policy. The European Commission adopted a series of measures to neutralise the impact of almost completely interrupted supply of natural gas from Russia. Thus, it adopted measures for voluntary reduction of natural gas consumption by 15%, for mandatory filling of gas storage facilities, establishment of the platform for joint gas purchase in global markets, etc. The measure on voluntary reduction of gas consumption was prolonged also into the 2023/24 heating season, with the exception of several heating plants that provide heat for district heating systems and where coal is being replaced with cleaner fuel, i.e. natural gas.

The European Commission presented the most comprehensive programme of measures in the document called REPowerEU, which supports diversification of energy supply. On the one hand, it is an accelerated establishment of the gas pipeline infrastructure that should allow the inflow of natural gas from the altered supply directions (i.e. mostly from the west, north and south of Europe), and a higher inflow of natural gas via the LNG terminals. On the other hand, the European Commission significantly increased the goals to use biomethane and green hydrogen already by 2030. The Member States must prepare a new chapter in the Recovery and Resilience Plan in line with the REPowerEU, and adjust its content.

At the level of the whole Europe, the focus will be on the operation of the integrated internal energy market. In this regard, the importance lies in connections between Member States to provide access to energy from various sources and routes. Suitable infrastructure connections will be also essential for ensuring adequate energy security in the future.

6.1 Intensive development and upgrades to gas transmission systems in EU countries

Regulation (EU) 2023/435 of 27/02/2023 amending Regulation (EU) 2021/241 regarding the "REPowerEU" measures in recovery and resilience plans addressed investments aimed at contributing to the following goals:

- Improving energy infrastructure and facilities to satisfy the immediate needs of reliable gas supply, including liquefied natural gas, in particular to enable supply diversification in the interest of the Union as a whole,

- Eliminating internal and cross-border bottlenecks in transmitting and distributing energy.

In 2022 and 2023, tied to the provision of the reliability of gas supply after changes caused by the war in Ukraine, the following important gas pipeline projects were implemented in the EU:

A. In 2022, an LNG terminal was built and started its operation at Eemshaven, the Netherlands. The project was executed in two phases, and the total technical capacity of the terminal is 39 M Nm^3/day.

B. At the end of November, Finland introduced in operation a small LNG terminal in Hamina (0.5 M Nm^3/day), while in December, the operation of a large floating LNG terminal started in Inkoo (14 M Nm^3/day), which, in addition to Finland, will also partially supply Estonia.

C. In 2022 and 2023, the first three German floating LNG terminals were constructed and started their operation: Wilhelmshaven, Lubmin and Brunsbüttel. The floating LNG terminal Stade is still under construction and is planned to start its operation in December 2023.

D. In 2023, a new floating LNG terminal in Piombino, Italy started its operation, while a new floating terminal in Ravenna is expected to start its operation in 2024.

E. In October 2022, a new connecting pipeline between Greece and Bulgaria started its operation; it connects Bulgaria with the pipeline running through Azerbaijan via Turkey and Greece to Italy (3 billion Nm^3/year. The construction of the pipeline started three years ago and can meet total requirements of Bulgaria.

F. In May 2022, the pipeline between Poland and Lithuania started its operation (Gas Interconnection Poland–Lithuania, GIPL) providing gas transmission in both directions (2 billion Nm^3/year).

G. In November 2022, a new pipeline called "Baltic pipe" started its operation establishing a supply route Norway-Denmark-Poland with an annual transmission capacity of 10 billion Nm^3.

H. In 2022, the capacity of the pipeline between Lithuania and Latvia was increased (to 7.9 billion Nm^3).

I. In 2022, the pipeline between Poland and Slovakia started its operation (Gas Interconnector Poland–Slovakia, GIPS) providing gas transmission in both directions (4.7 billion Nm^3/year).

J. In December 2022, the physical transmission was executed for the first time through the "Trans-Balkan Pipeline) from Bulgaria via Romania to Ukraine and Moldova, which provides the supply of Moldova also from southern supply sources.

K. In 2022, a transmission from France to Germany was established, taking over also odorised gas from the French system during the declared crises level "Readiness".

L. In 2022, the capacity of the connection was increased between Spain and France by adjusting the transmission system operations (by 4 M Nm^3/day).

M. In 2022, the capacity of the connection was increased between Romania and Hungary (by 2.4 M Nm^3/day).

N. In Italy, upgrades of the transmission system are under way to increase the capacity from south to north.

O. In the Slovenian transmission system, by upgrading BMCS Šempeter, the technical capacity of the connection between Italy and Slovenia as of 01/10/2022 was increased from 2.5 million Nm^3/day to 3.4 million Nm^3/day.

The indicated projects (A-O) are marked on the map of European gas network (ENTSOG):

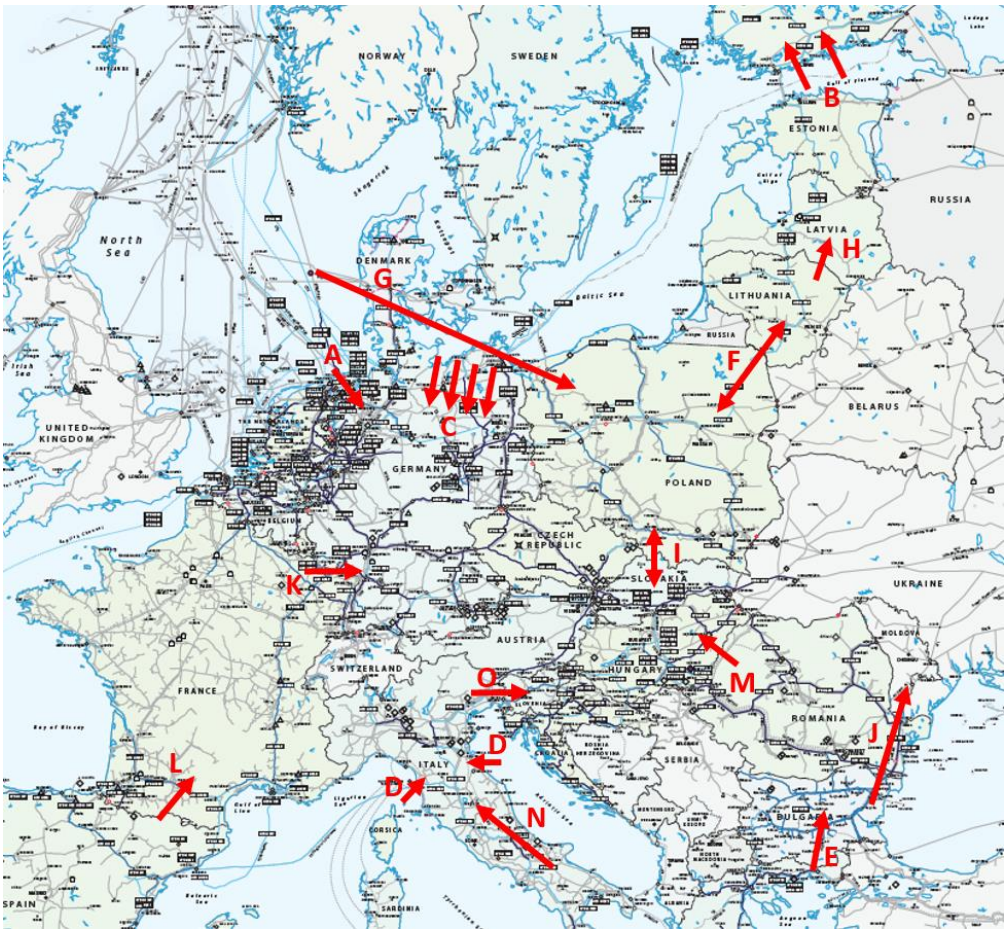

Figure 36. Projects of upgrading EU transmission systems in the 2022-2024 period

After the war started in Ukraine, Plinovodi also immediately approached the preparation of necessary upgrades of the Slovenian transmission system and already in May obtained a consent of the Energy Agency to amend the existing Ten-year gas transmission network development plan for the 2022-231 period and the Investment Plan 2022-2024.

6.2 Development of exchanges with other countries

In accordance with the Regulation of the Council (EU) 2022/1369, the Member States endeavour to voluntarily reduce gas consumption by at least 15%. In accordance with the Regulation, Member States monitor the gas consumption and strive to reach at least 15% reduction compared to their average gas consumption in the last five consecutive years before the entry into force of this Regulation. To maintain the reliable supply and price stability, the European Commission prolonged the framework for harmonised reduction of gas demand in the EU until 31/03/2024. The prolongation of the EU framework should contribute to reaching the goal set that by 01/11/2023 a 90% filling level of gas storage facilities is reached and in this way Europe will be better prepared for the coming winter. In accordance with the prolongation of the EU framework, the voluntary goal of 15% for reducing the gas demand in Member State, according to the average gas consumption in the period from 01/04/2017 to 31/03/ 022, shall be monitored between 01/04/2023 and 31/03/2024. The extended Regulation has a mechanism in place to adjust the reference consumption of gas given the quantity of the increased gas consumption due to the transition from coal to gas for district heating.

