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SEEGAS REPORT

REGIONAL TRANSMISSION ROUTES

*Energy Community Secretariat
September 2022*

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Executive summary

Less than 10 years ago, the European Union identified central and eastern European countries as being the most exposed to Russian gas supply curtailments.

A stress test¹ performed in 2014 across EU Member States and including Contracting Parties of the Energy Community found the region's vulnerability lay in two weaknesses.

The first weakness related to the fact that several infrastructure projects, which had been launched to increase security of supply after Russia cut exports to Europe in 2009, had not been fully commissioned by the date of the stress test.

The second weakness highlighted the fact that many national strategies were insufficiently coordinated which resulted in a sub-optimal level of efficiency in dealing with security of supply issues across the region.

Since the publication of the report, most of the infrastructure projects that were launched had been or are in the process² of being brought in commercial operation, allowing the region to access alternative sources of gas, supplied either as LNG to regional terminals in Croatia, Greece or Poland or as pipeline gas delivered from the Caspian region to southern and eastern Europe via the newly commissioned Southern Gas Corridor.

Even so, as Europe faces the prospect of a total curtailment of Russian gas against the background of the ongoing political standoff with Moscow over its war in Ukraine, there are still concerns about central, eastern and southern Europe's vulnerability to disruptions caused by lack of intra-regional cooperation.

Recognising the need for dialogue and cooperation well before the first signs of the current energy crisis, the Energy Community Secretariat launched the SEEGAS project, an initiative aiming to foster closer cooperation between gas exchanges and transmission system operators in central, southern and eastern Europe. The goals are to enable market opening, better services for traders and ultimately to benefit end-consumers through increased competition in gas trading.

The true importance of the SEEGAS project is only now beginning to show as the region's security of supply in case of an energy crisis will hinge primarily on closer cooperation and coordination.

In preparation for winter but also with an eye on the months and years ahead when Europe expects to wean itself off Russian gas supplies, the Energy Community Secretariat has prepared a hands-on study that aims to offer practical information on the import and transmission capacity that is available regionally, identify and describe the projects that are being developed and recommend solutions to barriers that are causing bottlenecks.

Although the SEEGAS project has the double mission to integrate exchanges and infrastructure, this study focuses strictly on the latter, the former being analysed in a report to be published separately.

More concretely, the *SEEGAS Regional Transmission Routes* has surveyed 10 national gas transmission system operators in Bulgaria, Croatia, Greece, Hungary, Moldova, North Macedonia, Poland, Romania, Turkey, Ukraine, 10 existing or prospective LNG terminal operators in Croatia, Greece, Poland, Turkey as well as the operators of the recently commissioned Trans-Anatolian Pipeline (TANAP) and Trans-Adriatic Pipeline, which together make up the Southern Gas Corridor.

Respondents include operators in EU Member States and Energy Community Contracting Parties which have also expressed interest in joining the SEEGAS project.

The value of the report resides in the fact that most of the data captured here was provided first-hand by operators. Other institutions such as the EU's Agency for the Cooperation of Energy Regulators (ACER) or the European Network of Transmission System Operators for Gas (ENTSO-G) were also consulted on a variety of issues including tariffs, transmission capacity or the signing of interconnection agreements.

Importantly, the study also benefited from comprehensive feedback from traders who shared their experience in shipping gas regionally and their recommendations on possible solutions to tackle underlying problems.

The paper is split into four sections corresponding to four supply corridors grouped around key sources of supply.

All corridors take Ukraine as the terminus market but to avoid duplication, the market is discussed only once in the context of the Trans-Balkan supply route.

In some cases such as the Croatia – Hungary – Ukraine or Poland – (Slovakia) – Ukraine, the corridors are relatively short in distance and the supply sources are two onshore LNG terminals.

In the Poland – (Slovakia) – Ukraine case, the supply source is likely to expand to include two more offshore

1 Communication from the Commission to the European Parliament and Council on the short term resilience of the European gas system: Preparedness for a possible disruption of supplies from the East during the fall and winter of 2014/2015, European Commission, 16.10.2014 https://ec.europa.eu/energy/sites/ener/files/documents/2014_stresstests_com_en.pdf (Last accessed 17.07.2022)

2 For example, the delayed Interconnector Greece-Bulgaria



LNG terminals as well as the Baltic Pipeline, which will guarantee access to Norwegian supplies.

This paper acknowledges the importance of the existing or new LNG terminals that are being developed in the Baltic countries and Finland and which would link up to Poland, contributing to central Europe's overall security of supply in the mid to long-term. Nevertheless, the current report does not review them as the countries are outside the scope of the SEEGAS platform.

The third route analysed by the report includes the Trans-Balkan corridor and focuses on the entire infrastructure which has historically linked Ukraine to Bulgaria,

Greece, North Macedonia and Turkey via Moldova, and Romania.

The study acknowledges the importance of the route, noting it could become the backbone of an integrated region, providing access to alternative supplies, sourced as LNG in Greece or Turkey or as pipeline gas delivered from the Black Sea or Caspian Sea.

The importance of the route is even greater considering the possibility to integrate it with the fourth regional project analysed here – the Southern Gas Corridor – via the upcoming Interconnector Greece-Bulgaria.

Findings

The survey of the four corridors has provided valuable insights which can be summed up in the following findings:

1. Although nearly all³ surveyed countries benefit from access to at least three sources of supply, only a fraction of the existing capacity is used. During the survey period covering 1 April – 30 June 2022, less than 20% of the technically available capacity was used.⁴
2. The Bulgarian, Polish and Romanian exit capacity was the least used in the surveyed region, standing below 5% over the surveyed period.
3. Polish entry capacity has been the most used, close to 75%
4. The utilisation of the Ukrainian gas transmission system has been reduced but balanced over the surveyed period (19% for entry and 16% for exit)
5. LNG terminal usage has been very high across the region, with the Croat Krk terminal being the most used, at 84% of total capacity, and the Greek Revithousa the least, but still above 50% of capacity.
6. The most used infrastructure was TAP, with 89% at entry.
7. The existing regasification capacity across the region is 21bcm/year but could rise to 65bcm/year if Turkey's four onshore and offshore terminals are included.
8. In a hypothetical scenario where another seven proposed offshore terminals are completed⁵ and a number of terminals are fully expanded,⁶ the region could benefit from 110bcm/year of regasification capacity.⁷
9. The cheapest route to source natural gas imported as LNG into Ukraine is the Polish-Ukrainian corridor (assuming a direct Poland-Ukraine route).
10. The most expensive transmission route is the Trans-Balkan pipeline if assuming a company would try to use the entire stretch of the corridor starting at the Greek Revithousa LNG terminal, heading north into Bulgaria and Romania and then transiting Moldova into Ukraine. If the Moldovan transit leg is excluded, the route would be cheaper than the Croatia-Hungary-Ukraine corridor.
11. The Southern Gas Corridor is of great importance to the region, providing real diversification, particularly if expanded in the future and linking up with a planned offshore terminal in Albania which could help western Balkan countries to diversify away from Russian gas as well as reduce their dependence on coal.
12. Despite abundant transmission and import capacity, the region remains poorly connected because of numerous regulatory bottlenecks, including lack of interconnection agreements, delays in implementing congestion management mechanisms or failure to implement the use-it-or-lose-it principle (UIOLI).