According to the European Commission's quarterly reports for the year 2022, gas consumption in the third quarter of the year 2022 decreased year-on-year by 8% (-5.1 bcm) compared to the third quarter of the

year 2021 and amounted to 59 billion cubic meters (bcm). On the other hand, the gas demand in the production of electricity increased by 13% (+15 TWh) compared to the third quarter of 2021. Due to the increasing gas prices, the gad demand decreased in energy-intensive industries.

In the third quarter of 2022, the year-on-year gas consumption increased only in six EU Member States. The biggest boost was recorded in France (+10%, +0.4 bcm) and Ireland (+ 9.3%, +0.1 bcm). In other 20 EU Member States (data for Cyprus not available), the year-on-year gas consumption decreased in the third quarter of 2022. Gas consumption deceased the most in Finland (-43%, -0.2 bcm), Latvia (-37%, -0.1 bcm), Estonia (-35%, -0.02 bcm) and Lithuania (-34%, -0.1 bcm). In major gas consumers, the year-on-year consumption decreased in the third quarter of 2022, namely in Romania by 31% (-0.5 bcm), in Poland by 26% (-1.1 bcm), in the Netherlands by 16% (-1.0 bcm), in Italy by 8% (-1.1 bcm) and in Germany by 5% (-0.4 bcm). In the same period, the gas consumption in Spain increased by 3% (+0.2 bcm).

6.3 Supply of gas to EU countries and access to gas sources

Although the EU still depends on the import of fossil fuels, it constantly diversifies its gas suppliers. The Russian invasion of Ukraine and filling energy storage capacities put the supply diversification higher on the list of EU priorities.

Although the diversification is a long-term and expensive process requiring investments in the infrastructure (new gas pipelines, LNG terminals, etc.), the results are already visible. In 2021, the EU imported 83% of its natural gas. Since the Russian invasion of Ukraine, the gas import from Russia to the EU reduced significantly. This was mainly compensated with strong increase LNG import, in particular from the USA.

Between January and November 2022, Russia (gas import from gas pipelines and LNG) accounted for less than one quarter of gas import to the EU. A quarter was imported from Norway and Algeria (11.6%). The LNG import (excluding Russia – in particular for the USA, Qatar and Nigeria) amounted to 25.7%.

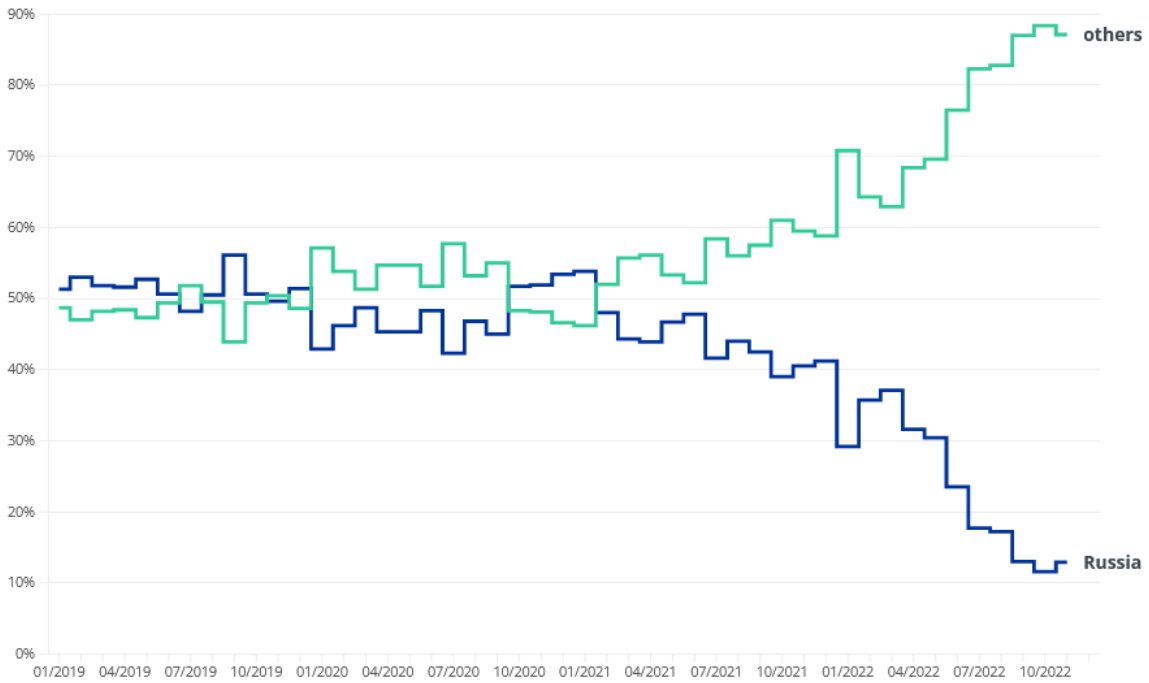

Figure 37. Presentation of gas share supplied to the EU by Russia compared to other countries (January 2019 - November 2022)[25]

[25] https://www.consilium.europa.eu/en/infographics/eu-gas-supply/

During January and November 2022, the LNG import from the USA exceeded 50 billion cubic meters (bcm), which is twice as much as in the entire 2021 (over 22 bcm).

In 2021, 27 countries of the European Union consumed 412 bcm of gas. Gas is used mainly for the generation of electricity, heating of households, and industrial processes. Over 30% of households in the EU use gas to heat their homes.

Over 30% is used for the generation of electricity and thermal energy, 24% are consumed by households, 22.6 by industry, and 10.6% by the services activities. Other energy consumption and non-energy consumption is over 11%.

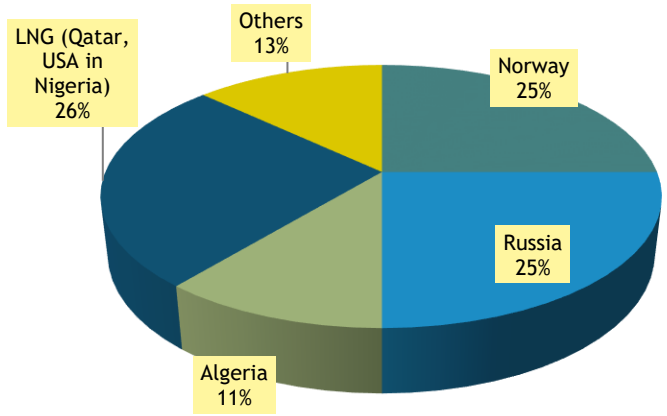

Figure 38. Sources of gas supply to EU countries (2022)

In addition to freight ship transport of LNG (from Qatar, the USA and Nigeria), Russia and Norway were the largest gas suppliers to EU Member States in 2022. Their share in the year 2022 was 25, while Algeria contributed 11%. In 2022, the global share of all other countries exporting gas to the EU was 13%.

Data source:
Eurostat

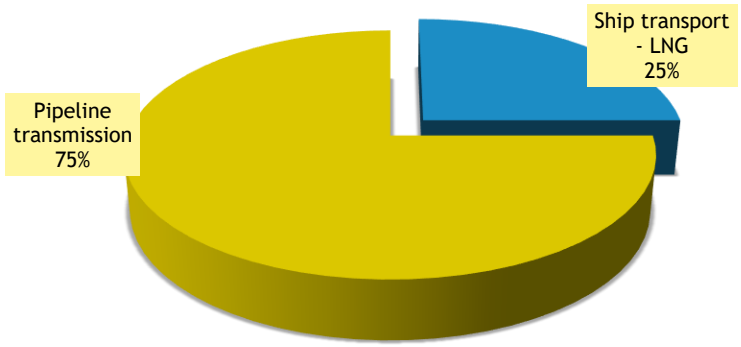

Figure 39. Transport of imported gas for EU countries (2022)

Since the end of 2021, the monthly gross import of LNG increased significantly due to extreme conditions on the gas market and the urgency of re-filling underground storage facilities. From the start of 2022, the EU imported 98 billion cubic meters of LNG. This is 39 billion cubic meters more than at the same point in 2021. During January and September 2022, the EU imported more than in the whole record year (2019). During this period, the major exporter of LNG into EU were the USA (44%), Russia (17%, and Qatar (13%).

Data source:
European Commission[26]

[26] https://energy.ec.europa.eu/topics/oil-gas-and-coal/liquefied-natural-gas_en

6.4 REGULATION (EU) No. 2022/869 on guidelines for trans-European energy infrastructure

The new Regulation (EU) 2022/869 of the European Parliament and of the Council on guidelines for trans-European energy infrastructure that entered into force on 30 May 2022 repealed the Regulation (EU) No. 347/2013 that was a basis for our cooperation within European organisations (ENTSOG, the European Commission, etc.) for the past 9 years and for applications to calls for co-projects co-financed by the EU.

New rules of the Regulation (EU) 2022/869 should contribute to the modernisation, decarbonisation and connection of cross-border energy infrastructure of Member States, thus facilitating the EU in achieving goals of climate neutrality by 2050. The revised regulation should also provide market integration and their competitiveness and reliability of supply in the future.

New rules, inter alia, eliminate the support to new projects associated with natural gas and oil, and also mandatory sustainability criteria will be introduced for all projects. The procedures of issuing permits and approvals should also be more simple and rapid. The revised rules enhance the role of renewable sources with regard to all assets, also in smart gas networks. Opportunities emerge for unbinding cooperation in planning marine networks.

The Regulation on trans-European energy networks (TEN-E) supports cross-border projects that should connect energy networks of Member States and support the inclusion of renewable energy sources. It specifies corridors throughout the EU to defined priority investment areas.
The revised regulations lays down 11 priority corridors focusing on:

- Electricity,
- Off-shore grids,
- Hydrogen and electrolysers.

Three priority thematic areas are defined as well:

- Introduction of smart electricity grids to improve the efficiency of electricity networks,
- Cross-border network for carbon dioxide that would provide capturing and storing CO_2,
- Smart gas networks focused on renewable and low-carbon gas sources.

The objectives of TEN-E policy are mainly implemented through the projects of common interest funded by the Connecting Europe Facility 2021-2027.

6.4.1 The first list of PCI and PMI projects

As part of the new Regulation (EU) 2022/869 of the European Parliament and of the Council on guidelines for trans-European energy infrastructure, the first list of projects of common interest (PCI) and projects of mutual interest (PMI) is being prepared and will be presumably adopted at the end of this year.

The identification and selection of PCI and PMI projects are based on a regional approach, while the procedures are being implemented by regional groups of several stakeholders comprised of representatives of the competent ministries, national regulatory authorities, individual power and gas transmission system operators and other project holders, European Network of Transmission System Operators for Electricity and Gas (ENTOS-E and ENTSOG), Agency for the Cooperation of Energy Regulators (ACER) and the European Commission. Meetings of regional groups are open for all interested

parties, such as public services, industry associations, environmental and consumer organisations and representatives of the civil society who are invited, consulted with and expected to contribute to the work carried out in these groups.

Within the selection procedure of projects for the first list of Projects of Common Interest (PCI) and Projects of Mutual Interest (PMI), Plinovodi submitted the applications for project proposals together with neighbouring transmission system operators in December 2022, namely for two hydrogen corridors:

- Italy – Slovenia – Hungary, H2 corridor
- Croatia – Slovenia – Austria, H2 corridor.

6.4.2 The PCI list 2021

On 19 November 2021, the European Union adopted the fifth list[27] of projects of common interest (PCI). These are key projects of cross-border energy infrastructure required to build a more integrated and resilient EU internal energy market and to achieve energy and climate objectives of the EU. This PCI list comprises 98 projects, namely 67 projects in the field of transmission and storage of electricity, 20 projects in the field of gas, six projects in the field of CO_2 networks, and five projects in the field of smart grids. All PCI projects are subject to simplified authorisation and regulatory procedures and are entitled to financial support of the European connectivity fund (CEF).

The PCI list 2021 was prepared and adopted in accordance with the existing regulation on trans-European energy networks (TEN-E). The projects, defined as the Projects of Common Interest, are subject to certain advantages:

- Enhanced transparency and public consultation;
- Simplified authorisation procedures (the binding time limit is three and a half years);
- Better, quicker and simplified environmental assessment;
- A single national authority operating as a „one-stop“ point for faster authorisation procedures;
- Improved regulatory treatment with allocation of costs based on net benefit and regulatory
- incentives;
- Possibility of financial aid under the Connecting Europe Facility (CEF) in the form of grants and innovative financial instruments.

In order for a project to be included in the PCI list, it must be proven that the project brings significant benefits for at least two Member States. In addition, it must contribute to market integration and enhance competition, as well as increase the security of energy supply and reduce carbon dioxide emissions.

Table 29. List of Plinovodi projects included in the PCI 2021 list

#	Project	PCI 2021
C5	CS Kidričevo – stage 2 of extension	✓
C12	Upgrade of interconnection Rogatec	✓

[27] https://ec.europa.eu/energy/sites/default/files/fifth_pci_list_19_november_2021_annex.pdf

The projects of Plinovodi are included in the PCI 2021 list in the context of the set of project group:

6.26 Croatia – Slovenia set at Rogatec which includes the following projects:

- Connection between Croatia and Slovenia (Lučko - Zabok - Rogatec)
- The compressor station Kidričevo, second phase of upgrade (SI)
- The upgrade of the connection Rogatec (SI)

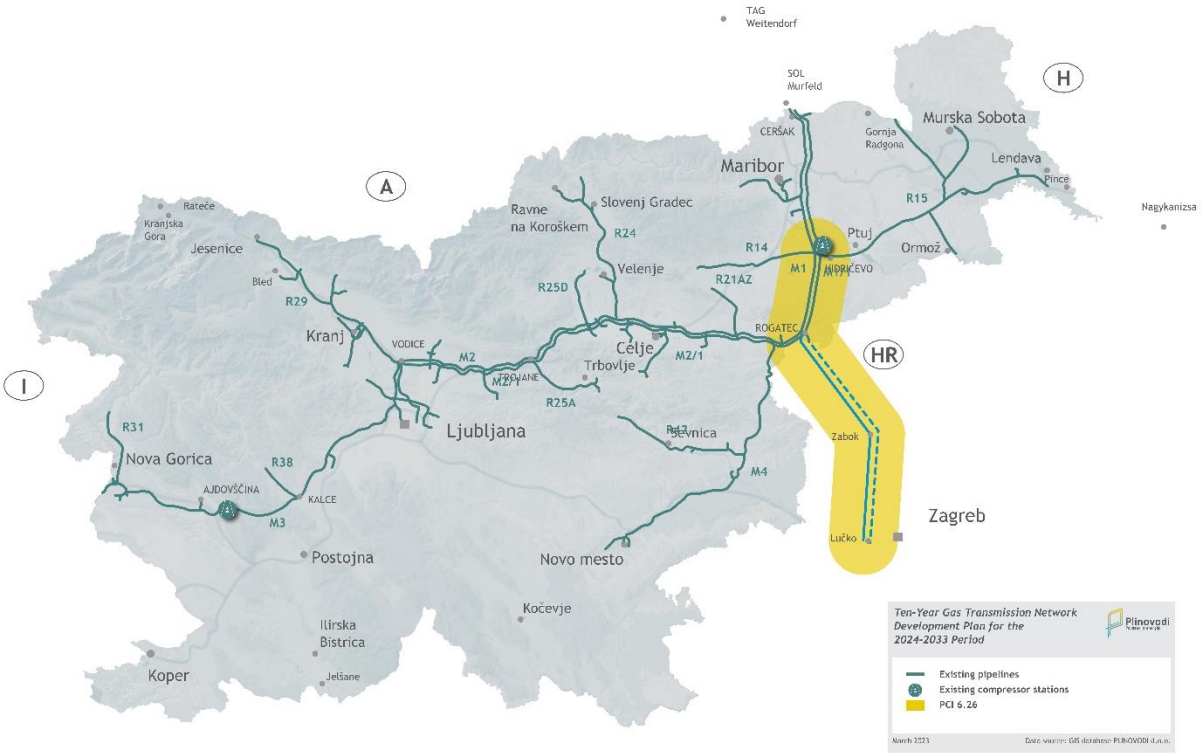

Figure 40. Schematic map of the placement of the Plinovodi's development plan in the PCI projects (2021)

6.5 ENTSOG

The establishment of the European Network of Transmission System Operators for Gas (ENTSOG) was required by Regulation (EC) No. 715/2009. The ENTSOG was founded on 1 December 2009 with the objective of accomplishing the following tasks: to facilitate the formation and operations of a single European internal market and cross-border trading in gas, as well as to ensure optimum management, coordinated operation and technical evolution of the European gas transmission system by preparing and proposing adequate network codes.

The company Plinovodi is one of the founding members of the ENTSOG. Its current membership structure is: 44 European TSOs and 1 associated partner (Switzerland - Trans Adriatic Pipeline AG) from 27 EU Member States and 10 observers from Europe (Albania, Bosnia and Herzegovina, Moldova, Norway, Ukraine, North Macedonia, and Switzerland - Erdgas Ostschweiz AG, Transitgas AG, Fluxswissin Swissgas AS).

The central task of the ENTSOG is to prepare network codes, the EU ten-year development plan, the "Winter Outlook" and "Summer Outlook" reports, to inform the interested public, bring together TSOs and cooperate in the preparation of 3-year regional investments plans within the EU.