While most of the findings were encouraging, there were also a number of issues that have been highlighted in the comprehensive feedback provided by traders and relate mainly to problems that have been afflicting the region in the past and continue to be emphasised in various debates or reports, including the EU's 2014 gas stress test mentioned above.

³ The exception is the Republic of North Macedonia, which relies on a single interconnector with Bulgaria. Moldova has access to supplies via Ukraine and Romania but with the construction of the interconnector Iași-Ungheeni and expansion of the infrastructure connecting it to the domestic transmission system, it can theoretically access volumes via northern and southern Ukraine as well as via Romania.

⁴ The analysis added up all the technically available capacity at the border points of surveyed countries and compared against the average physical flows at these border points over the three month period 1 April – 30 June 2022.

⁵ Two more FSRUs in Poland, at least four new FSRUs in Greece and one more FSRU in Turkey

⁶ Expansion plans are envisaged for the Croat Krk and the Polish Świnoujście terminals.

⁷ The total includes Turkey's existing and upcoming terminal at the Gulf of Saros on the assumption that it would charter a third FSRU specifically for this terminal.



Lack of cooperation and coordination among transmission system operators largely caused by legal ambiguities at the interface between EU Member States and Contracting Parties, regulatory instability and unpredictability

as well as political manoeuvring remain the most important barriers to regional market integration as envisaged under the SEEGAS platform.

Recommendations

The Energy Community Secretariat takes this opportunity to make a number of recommendations on how to remove these barriers, hoping that the challenges facing Europe against a looming energy crisis threatening the energy security of consumers would provide the impetus to recognise shared risks and address them in unison as a matter of urgency.

1. The Energy Community Secretariat recommends as a matter of priority the application of the EU's Network Codes at border points between Contracting Parties and Member States. Failure or delays in implementing them have already led to multiple bottlenecks regionally. The application of network codes at the interface between EU and non-EU countries should be mandatory but implementing them would help remove many existing bottlenecks.
2. The Energy Community Secretariat recommends the signing of interconnection agreements between Bulgaria – North Macedonia, Bulgaria-Turkey, Turkey – Greece, Romania – Ukraine (for additional capacity at Isaccea 2, 3; Tekovo-Medieşu Aurit; Negru Vodă 2, 3; Romania VTP – Ukraine.)
3. Transmission system operators are urged to offer firm capacity in addition to interruptible capacity, wherever possible. The Polish transmission system operator, Gaz-System has offered physical exit capacity to Ukraine for a limited period of time but this may be needed in the longer-term as Ukraine would depend on natural gas imports from central European markets. Similarly, the Romanian gas transmission system operator Transgaz only offers interruptible capacity to Ukraine on the Isaccea 1 border point. It has recently allowed the export of volumes from its VTP to Bulgaria but not to Ukraine. Romania should also offer firm and interruptible capacity from its virtual trading point to Ukraine.
4. Transmission system operators should align on key issues including gas quality or the calculation of commodity charges. Romania's Transgaz insists it cannot offer physical capacity to Ukraine via the Isaccea 1 border point because of a mismatch in the methane content of gas in Ukraine and that in Romania and Bulgaria, where the methane content is lower. Problems related to gas quality differences and how to solve them are included in the EU's interoperability and data exchange network code.
5. The Turkish transmission system operator and incumbent BOTAŞ may see merit in working with regional partners by offering access to regasification capacity at its terminals as well as exit capacity on the Turkish – Bulgarian and Turkish-Greek borders. Stronger cooperation would benefit not just regional countries, which could source LNG via Turkish terminals and export regasified volumes in reverse as far as Ukraine but could also open up opportunities for BOTAŞ itself and potentially other Turkish companies. These benefits include allowing Turkish companies to partner up with regional companies to source more LNG and share costs, raising revenue through tariff payments, opening up new supply routes as natural gas could flow from Turkey to the region or in opposite direction. Importantly, Turkish companies should also consider partnering up with regional companies to take advantage of seasonality. For example, Turkish LNG terminals could be used by companies in the summer to import volumes for storage injections across the region, including in Ukraine, and export supplies from regional stocks back to Turkey in winter.
6. Specifically to Moldova, the Energy Community Secretariat applauds the progress made in terms of establishing the foundation for the implementation of a balancing regime as well as the application of EU network codes at border points. However, it notes the country's delay in implementing virtual reverse flows (backhaul) at border points which would contribute to regional integration and help the country raise more revenue. If the backhaul mechanism had been implemented, the revenue of the local transmission system operator, Moldovatrangaz could have been 44% higher in 2020 and 2021 than figures reported for those years. In the absence of backhaul, the company transferred Moldovan Lei (MDL)5.4million (€270,000) less to the state budget than what it had expected that year, according to official data. Failure to implement this procedure may also



have a negative impact on end consumers. Calculations show that just by adopting this procedure end-consumer natural gas bills could be reduced by MDL 130.00/1000m³ (€6.50/1000m³).

7. The Energy Community Secretariat recommends the streamlining of licensing processes, noting burdensome regimes in countries such as Greece and Romania.
8. Romania remains a major concern to all traders surveyed by our study. Regional stakeholders have highlighted the onerous reporting requirements

imposed by ANRE in comparison with other countries, which even ask companies to provide access to supply contracts concluded abroad. The Energy Community Secretariat acknowledges the critical importance of Romania to the SEEGAS project, both in terms of its role as a gas producing country with access to alternative supplies and in terms of transit route, along the Trans-Balkan corridor. Based on the feedback of the market players in the country, Romania should consider making improvements to its regulatory environment by being more cooperative regionally and offering more transparency and predictability.

Chapter I

CROATIA – HUNGARY - CEE CORRIDOR





CROATIA⁸

The launch of the Croatian LNG terminal on the island of Krk in Omišalj has placed the country at the heart of a new supply hub for south-east Europe, bringing diversification not only for its own market but also for the region.

The terminal, using its own floating storage and regasification unit (FSRU), has been recently expanded by 0.3bcm to 2.9bcm annually but pipeline expansion projects linking to Slovenia, Hungary and the Balkans via Serbia could help increase that capacity further.

Since its launch in January 2021, the offshore facility received cargoes originating in the US, Nigeria, Qatar, Russia, Trinidad & Tobago or Egypt.

The volumes are netted out, with imports nominally earmarked for Hungary being retained in Croatia and the equivalent of Russian gas expected to transit Hungary for delivery in Croatia being kept on the Hungarian side of the border. Hungarian state-owned energy firm MVM Group's trading subsidiary MFGK is the terminal's main user, having signed a six-year LNG supply contract with Shell for the equivalent of 250mcm of gas in 2020 and also having purchased spot cargoes.

As European countries are preparing to diversify away from Russian imports, new supply routes are likely to open up, radiating from the Krk terminal and linking Croatia to southwest Europe via Slovenia, to central Europe via Hungary and to other neighbouring countries in the Balkans via the Ionian Adriatic Pipeline (IAP) or via an interconnector with Serbia.

In May 2022 the Slovak state company SPP said it had secured two LNG cargoes for delivery via Krk, with some volumes likely to be shipped further to the Czech Republic, signalling the opening up of a new corridor linking the western Balkans to central Europe.

The transmission system operator Plinacro is looking to cater to the growing regional demand and is working on plans to open up or expand four routes, including the IAP, which will allow it to maximise the use of the FSRU or its replacement with a larger vessel.

THE CROAT VTP, LNG TERMINAL AND INTERCONNECTIONS

The country has an annual demand of 3bcm and has been receiving supplies mainly via the Krk LNG terminal as well as pipeline supplies from Russia transited via the Drávaszerdahely border point.

Croatia is also importing volumes from Slovenia via the Rogatec interconnector in the western part of the country. The interconnector itself is linked primarily to the Austrian TAG pipeline via the Slovenian transmission system.

⁸ Information included in this section was provided by the Croat gas grid operator PLINACRO

Both links are bidirectional but flows have been largely towards Croatia rather the outwards towards Hungary and Slovenia.

LNG HRVATSKA (KRK TERMINAL)

LOCATION: Omišalj municipality on the island of Krk

TOTAL REGASIFICATION CAPACITY: 2.9bcm/year – to be expanded to 3.5bcm/year

DAILY SENDOUT: 10.84 mcm/day

STORAGE CAPACITY: 140,206 cubic metres of LNG

VESSEL CAPACITY: Q-Max⁹ compatible

COMMISSIONING DATE: In operation

OPERATOR: LNG Croatia LLC

CAPACITY BOOKED: First-come-first-served basis.

AVAILABLE CAPACITY FOR BOOKING: Fully booked by single user until 2027.

TARIFFS: €1.17/MWh until 2034 <https://lng.hr/en/services-and-tariffs/>

LNG regasification tariff and capacity allocation

The regasification tariff has been set at a fixed rate of €1.17/MWh until 2034, after which it will increase to €1.18/MWh.¹⁰

For more information check: <https://lng.hr/en/services-and-tariffs/>

Capacity is allocated on a first-come-first-served basis.

A total of 0.3bcm/year were added to the terminal's existing capacity of 2.6bcm/year in March 2022. The capacity was immediately allocated to a single user until 2027.

Spot capacity is rare but may be allocated depending on availability.

For more information on regasification capacity check: <https://lng.hr/en/capacity-booking/available-capacities-at-the-terminal/>

Interconnections

The Krk terminal is currently supplying the domestic market and central European companies, primarily in Hungary via a combination of swaps and physical flows at the Drávaszerdahely interconnection point.

⁹ Q-Max is a type of ship, specifically a membrane type liquefied natural gas carrier. Q-Max vessels, "Q" stands for Qatar and "Max" for the maximum size of ship are able to dock at the LNG terminals in Qatar. Ships of this type are the largest LNG carriers in the world. A ship of Q-Max size is 345 metres (1,132 ft) long and measures 53.8 metres (177 ft) wide and 34.7 metres (114 ft) high, with a draft of approximately 12 metres (39 ft). It has an LNG capacity of 266,000 cubic metres (9,400,000 cu ft), equal to 161,994,000 cubic metres (5,7208x109 cu ft) of natural gas.

¹⁰ Valid as of July 2022.



The border point had been used close to technical capacity in 2021 but flows have been falling below less than half that level since the start of the year.



Entry point	Direction	EIC code	Technical firm capacity in KWh/day
1 Dravaszerdahely	Hungary - Croatia	21Z000000000249H	77,521,707
2 Rogatec	Slovenia - Croatia	21Z000000000128T	53,160,000
3 Croatia LNG	LNG terminal - VTP	21Z000000000510W	79,835,747
Exit point	Direction	EIC code	Technical firm capacity in KWh/day
1 Dravaszerdahely	Croatia - Hungary	21Z000000000249H	51,695,538
2 Rogatec	Croatia - Slovenia	21Z000000000128T	7,596,000

Tariff items for gas transmission

Entry-exit tariffs into the domestic system can be found here: <https://www.plinacro.hr/default.aspx?id=612>;

A tariff calculator is available here: <https://www.sukap.plinacro.hr/pub/app/app?lang=en#tariffCalculator>

Data on technical, booked and available capacity at all points, including aggregated capacity can be found here: <https://www.sukap.plinacro.hr/pub/app/app>

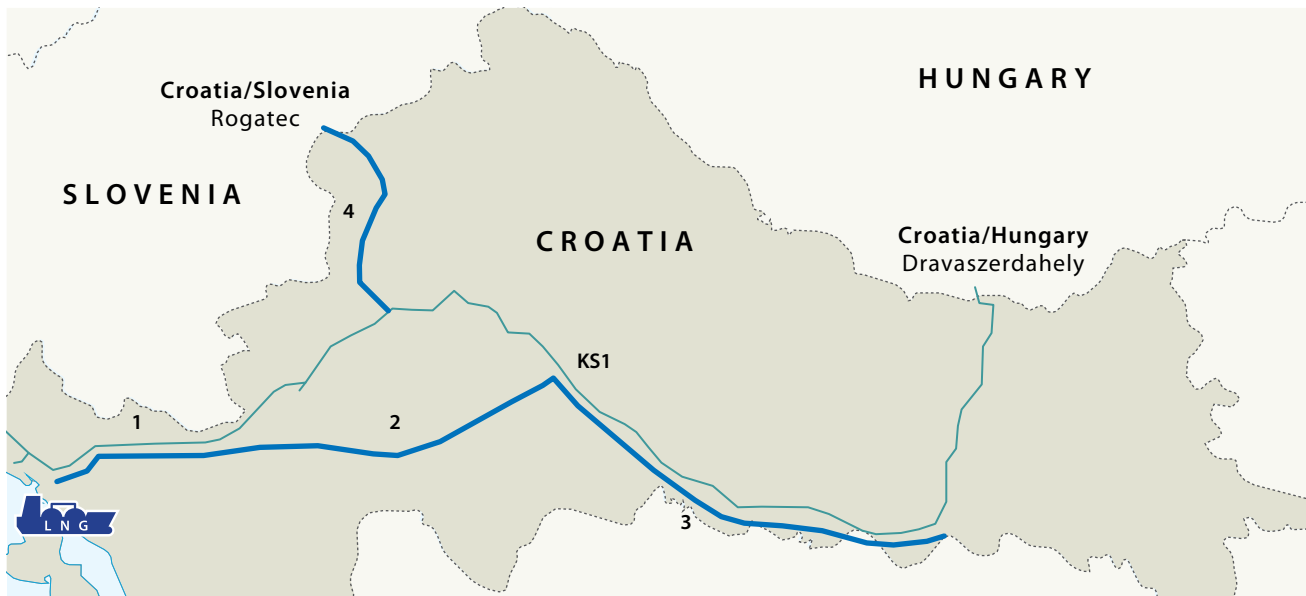
DEVELOPMENT PLANS

Croatia has been planning to expand its LNG importing and transmission infrastructure well before the EU’s push to diversify away from Russian gas imports. These plans are now likely to gather speed amid growing regional demand.

The current facility/mooring arrangements have the capacity to receive Q-Max vessels.

The existing vessel is owned by Croatia LNG and has an hourly sendout of 336,000m3.

There are plans to expand it to 400,000m3/hour which would help increase the facility’s overall capacity by another 0.6bcm/year to 3.5bcm/year.



Source: Plinacro

To increase the sendout, there is a need to expand the transmission capacity of pipelines to Slovenia and Hungary.