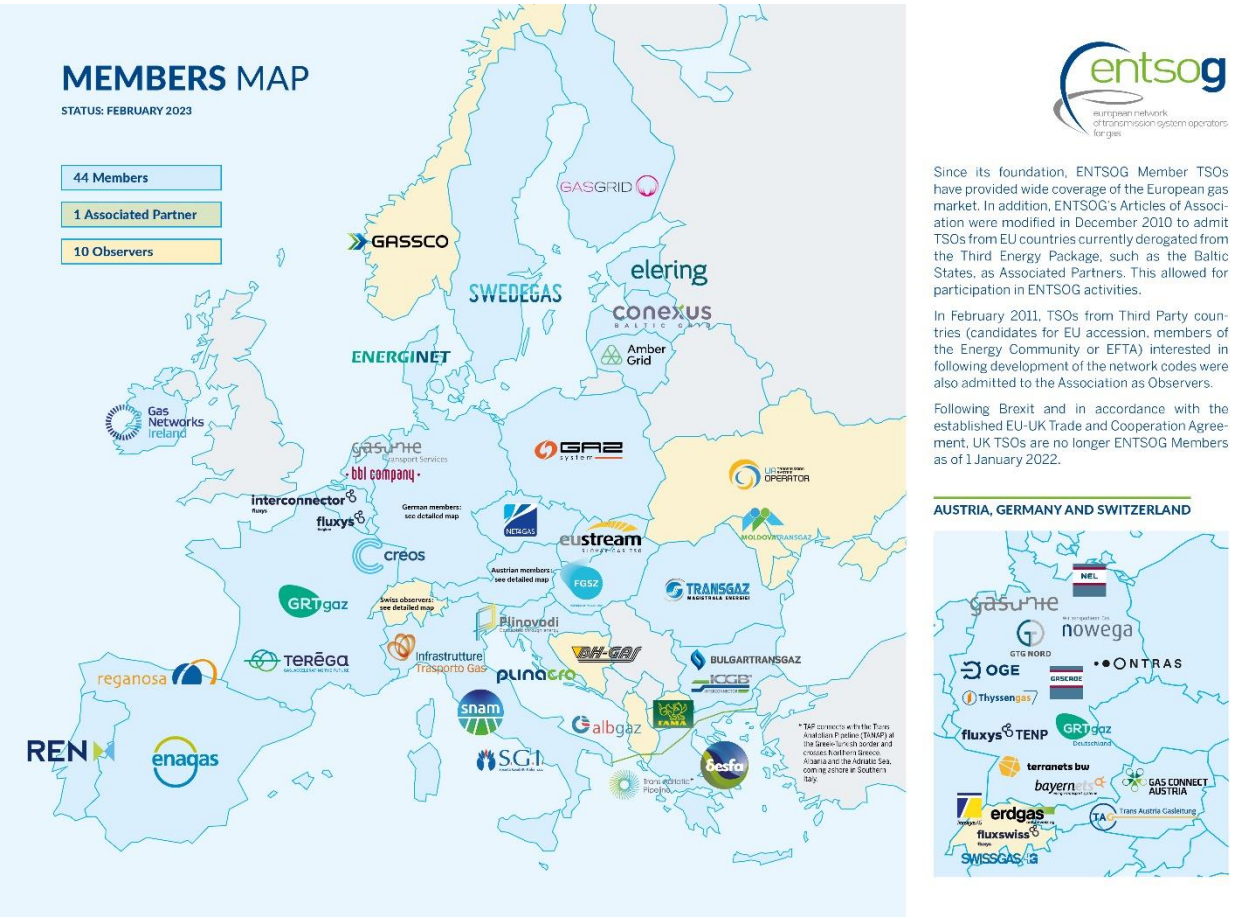

Figure 41. Members of the ENTSOG (February 2023)

6.5.1 TYNDP

One of the central objectives of the TYNDP (the Ten-Year Network Development Plan - TYNDP) is to provide an overview of trans-European infrastructure, thereby detecting potential gaps in future investments. The European 10-year development plan aims to cover a wider dynamic of the European gas market in relation to supply potential, market integration and security of supply.

The ENTSOG publishes the 10-year development plans on its website: http://www.entsog.eu/publications/tyndp. In accordance with the requirements of the Regulation (EC) No. 715/2009[28], the TYNDP is prepared every two years.

When preparing the European TYNDP, the company Plinovodi has been cooperating with the ENTSOG since the preparation of the first plan in the year 2010. Thus, the projects of the Slovenian TSO are summarised in the European TYNDP and coordinated with the national 10-year development plans. The TSO ensures that the European TYNDP takes into account all projects that are listed in the national 10-year development plan and that can be qualified as affecting the European gas infrastructure. When preparing the national 10-year development plan, the TSO always ensures that the forecasts of estimated transmitted quantities and booked transmission capacities are coordinated. With the coordination of the development plans, the transparency and impartiality in the development of gas transmission infrastructure can therefore be assured.

[28] 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

The basis for registering projects in the ENTSOG TYNDP is their involvement in the national development plan. As a rule, we apply projects of international significance that interconnect with the neighbouring transmission systems in the TYNDP. In Annex 1 - "Planned transmission infrastructure", there are the project codes from the ENTSOG TYNDP entered in the assembly tables, which show which projects are included in both development plans and under what code.

The most recent 6th edition of the European 10-year development plan – TYNDP 2020 was published on 2 July 2021. Currently, the new, 7th edition of TYNDP 2022 is in the final phase of preparation, and is expected to be confirmed in August 2023.

6.5.2 GRIP CEE and GRIP Southern Corridor

In accordance with the requirement to promote and establish regional cooperation set out in Article 7 of the Directive (EC) 2009/73[29], and Article 12 of the Regulation (EC) No. 715/2009, the TSOs within the ENTSOG shall publish a Gas Regional Investment Plan (GRIP) every two years, on the basis of which they can decide on investments.

As the Slovenian TSO, the Plinovodi company takes part in the preparation of two GRIP documents; namely, GRIP Southern Corridor and GRIP Central Eastern Europe (CEE). GRIP Southern Corridor is prepared in cooperation with TSOs from Greece, Italy, Austria, Bulgaria, Croatia, Hungary, Romania, Slovakia and Slovenia, and GRIP Central Eastern Europe is prepared in cooperation with operators from Austria, Germany, Croatia, the Czech Republic, Bulgaria, Hungary, Poland, Romania, Slovakia and Slovenia. Based on mutual cooperation and regional connections, the ENTSOG has identified 6 different European corridors or connections.

The latest, 5th version of GRIP CEE was published on 17 December[30], while GRIP SC was published on 18 March 2022[31].

6.6 European Hydrogen Backbone

In 2020, the Plinovodi company joined the European Hydrogen Backbone initiative. The initiative consists of 31 transmission system operators from the European Union, including Open grid Europe, Gasunie, GRTGaz, SNAM, GAZ System. It also includes all transmission system operators of neighbouring countries.

The main objective of the initiative is to study possibilities of safe, uninterrupted and cost-efficient hydrogen transport via the pipeline network reserved solely for hydrogen. Such solution also provides for a certain level of integration of the existing gas network with the hydrogen network and increases a total adaptability of the system and the maximum use of recoverable gases.

In accordance with the Hydrogen Strategy for a Climate-neutral Europe adopted by the European Commission in 2020, the production and consumption of hydrogen in Europe will significantly increase already in the medium term.
In the changed situation, the European Commission has even increased the goals set in the REPower EU to anticipate the production of 10 million tonnes of renewable hydrogen per year in the EU already in 2030, with additional 10 million tonnes in neighbouring regions. The European Commission makes targeted assumption concerning the use of the so-called green hydrogen which is a renewable energy source since it is produced with surpluses of renewable electricity. In the transitional period, the use of blue hydrogen was also possible (i.e. hydrogen produced from gas by extracting and environmentally sound storage of CO_2).

[29] The DIRECTIVE 2009/73/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC
[30] http://www.entsog.eu/sites/default/files/2022-01/entsog_GRIP_CEE_2021_220126.pdf
[31] https://www.entsog.eu/sites/default/files/2022-03/GRIP_SC_2021_220318.pdf

Green hydrogen is also very environmentally-friendly energy carrier, since heat and water are main products of its combustion. It is possible to directly generate electricity in the fuel cells. Hydrogen or synthetic methane produced from hydrogen can be stored in large quantities and for a longer period (season) at affordable prices. This is one of the main challenges of climate neutral energy, since the surplus production of renewable energy sources must be synchronised in some parts of the year with large needs of energy in other parts of the year (in particular in winter).

European documents expect the start of using hydrogen in industry, namely in sectors where carbon footprint is hard to reduce by using non-gas technologies (e.g. metalworking industry and glass industry).

Based on studies, the initiative to establish the European Hydrogen Backbone found that it would be possible to upgrade the existing gas transmission infrastructure in order to establish the European hydrogen pipelines with over 60% coverage. This would also significantly reduce the costs of establishing a dedicated network, while also the speed of its construction would be increased. New gas transmission network would have to be constructed only in the areas with no existing pipework. One of major concerns of the respective initiative is cross-border harmonisation of plans and dynamics for developing potential hydrogen networks.