The development options are:

1. Zlobin-Bosiljevo pipeline connecting directly to the Krk terminal – enables the increase of the current FSRU up to 400,000 m³/h
2. Bosiljevo-Kozarac pipeline (central Croatia) – enables the increase of export towards Hungary to 400,000 m³/h

3. Kozarac-Slobodnica pipeline – enables the increase of export towards Hungary to 600,000 – 700,000 m³/h
4. Lučko-Zabok-Rogatec pipeline – enables the increase of export towards Slovenia to 500,000 – 650,000 m³/h

The expansion of the Bosiljevo – Kozarac and Lučko-Zabok-Rogatec pipelines will require the development of bigger regasification capacity at the LNG terminal of at least 700,000 m³/h.

The Lučko-Zabok-Rogatec pipeline to Slovenia can be developed in two to three phases, offering different border capacities throughout each stage.



HUNGARY¹¹

The Hungarian gas market has been positioning itself as a regional supply and transport hub, seeking to establish numerous routes linking southern European markets to central European hubs to the north.

Hungarian shippers have been actively working to source natural gas either as part of long-term contracts with Russia, buy on the spot on hubs or secure LNG swaps for volumes imported via the Croat terminal Krk.

Although Hungary does not have significant gas reserves, it has supplied volumes to neighbouring countries, including Romania, one of Europe's larger producers.

Since the launch of the Krk terminal in 2021, Hungarian companies have been active buyers, signing a six-year supply agreement with Shell in 2020 for 250mcm annually. The gas is in fact swapped, which means that gas sourced as LNG earmarked for deliveries to Hungary is retained in Croatia and the equivalent amount transiting Hungary towards the Balkan country is retained at the border.

Also in 2021, Russian flows which had been historically supplied to Hungary via Ukraine were rerouted via the new TurkStream – Balkan Stream corridor entering Hungary via the Kiskundorozsma border point with Serbia.

In September 2021, Russia's Gazprom signed two long-term contracts to supply 4.5bcm/year of gas to Hungary until 2036. In July 2022, the government said it was looking to secure an additional 0.7bcm/year from 1 September 2022. In this context, the Foreign Minister of Hungary announced on 31 August 2022, that additional quantities were acquired from Gazprom, which increases the maximum daily deliverable quantities to 5,8 mcm/d via the southern route.

Under the terms of the agreements, which came in force at the beginning of October 2021, 3.5bcm/year of gas is being delivered via Hungary's new connection to the Turk Stream route via Serbia and the remaining 1bcm/year are delivered through Austria.

The opening up of the Ukrainian gas market and increased interest from non-resident companies in Ukrainian storage had also triggered a spurt of trading liquidity internally and on the border.

Over-the-counter trades on the Hungarian MGP hub

more than doubled year on year in 2021, although they remain well below volumes traded on the neighbouring Austrian hub.

Hungary was expected to be a recipient and transit route for Black Sea gas sourced in the Romanian offshore economic zone.

The gas was due to be exported via the BRUA project, linking Bulgaria and Romania to Hungary and Austria. However, over the years Austria was dropped off, amid reports there was no market interest in reverse capacity from Hungary on the existing interconnector, which is currently used for offtakes from Austria.

The expansion of the slimmed-down version of BRUA, later known as RO-HU, was also put on hold amid lack of market interest and delays to the Black Sea production projects. However, in mid September, the Hungarian energy regulator, MEKH, confirmed the import capacity from Romania would increase from 4.8cm/day to 7mcm/day from 1 October 2022.

HUNGARIAN VTP AND INTERCONNECTIONS

Trading activity has expanded across the board in the last two years, largely because of soaring storage interest in neighbouring Ukraine.

Over-the-counter trades on the Hungarian MGP in 2021 more than doubled over the average volumes over the previous five years, although they remain well below volumes traded on the neighbouring Austrian hub.

On the Central Eastern European Gas Exchange (CEEGEX) platform, total traded volume was just shy of 35TWh, up by nearly 5TWh year on year, according to data published in the CEEGEX end-of-year report. This was the highest recorded level of trading activity on that platform since 2019.

Liquidity also rose on the spot and the derivatives exchange HUDX. Trading has been brisk at all border points thanks to new or expanded capacity in recent years. Nevertheless, liquidity fell in 2022 amid soaring gas prices which put significant financial strain on companies.

In July 2022, the Hungarian regulator MEKH published the new tariffs for the Gas Year 2022/23 which will be applicable from 1 October 2022 and can be accessed from here: <https://fgsz.hu/en/home/news/information-on-tariffs-applicable-from-1-october-2022.html>

¹¹ Information included in this section was provided by the Hungarian gas transmission system operator FGSZ



Entry point	Direction	EIC code	Firm technical capacity (KWh/d)
1 Mosonmagyaróvár	Austria-Hungary	21Z000000000003C	153,079,200
2 Balassagyarmat (HU) / Velké Zlievce (SK)	Slovakia- Hungary	21Z000000000358C	128,975,952
3 VIP Bereg (HU) / VIP Bereg (UA)	Ukraine- Hungary	21Z000000000507L	517,472,808
4 Csanádpalota	Romania - Hungary	21Z000000000236Q	73,372,176
5 Kiskundorozsma 2	Serbia - Hungary	21Z000000000505P	245,765,568
6 Drávaszerdahely	Croatia - Hungary	21Z000000000249H	51,744,408
Exit point	Direction	EIC code	Firm technical capacity (KWh/d)
1 Mosonmagyaróvár	Hungary - Austria	21Z000000000003C	-
2 Balassagyarmat (HU) / Velké Zlievce (SK)	Hungary - Slovakia	21Z000000000358C	50,883,024
3 VIP Bereg (HU) / VIP Bereg (UA)	Hungary - Ukraine	21Z000000000507L	84,768,360
4 Csanádpalota	Hungary - Romania	21Z000000000236Q	77,457,960
5 Kiskundorozsma	Hungary - Serbia	21Z000000000154S	141,977,484
5 Kiskundorozsma 2	Hungary - Serbia	21Z000000000505P	-
6 Drávaszerdahely	Hungary - Croatia	21Z000000000249H	77,594,976

DEVELOPMENT PLANS

At the start of the year, Ukraine and Hungary decided to carry out a pilot project for firm export capacity from Hungary to Ukraine until the end of September 2022. The initial volumes were offered at 8mcm/day and there were expectations they would double depending on market interest. The two gas TSOs subsequently announced the pilot would be extended until 31 March 2023.

However, with demand being destroyed in Ukraine following Russia's invasion of the country at the end of February, Ukraine has been relying mostly on its own production to cover falling demand.

Many Ukrainian shippers have expressed an interest in sourcing natural gas imported as LNG in Croatia and transiting it to Ukraine via Hungary.



Depending on long-term demand, this may require additional border capacity, as discussed in the chapter on Croatia.

Furthermore, if Romania fast-tracks its Black Sea exploration and production projects, Hungary would be interested in sourcing more volumes from the country via the Csanádpalota interconnection point.

A total of 50GWh/day have been booked at the IP on a long-term basis from Romania to Hungary until 2029/2030 and 70GWh/day in opposite direction over the same period.

CASE STUDY: SUPPLY ROUTE CROATIA - HUNGARY - UKRAINE

Although Croatia is planning to establish several supply routes radiating from the Krk terminal for supplies towards Slovenia in the West and Serbia in the East, Hungary is likely to expand its role as a key offtaker and transit country for gas sourced as LNG.

The route had been used primarily for supplies to Hungary, with first volumes due to reach Slovakia and the Czech Republic by mid-May 2022.

According to ENTSO-G data, the terminal has been used at 84% of its capacity over the period 1 April – 30 June 2022.

Ukraine could also benefit by importing volumes via Hungary and into the country at the Bereg border point.

To transport gasified LNG from the Krk terminal to Hungary and possibly other destinations, a number of elements would need to be taken in consideration.

For example, to ship natural gas from the terminal to Ukraine, the following system usage fees need to be taken in consideration.

- LNG natural gas terminal regasification fee;
- Entry (Omišalj) capacity fee to the Croatian TSO system;
- Exit capacity fee at HR>HU border;
- Entry (Drávaszerdahely) capacity fee to the Hungarian TSO system;
- Volume fee of the HU TSO system;
- Exit (VIP Bereg) capacity fee at HU>UA border;
- Entry capacity fee to the Ukrainian TSO system.

Based on the tariffs for the Gas Year 2021/2022, the cost annual capacity to ship regasified LNG from the Krk terminal to Ukraine via Hungary costs **€3.51/MWh** (the total cost does not include a 20% VAT levy charged by Ukraine on its entry tariff).

Costs	€/MWh
Regasification Krk	1.17
Entry Plinacro VTP	0.73
Croatia - Hungary (Drávaszerdahely Plinacro exit)	0.52
Croatia - Hungary (Drávaszerdahely FGSZ entry)	0.29
FGSZ commodity fee	0.11
Hungary - Ukraine (Bereg FGSZ exit)	0.28
Hungary - Ukraine (Bereg GTSOU entry exclusive of 20% VAT)	0.41

The costs were valid as of 15.07.2022

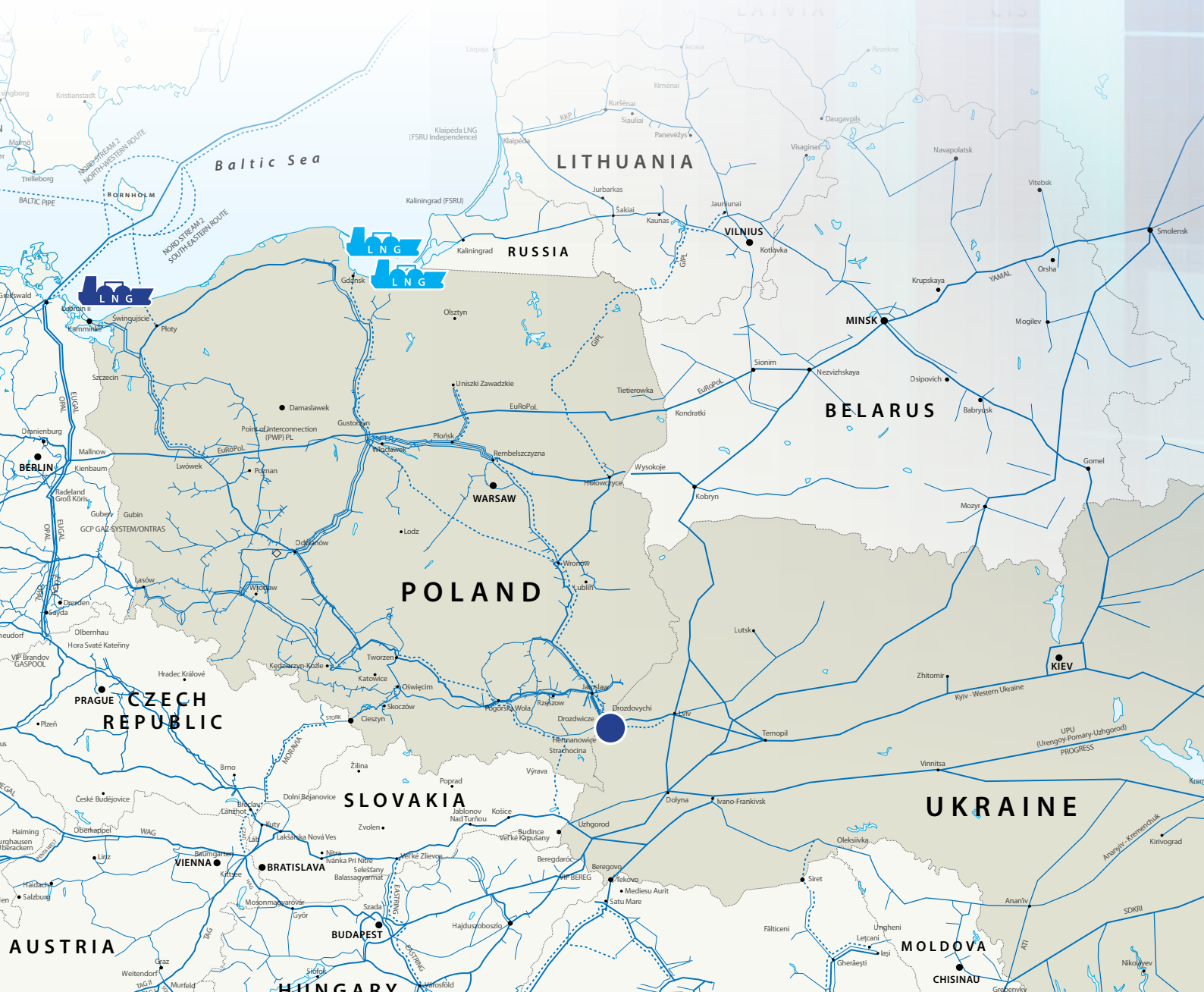


MARKET FEEDBACK

	General observations	Croatia	Hungary	Ukraine
What is your experience of dealing with regional transmission system operators?	Good	Good	Good	Good
What is your experience of booking border capacity in this region?	Good, standard procedure with bookings via the Hungary-based RBP platform		Heavy-handed approach and insufficient communication from the Hungarian regulatory authority MEKH following its decision to limit bids on the Austria-Hungary border that can be submitted by a network user at borders. This was highlighted by traders because of the measure's impact on West-to-East flows	
What is your experience of sourcing natural gas and transporting it regionally?	Previous experience might sound irrelevant in the current geopolitical situation since physical volumes were based primarily on Russian gas. Now access to proper volumes is a challenge for all market players.			
How would you describe transmission tariffs (expensive/attractive/complex)?	Complex: the level of local tariffs is in general fine, however, cross-border trade with physical delivery via multiple markets limits access and competition. No wonder that swap deals began to occur in the region. In the current geopolitical and price environment, however, not tariffs are the main concern.		The commodity charge is set to increase steeply for the upcoming Gas Year 2022/23. A commodity charge of this magnitude will greatly impact the overall transmission cost.	
What are the main impediments to market integration?	Tariffs can pile up due to multiple border crossings and regulatory risks			
What projects should be carried out to guarantee better interconnectivity and access to supplies?	The necessary physical infrastructure is generally available	Expansion of the KRK LNG terminal needed		
What can be done to streamline transmission operations in the region?			Limit reporting requirements which are very burdensome, with new obligations being added regularly since Russia's war in Ukraine started	
Other remarks				

Chapter II

POLAND – UKRAINE SUPPLY CORRIDOR





POLAND¹²

The Polish gas market is preparing for a sea-change in the upcoming decade as it is ending its reliance on Russian gas, looks to diversify sources of supply and expand the transmission infrastructure to establish a regional hub for cross-border exchanges with Ukraine, the Baltic countries and central Europe.