The analysis from 2022 “Five Hydrogen Corridors for Europe” identifies five hydrogen corridors that may connect regions outside the EU that would generate the surplus of green hydrogen with those regions with higher green hydrogen consumption (Germany and other countries in the Central Europe). The most significant corridors for Slovenia are from Africa via Italy into the Central Europe, and from the Eastern Europe (Romania, Ukraine, etc.) into the Central Europe. Also, additional green hydrogen supply to Slovenia could run from the respective corridors.

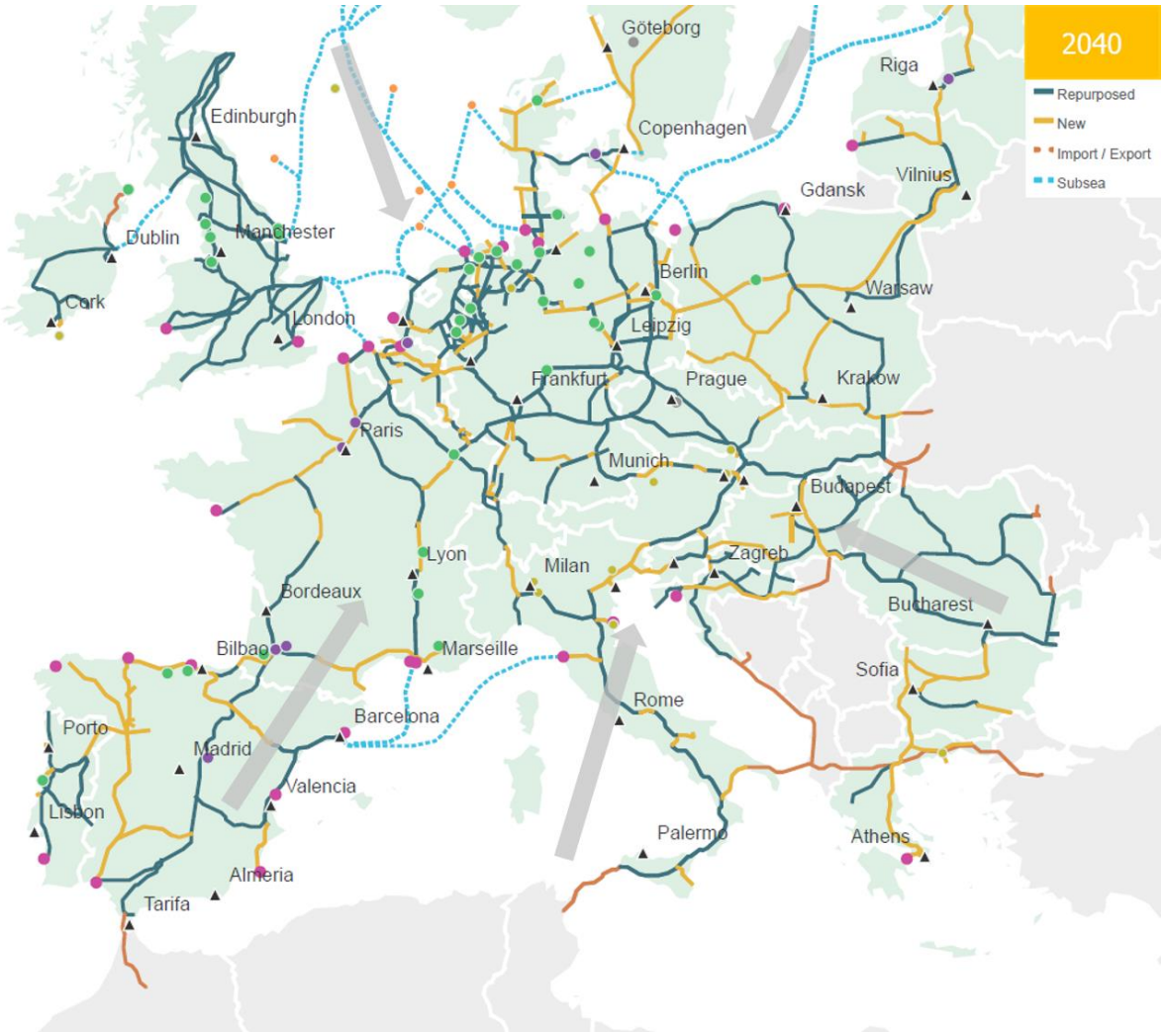

Figure 42. European Hydrogen Backbone according to EHB projections until 2040

ANNEXES

ANNEX 1 Planned transmission infrastructure

A – Increase of the operational security and expansion of the transmission system

B - Connections

C – Development of interconnection points with the neighbouring transmission systems

D – Development of hydrogen transmission projects

ANNEX 1

#	Project name	Purpose	Technical characteristics	Level treatment 01/01/2023	Planned start of operations	Estimated Investment value (in EUR 000)
A - INCREASE OF THE OPERATIONAL SECURITY AND EXPANSION OF THE TRANSMISSION SYSTEM						
A1	Loop to Zreče					
	Stage one: R21AZ Konjiška vas - Oplotnica	Increase of the operational security with the system loop	New construction, , L = 7km, D = 150mm, OP = 50 bar	NSP prepared	2024	4,700
	Second stage R21AZ Oplotnica – Zreče	Expansion of the pipeline system	New construction, , L = 5.3km, D = 150mm, OP = 50 bar		after 2026	3,000
	Third phase P21AZ1 Oplotnica - Slovenska Bistrica	Expansion of the pipeline system	New construction, , L = 8.9km, D = 150mm, OP = 50 bar		after 2026	5,100
A2	R51a Jarše – Sneberje	Increase of the operational security with the system loop	New construction, , L = 2.5km, D = 300mm, OP = 30 bar, DMRS Jarše	NSP prepared	after 2026	2,130
A3	R51b TE-TOL Fužine/Vevče	Increase of the operational security with the system loop and the possibility of connection of DSO to MOL	New construction, , L = 4.5km, D = 300mm, OP = 30 bar, MRS Dobrunje	NSP prepared	2025	5,900
A4	R51c Kozarje – Vevče	Increase of the operational security with the system loop	New construction, , L = 17.5km, D = 300mm, OP = 30 bar, MRS Kozarje	NSP prepared	2026	16,000
A5	Dravograd – Ruše - Maribor					
	Stage one: Dravograd - Ruše	Increase of the operational security with the system loop and the possibility of connection of new municipalities	New construction, , L = 45km, D = 250mm, OP = 50 bar	Conceptual designs	nd	nd
	Stage two: Ruše - Maribor	Increase of the operational security with the system loop	New construction, , L = 10km, D = 250mm, OP = 50 bar		nd	nd
A6	Kalce - Godovič - Žiri – Škofja Loka					
	Stage two: Godovič - Žiri - Škofja Loka	Increase of the operational security with the system loop and the possibility of connection of new municipalities	New construction, , L = 29km, D = 150mm, OP = 70 bar	Conceptual designs	nd	nd
A7	Škofja Loka - Medvode - Ljubljana	Increase of the operational security with the system loop	New construction, , L = 15km, D = 200mm, OP = 50 bar	Conceptual designs	nd	nd
A8	Laško - Hrastnik – Radeče	Increase of the operational security with the system loop	New construction, , L = 22km, D = 200mm, OP = 50 bar	Conceptual designs	nd	nd

A9	R12A M1 - Lenart – MRS Gornja Radgona	Increase of the operational security with the system loop and the possibility of connection of new municipalities	New construction, , L = 30km, D = 250mm, OP = 70 bar	Conceptual designs	nd	nd
A10	Šoštanj – Dravograd	Increase in operational security by installing a system loop with the possibility to operate by using renewable gas and up to 100% hydrogen	New construction, , L = 24km, D = 200mm, OP = 70 bar	Conceptual designs	nd	nd
A11	M4 Podčetrtek section	Increase of the operational security with the displacement of pipeline	New construction, , L = 4km, D = 400mm, OP = 50 bar	Conceptual designs	nd	nd
A12	M2 Trnovlje section	Increase of the operational security with the displacement of pipeline	New construction, , L = 2km, D = 400mm, OP = 70 bar	Conceptual designs	nd	nd
A13	M5 Vodice - Jarše – Novo mesto					
	Stage two: Jarše - Grosuplje	System pipeline; the expansion of the transmission system with the possibility of connection of municipalities and the increase of the operational security	New construction, , L = 66km, D = 400mm, OP = 70 bar	Conceptual designs	after 2026	17,900
	Other stages: Grosuplje – Novo mesto	System pipeline; the expansion of the transmission system with the possibility of connection of municipalities and the increase of the operational security			after 2026	29,700
A14	M6 Ajdovščina – Lucija	System pipeline; the expansion of the transmission system with the possibility of connection of municipalities and the increase of the operational security	New construction, L = 45.9km, D = 400mm, OP = 70 bar; L = 17.5 km, D = 200 mm, OP = 25 bar; L = 5.5 km, D = 150 mm, OP = 70 bar	NSP prepared	2024–2026	62,100
A15	Management Centre	Facility, development of information systems, digitalisation, and content upgrade		Conceptual designs	2027	6,800
A16	Backup Management Centre	Facility, development of information systems at the back-up site		Conceptual designs	after 2026	1,450
A17	Data transmission network	Upgrade, replacement of the existing TC connection	Data transmission network and connections	Conceptual designs	2026	3,000
A18	R45 Novo mesto – Bela Krajina	System pipeline; the expansion of the transmission system with the possibility of connection of municipalities and the increase of the operational security	New construction, L = 39 km, D = 400 mm, OP = 50 bar, MRS Črnomelj, MRS Metlika, MRS Semič Capacity 3.15 GWh/d (0.298 M Sm3/d)	NSP prepared	nd	nd

A19	R25A/1 Trojane - Hrastnik	System pipeline; the expansion of the transmission system with the possibility of connection of new users	New construction, L = 21.8 km, D = 400 mm, OP = 70 bar, MRS TET, Capacity 13.72 GWh/d (1.296 M Sm3/d)	NSP prepared		
	Stage one: Trojane - Trbovlje		Increase in operational security with the possibility to operate by using renewable gas and up to 100% hydrogen		after 2026	17,000
	Third stage: TTPP branch		Expansion of the transmission system with the possibility to operate by using renewable gas and up to 100% hydrogen		nd	nd
A20	R29 Jesenice – Kranjska Gora					
	Stage two	System pipeline; the expansion of the transmission system with the possibility of connection of DSO and the increase of the operational security	New construction, , L = 25km, D = 200/250mm, OP = 50 bar	Conceptual designs	nd	nd
A21	R42/1 Anže - Brestanica	Expansion of the pipeline system	New construction, L = 4.5km, D = 400mm, OP = 50 bar, MRS Brestanica	NSP in preparation	2027	6.220
A22	R42/1 Brestanica – Radeče	Increase of the operational security	New construction, L = 28km, D = 400mm	Conceptual designs	nd	nd
A23	Research and innovation projects	Innovations on gas transmission infrastructure		Conceptual designs	nd	nd
A24	Relocation of part of the P29134 gas pipeline in the Kranj area	Increase of the operational security	L= 700m D= 200mm OP = 50 bar	Conceptual designs	2025	1,100
A25	Transmission pipeline system Sneberje - Šentjakob	Increase in operational security and connection of user	L= 1.9 km D= 250mm DP = 30bar	Conceptual designs	nd	
A26	Connection Meljska cesta (Maribor)	Increase of the operational security	L= 2.0 km D= 250mm DP = 20bar	Conceptual designs	nd	
A27	CS Ajdovščina extension					
	Stage one	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows	One compressor unit; power up to 5MW	NSP prepared	2024	14,180
A28	Reconstruction of M3 at section CS Ajdovščina – Miren with branches	Adjustment to the operational parameters of the Italian TSO's transmission system (73.9bar)	New construction, L = 11 km, D = 500 mm, OP = 73.9 bar, initial capacity 25.40 GWh/d (2.4 M Sm3/d)	NSP prepared	nd	nd
A29	BMCS Vrtojba	Adjustment of the two-way operation regime to the operating parameters of the Italian TSO transmission system		NSP prepared	2025	9,360

A30	R23-R23B loop (Celje-Štore-Laško)	Increase of the operational security with the system loop	L=3 km, D=200 mm, DP= 50 bar	Analyses	after 2026	3,600
A31	M4/1 Male Rodne - Anže	Increase of the operational security		Analyses	nd	
A32	M3/1a Šempeter – Ajdovščina	System line to increase operational security by enhancing cross-border transmission capacitiy from the western direction. Provision of adequate transmission capacity in the event of a shortfall from the eastern supply direction, and also harmonisation with the existing capacity and operating pressures of the Italian transmission system, the integration into the gas pipeline corridors.	New construction, L = 30 km, D = 1100 mm, OP = 100 bar, capacity 340 GWh/d (32.126 M Sm3/d)	NSP prepared	2028	62,600
A33	System and equipment for controlling methane emissions	Establishment of the system to detect and control methane emissions in the transmission system		Construction and partial planning	2026	2,140

#	Project name	Purpose	Technical characteristics	Level treatment 01/01/2023	Planned start of operations	Estimated Investment value (in EUR 000)
B - CONNECTIONS						
B1	MRS Brestanica; R42/1 Anže - Brestanica	Change in connection of final user	MWPB, adaptation of MRS, new construction of MRS	NSP in preparation	2027	2,000
B2	MRS Miklavž na Dravskem polju	Connection of DSO	New construction MRS	OPN in preparation	2024	70
B3	MRS Velika Polana	Connection of DSO	Existing MRS	BP	nd	nd
B4	R25A/1 Second stage Trbovlje - Hrastnik with MRS Hrastnik and MRS Podkraj	Connection of three final users	New construction of pipeline	NSP prepared	2025	6,600
B5	MRS Duplica	Change in connection for DSO	New construction MRS	Conceptual designs	2024	280
B6	MRS Kamnik-Center	Change in connection for DSO	New construction MRS	Conceptual designs	2024	280
B7	MRS Sava with a pipeline	Change in connection of final user	New construction MRS	Conceptual designs	2025	3,000
B8	MRS Verovškova/KEL	Change in connection of final user	New construction MRS	Conceptual designs	2025	970

B9	MRS Koto	Change in connection of final user	New construction MRS	OPPN adopted	2025	985
B10	MRS Dobrunje	Connection of DSO	New construction MRS	DPN adopted	2024	490
B11	MRS Emona	Connection of final user	MWPB, adaptation of MRS	Conceptual designs	2024	80
B12	MRS Donit	Change in connection of final user	New construction MRS	Conceptual designs	2024	480
B13	MRS Impol	Capacity increase for final user	MWPB, adaptation of MRS	Conceptual designs	2026	nd
B14	MRS Banovci	Connection of final user	New construction MRS	Conceptual designs	2024	145
B15	MRS Tekoma Marguč	Change in connection of final user	New construction MRS	Conceptual designs	2025	365
B16	MRS Litostroj Power	Change in connection of final user	New construction MRS	Conceptual designs	2025	490
B17	MRS LtH Castings	Change in connection of final user	New construction MRS	Conceptual designs	2025	495
B18	MRS Draženci	Connection of final user	New construction MRS	Conceptual designs	2025	1,290
B19	MRS Sežana, MRS Kozina, MRS Dekani, MRS Koper, MRS Izola, MRS Lucija	Connection of DSO in municipalities of Sežana, Hrpelje-Kozina, Koper, Izola, Piran; connection with the system pipeline M6	New construction MRS Sežana, MRS Kozina, MRS Dekani, MRS Koper, MRS Izola, MRS Lucija	NSP prepared	2024–2026	5,100
B20	MRS Lendava/ Petišovci	Connection to the production of gas	New construction MRS	User is the investor of the project - *Building permit obtained*	nd	nd
B21	MRS Trnava	Connection of final user	New construction MRS	Conceptual designs	nd	nd
B22	MRS Loče	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B23	MRS ACB Vransko	Connection of final user	New construction MRS	Conceptual designs	nd	nd
B24	MRS Belinka	Change in connection of final user	New construction MRS	Conceptual designs	nd	nd
B25	MRS Cerklje; R297B Šenčur – Cerklje	Connection of DSO in the Municipality of Cerklje	New construction, L = 2.9 km, D = 200 mm, OP = 50 bar, MRS Cerklje, capacity 2.54 GWh/d (0.240 M Sm3/d)	NSP prepared	nd	nd
B26	MRS TTPP; R25A/1 Trojane - TTPP	Connection of thermal power station	New construction of pipeline and MRS	NSP prepared	nd	nd
B27	MRS Marjeta	Connection of DSO in the Municipality of Starše	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B28	MRS Lakonca	Connection of final user	New construction MRS	Conceptual designs	nd	nd
B29	MRS Nasipi Trbovlje	Connection of final user and DSO	MWPB, new construction of MRS	Conceptual designs	nd	nd