Transformations have already been afoot for nearly a decade.

Since 2010 reverse flows have been introduced at the Mallnow border point with Germany on the Yamal pipeline. During the first phase flows were netted out. The construction of an additional metering facility on the border allowed for physical reverse flows.

In 2015, Poland completed its first onshore LNG terminal in Świnoujście on the Baltic Sea and the capacity is being presently expanded to respond to growing demand. As of January 2022, it stood at 6.2 bcm/year but after full expansion – scheduled by January 2024 – it will increase to 8.3 bcm/year.

As of 1 May 2022, the Poland-Lithuania Interconnection (GIPL / IP Santaka) was brought online, which marked the start of commercial gas transmission via this route.

Poland's strategy vis-à-vis Gazprom has been reviewed as the country has been looking to wean itself off transit revenue and imports well before the European Union indicated it would move away from Russian fossil fuel imports in response to Moscow's war in Ukraine.

In 2020 Poland said it had no intention of extending the long-term supply contract that was set to expire at the end of 2022 and notified Gazprom that it planned to terminate it on its expiry date. The contract was suspended by Gazprom ahead of time at the end of April 2022, when the Russian supplier stopped deliveries in response to Poland's refusal to pay for imported gas in compliance with a ruble payment mechanism introduced by the Kremlin on 31 March.

Thanks to its supply policy overhaul, Poland will have switched from being almost entirely reliant on Russia for gas imports to weaning itself completely off supplies from the East.

Meanwhile, the gas transmission system operator, Gaz-System, is working on multiple projects to expand or build new interconnecting infrastructure with neighbouring countries.

These include the completion of an interconnector with Slovakia in 2022 as well as a new importing corridor for 10 bcm/year of Norwegian gas shipped across Denmark via the Baltic Pipe from 1st October 2022.

The expansion of the importing infrastructure will not only help to respond to increasing demand, which has been rising by 30% to 19 bcm/year between 2010 and 2020 and is likely to increase within the next decade as Poland is looking to replace coal with natural gas in electricity generation.

It will also turn Poland into a regional hub that would allow neighbouring Ukraine, the Baltic states and central European countries to access Norwegian supplies as well as source LNG on global markets and import it via Polish LNG terminal(s).

As of early July 2022, there were discussions about plans to streamline storage obligation requirements, which had discouraged foreign traders from entering the market since they were adopted in 2017. Proposals for amendments included the calculation of reserve storage based on household demand.

THE POLISH VTP, LNG TERMINAL AND INTERCONNECTIONS

Around 80% of the gas consumed in Poland is currently imported, of which 60% had been historically oftaken from Russia via Ukraine and Belarus, with the remaining volumes being sourced either as LNG through the Świnoujście terminal from Qatar, Norway and the US or as pipeline gas imported from Germany and the Czech Republic.

The country operates seven underground storage facilities with a total capacity of 3.2 bcm and a maximum aggregated daily sendout of 53.5 mcm/day.

In March 2022, the Polish transmission system operator Gaz-System offered physical flows towards Ukraine amounting to 4mcm/day as a security of supply measure.

PRESIDENT LECH KACZYŃSKI LNG TERMINAL IN ŚWINOUJŚCIE

LOCATION: Świnoujście, northern Poland

TOTAL REGASIFICATION CAPACITY: 6.2bcm/year – to be expanded to 8.3bcm/year in 2024

DAILY SENDOUT: 16.98 mcm/day

STORAGE CAPACITY: two tanks 160.000 m³ LNG each

VESSEL CAPACITY: from 120.000 m³ to 216.000 m³ (Q-flex)

COMMISSIONING DATE: In operation

OPERATOR: GAZ-SYSTEM

CAPACITY BOOKED: Yes

AVAILABLE CAPACITY FOR BOOKING: Fully booked

TARIFFS: Regasification_Service_Tariff_7.pdf (Gaz-System.pl)

¹² Information included in this section was provided by the Polish gas transmission system operator Gaz-System.



Interconnections

Poland has interconnection points with neighbouring countries for imports and exports of natural gas, some of which are expected to be expanded or upgraded to allow bidirectional flows in the short to medium term.



Entry point	Direction	EIC code	Technical firm capacity in KWh/day
1 GCP GAZ-SYSTEM/ONTRAS	Germany - Poland	21Z000000000456C	42,013,200 (as of 26.06.2022)
2 Santaka	Lithuania - Poland	21Z180960164W65R	14,933,184 (as of 26.06.2022)
3 GCP GAZ-SYSTEM/UA TSO	Ukraine - Poland	21Z000000000508J	135,600,000
4 Cieszyn (PL) / Český Těšín (CZ)	Czech Republic - Poland	21Z000000000239K	6,660,072 (as of 26.06.2022)
5 Strachocina	Slovakia- Poland	-	0
6 Świnoujście	LNG terminal - Polish VTP	21Z000000000454G	227,304,000
Exit point	Direction	EIC code	Technical firm capacity in KWh/day
4 Cieszyn (PL) / Český Těšín (CZ)	Poland - Czech Republic	21Z000000000239K	0
3 GCP GAZ-SYSTEM/UA TSO	Poland - Ukraine	21Z000000000508J	40,104,000
1 GCP GAZ-SYSTEM/ONTRAS	Poland - Germany	21Z000000000456C	26,846,976
5 Strachocina	Poland - Slovakia	-	0
2 Santaka	Poland - Lithuania	21Z180960164W65R	61,548,000



Information on capacity at interconnection points

For information on firm or interruptible capacity, please check: <https://www.Gaz-System.pl/en/for-customers/provision-of-capacity/nts-transmission-capacity.html>

For details related to technical, booked and available capacity please check: <https://www.Gaz-System.pl/en/for-customers/provision-of-capacity/tgps-transmission-capacity.html>

Entry, exit fees at interconnection points (English version) <https://www.Gaz-System.pl/dam/jcr:d04fa291-e2e8-4366-bbc1-0ce58c58508c/the-tariff-for-gas-transmission-services-no-15-searchable-version.pdf>

Polish transmission fees: <https://www.Gaz-System.pl/en/for-customers/provision-of-capacity/nts-transmission-capacity.html>

The **fee for provision of transmission services** at the physical entry point to the transmission network or physical exit point from the transmission network, **is described in Point 4** (formula, rates)

The **fee for provision of interruptible transmission services** at the physical entry point to the transmission network or physical exit from the transmission network **is described in Point 9** (formula, discount)

To check the fees please use the calculator:

Short term contracts: GAZ-SYSTEM fee calculator for gas transmission services provided under short-term contracts | GAZ-SYSTEM fee calculator for gas transmission services provided under short-term contracts

Long term contracts: GAZ-SYSTEM fee calculator for gas transmission services provided under long-term contracts | GAZ-SYSTEM fee calculator for gas transmission services provided under long-term contracts

DEVELOPMENT PLANS

The development of the Polish gas market is likely to continue over the upcoming years and will focus primarily on expanding the LNG importing infrastructure as well as its cross-border infrastructure to allow not only increased imports in response to growing domestic demand but also outward flows to neighbouring countries.