B30	Supply to users and other connection projects	Connection of new users with mobile systems, connection of filling stations for compressed gas and adjustment of existing connection points	New construction of mobile handover systems	Conceptual designs	2024-2033	2,500
B31	MRS Braslovče	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B32	MRS Kidričevo	Change in the connection and/or new connection of final user	MWPB, adaptation of MRS or new construction of MRS	Conceptual designs	nd	nd
B33	MRS Podčetrtek	Connection of DSO and final users	New construction MRS	Conceptual designs	nd	nd
B34	MRS Borovnica	Connection of DSO and final users	New construction MRS	Conceptual designs	nd	nd
B35	MRS Šmartno ob Paki	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B36	MRS Boštanj	Connection of DSO or final user	New construction MRS	Conceptual designs	nd	nd
B37	MRS Opekarna (Straža)	Connection of DSO	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B38	MRS Moravče	Connection of DSO	MWPB	Conceptual designs	nd	nd
B39	MRS Cerknica	Connection of DSO and final users	New construction MRS	Conceptual designs	nd	nd
B40	MRS Videm	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B41	MRS Vitanje	Connection of DSO or final user	New construction MRS	Conceptual designs	nd	nd
B42	MRS Šoštanj	Connection of final users	New construction, L = 4km, D = 100mm, MRS Šoštanj 2	Conceptual designs	nd	nd
B43	MRS Živila	Change in connection of final user	New construction MRS	Conceptual designs	nd	nd
B44	MRS Panvita Gornja Radgona	Change in connection of final user	New construction MRS	Conceptual designs	nd	nd
B45	MRS Papirnica Radeče	Change in connection of final user	New construction MRS	Conceptual designs	nd	nd
B46	MRS Muflon Radeče	Change in connection of final user	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B47	MRS Stražišče	Change in connection of DSO	New construction MRS	OPPN adopted	nd	nd
B48	MRS Pekarna Klasje Velenje	Change in connection of final user	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B49	MRS Lek Mengeš	Change in connection of final user	MWPB, adaptation of MRS or new construction of MRS	conceptual designs	nd	nd
B50	MRS Lek Lendava	Change in connection of final user	MWPB, adaptation of MRS or new construction of MRS	conceptual designs	nd	nd
B51	MRS Unior Zreče	Change in connection of DSO	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B52	MRS Labore	Connection of DSO	MWPB	Conceptual designs	nd	nd
B53	MRS Pesnica	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B54	MRS Sveti Tomaž	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B55	MRS Štore	Change in connection of final user	New construction, variant technical solutions	Conceptual designs	nd	nd
B56	MRS Lukovica	Connection of ODS and/or final user	New construction MRS	Conceptual designs	nd	nd

B57	MRS Svilanit	Connection of DSO	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B58	MRS Horjul	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B59	MS Kandija	Change in connection of final user	New construction MRS	Conceptual designs	nd	nd
B60	MRS Krško	Change in connection for DSO	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B61	MRS Solkan	Change in connection of final user	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B62	MRS Kozje	Connection of DSO and final users	New construction MRS	Conceptual designs	nd	nd
B63	MRS Moste	Connection of DSO or final user	New construction MRS	Conceptual designs	nd	nd
B64	MRS Keramix	Connection of final user	New construction MRS	Conceptual designs	nd	nd
B65	MRS Majšperk	Connection of final user	New construction MRS	Conceptual designs	nd	nd
B66	MRS Liboje	Connection of DSO or final user	New construction MRS	Conceptual designs	nd	nd
B67	MRS Brezovo	Connection of DSO or final user	New construction MRS	Conceptual designs	nd	nd
B68	MRS Puconci	Connection of DSO or final user	New construction MRS	Conceptual designs	nd	nd
B69	MRS Iskra	Change in connection of final user	New construction MRS	Conceptual designs	nd	nd
B70	MRS Arcont Gornja Radgona	Change in connection of final user	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B71	MRS Ravne	Change in connection of final user	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B72	MRS Hajdina	Connection of DSO or final user	New construction MRS	Conceptual designs	nd	nd
B73	MRS Vevče	Change in connection of final user	MWPB, adaptation of MRS	Conceptual designs	nd	nd
B74	MRS Ilirska Bistrica	Connection of ODS and/or final user	New construction of pipeline and MRS	Conceptual designs	nd	nd
B75	MRS Zdraviliški trg	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B76	MRS TIM Laško	Change in connection of final user	MWPB	Conceptual designs	nd	nd
B77	MRS Zdravilišče Laško	Change in connection of final user	New construction MRS	Conceptual designs	nd	nd
B78	MS TUS NTU	Change in connection of final user	MWPB	Conceptual designs	nd	nd
B79	MRS Ježica	Change in connection of DSO	New construction MRS	conceptual designs	nd	nd
B80	MRS Tacen	Change in connection of DSO	New construction MRS	conceptual designs	nd	nd
B81	MRS Panonia biogas	Connection of final user	New construction MRS	conceptual designs	nd	nd
B82	MRS Centrex LNG	Connection of final user	New construction MRS	conceptual designs	nd	nd
B83	MRS TOŠ; R52 Kleče – TOŠ	Connection of thermal energy plant	New construction, L = 5.1 km, D = 250 mm, OP = 70 bar, MRS TOŠ, capacity 6.99 GWh/d (0.660 M Sm3/d)	NSP prepared	nd	nd
B84	MRS Oplotnica	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B85	MRS Grosuplje, MRS Ivančna Gorica, MRS Trebnje, MRS Mirna Peč, MRS Mirna	Connection of DSO in municipalities; connection with the system pipeline M5	New construction MRS	Conceptual designs	nd	nd
B86	MRS Škofljica/Ig	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B87	MRS Komenda	Connection of DSO	New construction MRS	Conceptual designs	nd	nd

B88	MRS Brezovica/Log Dragomer	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B89	MRS Semič	Connection of DSO; connection with the system pipeline R45	New construction MRS	Conceptual designs	nd	nd
	MRS Metlika					nd
	MRS Črnomelj					nd
B90	MRS Dobrepolje	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B91	MRS Velike Lašče	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B92	MRS Sodražica	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B93	MRS Ribnica	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B94	MRS Kočevje	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B95	MRS Postojna	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B96	MRS Pivka	Connection of DSO	New construction MRS	Conceptual designs	nd	nd
B97	Gas transmission connection MRS Dekani – Port of Koper	Connection of the Port of Koper to supply port mechanisation	New construction	Conceptual designs	nd	nd

Notes:
In addition to the station, each MS / MRS also includes a pipeline connecting the station to the transmission pipeline.
The estimated value of the investment can be calculated based on the user's application. The application defines the flow-pressure parameters that affect the size and location of the facility, the selection of equipment and length of the pipeline.

#	Project name	Purpose	Technical characteristics	Level of treatment 01/01/2023	Planned start of operations	On the ENTSOG TYNDP 2022 list with the PCI	label	Estimated Investment value (in 000 €)
C - DEVELOPMENT OF INTERCONNECTION POINTS WITH THE NEIGHBOURING TRANSMISSION SYSTEMS								
C1	CS Ajdovščina extension							
	Stage two	Evacuation of the natural gas from the LNG terminal at Krk and from the IAP project (Ionian Adriatic Pipeline)	Two compressor units with total power of up to 20MW Connection to M3/1	NSP prepared	nd			nd
C2	Reconstruction of M3 at section CS Ajdovščina – Miren with branches							
	Adjustment of the two-way operation regime to the operating parameters of the Italian TSO transmission system		New construction, L = 20 km, D = 500 mm, OP = 100 bar, capacity 62.99 GWh/d (5.952 M Sm3/d)	NSP prepared	nd	TRA-N-108		nd
C3	R15/1 Pince – Lendava – Kidričevo							
	BMCS Pince	Bi-directional connection of the Hungarian and Slovenian transmission systems	New construction of a gas pipeline facility with metering and control lines.	NSP in preparation	2027	TRA–N–112		5,990
	Stage one: Pince – Lendava		New construction, L = 74.5 km (31 km and 43.5 km), D = 500 mm, OP = 100 bar, capacity		2027			10,400
	Stage two: Lendava – Ljutomer				2027–2029			25,000

	Stage three: Ljutomer – Kidričevo		49.0 GWh/d (4.5 M Sm3/d)		2027-2029			48,800
C4	Upgrade of interconnection Ceršak (M1/3 interconnection Ceršak)	Adjustment of operating parameters of the Austrian and Slovenian transmission systems and the provision of reverse flows within the bi-directional gas route Austria-Slovenia-Croatia	New construction, L = 200 m, D = 800 mm, OP = 70 bar, capacity 217.9 GWh/d (20.28 M Sm3/d)	NSP prepared	after 2026	TRA-N-389		8,400
C5	CS Kidričevo – stage 2 of extension	Improvement of operating parameters in M1/1 and M2/1 in the framework of the bi-directional gas route Austria - Slovenia - Croatia	New construction, up to three compressor units with total power of up to 30MW	NSP prepared	after 2026	TRA-N-94	Status PCI 2021	94,500
C6	CS Vodice II	Improvement of operating parameters in M2, M2/1, M3, M3/1, M5, M10 in the framework of the bi-directional gas route Italy - Slovenia - Hungary and bi-directional gas route Austria - Slovenia - Croatia	New construction, up to three compressor units with total power of up to 30MW	Conceptual designs	nd			nd
C7	BMCS Vrtojba, extension	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows due to the evacuation of the natural gas from the LNG terminal at Krk and from the IAP project or the corridor for the transmission of large volumes IT - SI - HU			nd			nd
C8	M3/1b Ajdovščina – Kalce	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows due to the evacuation of the natural gas from the LNG terminal at Krk and from the IAP project	New construction, L = 24 km, D = 1100 mm, OP = 100 bar, capacity 340 GWh/d (32.126 M Sm3/d)	NSP prepared	nd			nd
C9	M3/1c Kalce – Vodice	Adjustment of operating parameters of the Italian and Slovenian transmission systems and the increase of reverse flows due to the evacuation of the natural gas from the LNG terminal at Krk and from the IAP project	New construction, L = 47 km, D = 1100 mm, OP = 100 bar, capacity 340 GWh/d (32.126 M Sm3/d)	NSP prepared	nd			nd
C10	M8 Kalce – Jelšane	Evacuation of the natural gas from the LNG terminal at Krk and from the IAP project, as well as the connections of new municipalities in Slovenia	New construction, L = 60 km, D = 1200 mm, OP = 100 bar, MRS Postojna, MRS Pivka, MRS Ilirska Bistrica, Capacity 414 GWh/d (39.118 M Sm3/d)	NSP in preparation	nd			nd

C11	R67 Dragonja – Izola	Interconnector with the Croatian TSO	New construction, L = 10 km, D = 300 mm, OP = 50 bar, capacity 5.1 GWh/d (0.480 M Sm3/d)	Conceptual designs	nd			nd
C12	Upgrade of interconnection Rogatec (M1A/1 Interconnection Rogatec)	Interconnector with the Croatian transmission system: construction of cross-border pipeline and extension of BMCS Rogatec	New construction, L = 3.8km, D = 800mm, OP = 100 bar	NSP prepared		TRA–N–390	Status PCI 2021	17,100
	First phase: Extension of BMCS Rogatec	Increase of the operational security			2026			
	Second phase: Construction of the cross-border pipeline	Expansion of the pipeline system			after 2026			
C13	M9a Lendava – Kidričevo and KP Kidričevo - stage 3 of extension	Cross-border transmission - extension of the bi-directional gas route Italy-Slovenia-Hungary	New construction, L = 73 km, D = 1200 mm, OP = 100 bar, up to five compressor units of the total power up to 80MW, capacity 1,030 GWh/d (97.397 M Sm3/d)	NSP in preparation	nd			nd
C14	M9b Kidričevo – Vodice and CS Vodice I	Cross-border transmission - extension of the bi-directional gas route Italy-Slovenia-Hungary	New construction, L = 117 km, D = 1200 mm, OP = 100 bar, up to four compressor units of the total power up to 60MW, capacity 1,030 GWh/d (97.397 M Sm3/d)	NSP in preparation	nd			nd
C15	M10 Vodice – Rateče	Cross-border transmission	New construction, L = 82 km, D = 1400 mm, OP = 100 bar, capacity 1,003 GWh/d (94.823 M Sm3/d)	NSP in preparation	nd			nd
C16	M6 Interconnection Osp	Interconnector with the Italian transmission system	New construction, L = 1.2km, D = 600mm, OP = 70 bar	NSP prepared	nd			nd
C17	CS Kidričevo - stage 3 of extension	Improvement of operating parameters R15/1	New construction up to three compressor units with total power of up to 2MW/unit	Conceptual designs	2027-2029	TRA–N–112		15,450

#	Project name	Purpose	Technical characteristics	Level of treatment 01/01/2023	Planned start of operations	On the ENTSOG TYNDP 2022 list with the PCI	label	Estimated Investment value (in 000 €)
D - DEVELOPMENT OF HYDROGEN TRANSMISSION PROJECTS								
D1	Italy – Slovenia – Hungary H2 corridor							
	R15/1 Pince - Lendava - Kidričevo	New pipeline for the transmission of hydrogen from the SI-HU border to CS Ajdovščina, including the new BMCS Pince for new H2 IP-SI-HU	L=75 km, D=500 mm, P=100 bar.		2035	HYD-N-1356	Application submitted for PCI 2023	nd

	M1/1 repurposing	Repurposing of the existing pipeline from CS Kidričevo to BMCS Rogatec, including the necessary updates of the existing BMCS Rogatec to allow measurements and regulation of the hydrogen flow.	L=20 km, D=800 mm, P=70 bar.		2029			nd
	M2/1 repurposing	Repurposing of the existing pipeline from BMCS Rogatec to MRS Vodice.	L=109 km, D=800 mm, P=70 bar.		2029			nd
	M3/1 Vodice - Šempeter	New pipeline for transferring hydrogen from MRS Vodice to the SI-IT border (BMCS Vrtojba), including necessary upgrades to BMCS Vrtojba and MRS Vodice to allow measurements and regulation of hydrogen flow.	L=101 km, D=800 mm, P=100 bar.		2035			nd
	CS Ajdovščina, stage 2 of extension	Additional compressor unit and necessary upgrades at the location of the existing CS Ajdovščina.			2035			nd
	CS Kidričevo, stage 3 of extension	New hydrogen compressor units at the location of the existing CS Kidričevo.			2035			nd
D2	Croatia – Slovenia – Austria, H2 corridor							
	Upgrade of interconnection Ceršak	Upgrade of the existing BMCS Ceršak to allow measurements and regulation of hydrogen flow.			2035	HYD-N-1237	Application submitted for PCI 2023	nd
	M1/1 repurposing	Repurposing of the existing pipeline from BMCS Ceršak (SI-AT Ip)to BMCS Rogatec (SI-CRO IP).	L=58 km, D=800 mm, P=70 bar.		2029			nd
	CS Kidričevo, stage 2 of extension	Additional compressor unit and necessary upgrades at the location of the existing CS Kidričevo.			2035			nd
	Upgrade of interconnection Rogatec	Upgrade of the existing BMCS Rogatec to allow measurements and regulation of hydrogen flow.			2035			nd
D3	Analyses, studies and testing with the gases from the renewable energy sources	Analyses and studies of the transmission network and its parts for the acceptance of renewable gases and testing to determine the acceptable shares, volume and composition of renewable gases in the gas transmission system for safe, reliable and effective operation of the gas transmission system.		Analyses	2024 and after 2024			180
D4	Hydrogen and renewable gas transmission system preparation projects	Location analysis and planning of transmission pipeline system upgrades for the preparation for injection and operation with hydrogen and renewable gases. Mobile connection unit for injecting hydrogen.		Analyses and planning	2024 and after 2024			2,650

D5	SLOP2G	Gas transmission part of the project to connect the gas and electricity sectors		Analyses and planning	nd			nd
D6	SLOH2 Backbone	Repurposing of the part of transmission system for transmission of pure hydrogen		Analyses and planning	nd			nd
D7	R25D-H Šoštanj - Šentrupert	Drawing up scientific bases for planning and siting the new pipeline for transferring up to 100% hydrogen from Šoštanj to Šentrupert via injection into the M2/1 transmission pipeline.		Conceptual designs	nd			nd
D8	CS Šoštanj	Drawing up scientific bases for planning and siting the compressor unit for compressing up to 100% hydrogen at the Šoštanj location		Conceptual designs	nd			nd

NOTE (applies to the entire Annex 1):

The TSO reserves the right to change these values if the parameters of the projects that affect the assessment change. For projects for which the estimated investment value is marked with nd, the processing rate on 01/ 01/ 2023 does not allow the preparation of the estimated investment value.

Abbreviations

CEE	Central Eastern Europe
CNG	Compressed natural gas (CNG)
D	Pipeline diameter
MS	Member States
DP	Design Pressure
NSP	National spatial plan adopted
NSP(p)	National spatial plan in preparation
DS	Distribution system
EC	European Commission
ENTSOG	European Network of Transmission System Operators for Gas
EU	European Union
EZ-1	Energy Act (Official Gazette of the Republic of Slovenia, Nos. 17/2014, 81/2015)
FID	Final Investment Decision
GRIP	Gas Regional Investment Plan
IAP	The Ionian Adriatic Pipeline project
CD	Conceptual designs
CS	Compressor station
L	Pipeline length
Lf	Load factor
LNG	Liquefied Natural Gas (LNG)
BMCS	Border metering and control station
CM	City municipality
MS	Metering station
MRS	Metering and regulation station
NEP	National energy programme
nd	No data available
DSO	Distribution system operator
TSO	Transmission system operator
PCI	Project of Common Interest
Cc	Connection contract
DMRS	Distribution metering and regulation station
TPP	Thermal power plant
Ca	Connection approval
TE-TOL	Ljubljana Thermal Power and District Heating Plant
TOŠ	Šiška District Heating Plant
TYNDP	Ten-Year Network Development Plan

Legal notice

The Ten-Year Gas Transmission Network Development Plan for the 2024 – 2033 period has been prepared pursuant to the rules of the profession and based on the data acquired by the company Plinovodi d.o.o. in good faith. The development plan contains predictions and analyses made by the company Plinovodi d.o.o. based on the data collected in this way.

The data and material contained in the Development Plan are of informative nature and have been prepared for the purposes of the said document. In the event of further use of the data and information contained in the document, these must be verified with due diligence that they are up to date and relevant.