This is already reflected in the plans that are afoot at various stages of development.

LNG

PRESIDENT LECH KACZYŃSKI LNG TERMINAL IN ŚWINOUJŚCIE- EXPANSION

- As of **January 2022** the maximum technical capacity was increased up to 6.2 bcm/year
- As of **January 2024** the maximum technical capacity will be increased up to 8.3 bcm/year
- The regasification capacity of the Świnoujście LNG terminal is fully booked. In case there is any capacity not being used by the terminal user during that period, it can be sold on the secondary market to other possible users.
- **More details regarding the secondary market can be found in the Terminal Code** https://terminalng.Gaz-System.pl/fileadmin/Dokumenty/The_Terminal_Code_of__2021.12.02.pdf

FSRU GDAŃSK TERMINAL (POSSIBILITY TO ACCOMMODATE TWO FSRUs)

LOCATION: Gdańsk, northern Poland

TOTAL REGASIFICATION CAPACITY: 6.1bcm/year + 6.1bcm/year

DAILY SENDOUT: 19.9 mcm/day + 19.9mcm/day

VESSEL CAPACITY: up to 180,000 LNG cubic meters at this stage

COMMISSIONING DATE: 2027

OPERATOR: GAZ-SYSTEM

CAPACITY BOOKED: Completed Order to Proceed process

The FSRU *Polish Baltic Sea Coast* project is planned as the first floating terminal in Poland. The annual regasification capacity will be approx. 6.1bcm/y (210.2 GWh/day). The scope of the project covers the construction of the FSRU terminal as well as pipelines connecting the LNG facility with the Polish Transmission System, namely an offshore pipeline between the FSRU and the domestic network and onshore pipelines: Kolnik – Gustorzyn and Kolnik – Gdańsk



New interconnections

SUPPLY ROUTE Poland – Lithuania interconnection (IP Santaka) GIPL – as of 1 May 2022 until the end of Gas Year 2022:

- Exit from PL: **Firm** 61.55 GWh/d in short term products
- Entry to PL: **Firm** 00 GWh/d, **interruptible** in short term products – detailed offer level is available at the GSA capacity auctions platform
- GIPL became operational on 1 May 2022. Capacity auctions are organised following requirements of EU Network Code on Capacity Allocation Mechanisms, capacity products timeframes is identical to the ones applied in other EU interconnection points: annual, quarterly, monthly, daily, within-day

SUPPLY ROUTE Poland – Slovakia interconnection – VYRAVA IP (Strachocina – Velké Kapušany) – as of H2 2022 (depending on commissioning on Slovak side):

- Exit from PL: up to 143.9 GWh/d, (4.7 bcm/year)
- Entry to PL: up to 174.5 GWh/d. (5.7 bcm/year)
- Capacity auctions will be organised in line with requirements included in the EU Network Code on Capacity Allocation Mechanisms. The capacity product timeframe is identical to the ones applied in other EU interconnection points: annual, quarterly, monthly, daily, within-day.

SUPPLY ROUTE DENMARK – POLAND (BALTIC PIPE)

The designed capacity for the route Denmark – Poland is: 13,411 MWh/h.

The Baltic Pipe capacity was partially booked for 15 years as of gas year 2022 in the Open Season process. The total booked capacity is as follows:

- North Sea Entry Point (NO->DK): 10,600 MWh/h
- Entry Point Baltic Pipe (DK->PL) and Exit Point Baltic Pipe (DK->PL): 10,600 MWh/h
- Entry Point Baltic Pipe (PL->DK) and Exit Point Baltic Pipe (PL->DK): 0 MWh/h

INCREMENTAL CAPACITY PROPOSAL FOR POLAND – UKRAINE INTERCONNECTION

GAZ-SYSTEM together with the Ukrainian counterpart, GTSOU, assessed the non-binding demand indication for incremental capacity received from 5 July 2021 to 30 August 2021. Based on the outcome of the Market Demand Assessment Report for the incremental capacity the TSOs have begun the design phase.

The two thresholds for firm capacity from Poland to Ukraine that have been proposed were:

- **3,869,863 KWh/h**
- **5,775,696 KWh/h**

INCREMENTAL BIDIRECTIONAL CAPACITY PROPOSAL FOR POLAND – CZECH REPUBLIC

Following Market Demand Assessment which ran between 5 July – 30 August 2021, GAZ-SYSTEM and the Czech transmission system operator, NET4GAS have begun the design phase of incremental capacity project at the interconnection point between Poland and the Czech Republic at **Český Těšín/Cieszyn**. **The interconnector is currently used only in the direction Czech Republic – Poland.**

The maximum capacity offer is for 1,270,000KWh/h

**CASE STUDY:
SUPPLY ROUTE POLAND – UKRAINE/POLAND – SLOVAKIA – UKRAINE**

With the increase in LNG imports as well as the commissioning of the Baltic Pipe, Poland expects to become a major supplier of non-Russian gas to the region.

According to ENTSOG data its onshore LNG terminal has been used at 82% of its capacity over the period 1 April – 30 June 2022.

Although Poland has temporarily offered firm capacity of close to 4mcm/day for exports to Ukraine, offtakes via the existing border point are limited. GAZ-SYSTEM and GTSOU are working to address the issue and offer incremental capacity but this is to be brought to the market no earlier than 2030.

However, Ukrainian shippers interested in tapping LNG imports via Poland could export the volumes into Ukraine via the Polish-Slovak Vyrava interconnector from Poland into Slovakia. The interconnector will have an exit point in Slovakia in close proximity to the Veľké Kapušany border point with Ukraine.

Before implementation of the incremental project, shippers interested in importing volumes into Ukraine could import gas via the Polish-Slovak interconnector and further via the Budince border point.

Costs

The Poland – Ukraine or Poland -Slovakia- Ukraine supply route could be one of the most attractive regionally, considering the relatively short distance to ship gas either from the LNG terminal or from the VTP system to Ukraine.

In a theoretical scenario assuming that companies would be interested in shipping regasified LNG to Ukraine, they could do so either directly if there is firm border capacity between the two countries or via Slovakia once the Poland – Slovakia interconnection point enters commercial operation.

However, in the current situation, it is likely that the border capacity with Ukraine would be offered on an interruptible basis or companies interested in exporting gas to Ukraine, could do so by booking firm capacity with Slovakia and ship the gas into Ukraine (physically) via the Budince IP on the Slovak-Ukrainian border point.

This case study calculates the cost to book annual capacity to ship gas directly from the LNG terminal to Ukraine and includes both a scenario where the gas is shipped physically via firm capacity or netted out through interruptible capacity.

The tariffs were converted from Polish zloty into euros at the spot conversion rate of 20 July 2022.

In a scenario where firm capacity is considered, the cost to ship regasified LNG to Ukraine would cost **€2.03/MWh (capacity plus commodity fee)**

In a scenario where interruptible capacity is considered, the cost to ship regasified LNG to Ukraine would be **€2.005/MWh (capacity plus commodity fee)**

Costs	€/MWh
Regasification tariff	1.02
Commodity fee (variable fee) (€/MWh)	0.2
Exit Gaz-System (firm)	0.4
Exit Gaz-System (interruptible)	0.375
Entry - GTSOU (exclusive of 20% VAT)	0.41



MARKET FEEDBACK

	General observations	Poland	Ukraine	Slovakia
What is your experience of dealing with regional transmission system operators?	Good	Good	Good	Good
What is your experience of booking border capacity in this region?		The LNG terminal is fully booked and there are storage obligations, which have foreclosed the market since the requirements were introduced in 2017. Draft proposals to amend existing storage obligations are currently being discussed, which could help open up the market.	Border capacity with Poland booked on an unbundled basis. There is not much interest in bundling capacity, as volumes are traded on the border because it is easier and safer. The bundling of capacity is not necessary currently but could be implemented once taxation barriers inside the Ukrainian market are removed. When implemented, the bundling of capacity would also help to increase liquidity.	
What is your experience of sourcing natural gas and transporting it in the region?	Previous experience might sound irrelevant in the current geopolitical situation since physical volumes were based primarily on Russian gas. Now access to proper volumes is a challenge for all market players.			
How would you describe transmission tariffs (expensive/attractive/complex)?	Complex: the level of local tariffs is, in general, fine, however, cross-border trade with physical delivery via multiple markets limits access and competition. No wonder that swap deals began to occur in the region. In the current geopolitical and price environment, however, not tariffs are the main concern.			The entire tariff methodology in Slovakia is imperfect. The commodity charge is linked to the short-term price index as if the gas transmission system operator eustream was buying its entire fuel gas in short-term products and the charge applies both to entry and exit regardless of whether these result in any physical flow or not.
What are the main impediments to market integration?	Tariffs can pile up due to multiple border crossings and regulatory risks			
What projects should be carried out to guarantee better interconnectivity and access to supplies?	The necessary cross-border physical infrastructure is generally available, however, the facilitation of LNG trade towards Ukraine would require further capacity expansions within Poland			
What can be done to streamline transmission operations in the region?		Increase transmission capacity in southern Poland to help decongest border with Ukraine and establish firm exit border capacity		
Other remarks		Unstable regulatory environment		

Chapter III

THE TRANS-BALKAN CORRIDOR





The Trans-Balkan corridor

The Trans-Balkan Pipeline had been one of the key gas supply routes in Europe, being historically used for Russian gas exports shipped via Ukraine to Moldova, Romania, Bulgaria, Turkey, Greece and the Republic of North Macedonia.

The pipeline exits Ukraine at the Grebenyky interconnection point, cutting in and out of the Republic of Moldova before re-entering south-eastern Ukraine at the Orlovka-Isaccea border point with Romania.

It travels south across Romania, where it splits into four sections – one of which enters the Romanian VTP while the remaining three transit the south-eastern Dobrogea province before entering Bulgaria at the Negru Vodă 1–Kardam border point.

In Bulgaria, the three lines narrow down to two at Valchi Dol before heading down to Lozenets in the south-eastern part of the country from where it splits into two sections.

One heads further East to Strandzha on the Bulgarian-Turkish border, the other travels south-west towards Ihtiman where it splits again. One leg heads to the North

Macedonian Border, the other travels south to the Greek border.

With the completion of TurkStream in 2020, a corridor linking southern Russia to Turkey across the Black Sea and supplying Turkey, the Balkans and Hungary, the Trans-Balkan lines have been mainly used for transporting gas from Bulgaria to Romania.

The direction of shipments has changed for the last two years, with supplies being rerouted from the traditional north-to-south corridor to flow from East to West or south to north.

Following the commissioning of the TurkStream corridor, Ukraine lost its regional transit role to Turkey, which became the transmission route for Russian gas shipped across the Black Sea.

Bulgaria also gained an important transit position in the new reconfiguration.

The Trans-Balkan route on Bulgarian territory is fully integrated in the domestic transmission system, which now includes newly built infrastructure as part of a project to expand the existing network and enable alternative supply routes to central Europe. Following the expansion, supplies exiting Turkey via a new border point – Strandzha 2 (BG) – Malkoçlar (TR) – are shipped towards Greece, the Republic of North Macedonia, Romania, Serbia and further to Hungary.



Source: ICIS



However, Russia's war in Ukraine and the subsequent dramatic push by the EU to diversify away from Gazprom supplies, have now revived interest in the corridor which could provide access to sizeable regasification capacity in Greece and Turkey as well as Caspian gas supplies via the Southern Gas Corridor or Black Sea gas.

In fact, thanks to the possibility of securing more supplies as well as its bidirectional transport capacity, the Trans-Balkan corridor could become the backbone of an integrated regional gas market, linking Ukraine's storage facilities in the north to Greek and Turkish LNG terminals, gas supply sources from the Caspian region via the Southern Gas Corridor, as well as offshore production facilities in Romania, Bulgaria or Turkey.

Although the pipeline is available for use, having a north-south capacity of 26.7bcm/year at the critical Orlovka-Isaccea border point on the Ukrainian-Romanian border, there are regulatory or tariff-related issues that need to be streamlined.

The Bulgarian gas transmission system operator, Bulgartansgaz, for example, has increased the technical capacity in reverse direction from Bulgaria to Romania at the IP Negru Vodă 1 -Kardam from 4.1mcm/day, as planned in the concept paper for the reversal of the pipeline, to 13.78mcm/day currently.

Nevertheless, many traders have been pointing to the possibility of making more capacity available along the route, particularly on the Romanian section, as well as to the need to offer backhaul services on the Moldovan-Ukrainian border or slash transmission tariffs.

Some companies active regionally have already carried out physical imports involving LNG imports via the Greek Revithoussa terminal over the last two years.

Typically for any bidirectional point, the physical flows at the IP Kulata/Sidirokastron on the Greek-Bulgarian border, depend on nominations by network users, which means that only the difference between nominated quantities in both directions is transported.

Turkey could also open a gateway to Caspian gas imported via the Southern Gas Corridor. Volumes currently transit the country and exit it on the Turkish-Greek border for onward flows to Bulgaria, Greece and Italy.

The Trans-Anatolian Pipeline (TANAP), which ships the gas from eastern to western Turkey as part of the Southern Gas Corridor, has been fitted with two delivery points – one at Eskişehir in north-western Turkey and one in the Trakya region close to the Turkish-Bulgarian border. The purpose of this delivery point is to serve as an exit point to the Turkish market. It is connected to the domestic network operated by BOTAŞ and although it has not been used for commercial gas deliveries yet, it can be used anytime in case the Turkish grid operator requests deliveries.

Expansion plans both in Turkey and Greece, involving the addition of more regasification capacity and complemented by additional transmission capacity such as the launch of Interconnector Greece Bulgaria (IGB) could help consolidate the region's security of supply even though, so far, the Turkish terminals have remained inaccessible to neighbouring countries.



GREECE¹³

The Greek gas market has been fast developing in recent years to take advantage of the surge in global LNG production as well as to accommodate the opening up of the Southern Gas Corridor, linking the Caspian region to Italy via Greece and Albania.

This has given Greece the opportunity not only to establish itself as a transit country but also as a supply hub thanks to its expanded LNG importing terminal at Revithoussa.

The terminal as well as the domestic pipeline network and interconnections with Greece and Turkey are operated by the transmission system operator DESFA.

The Trans-Adriatic Pipeline (TAP), which links up with the Trans-Anatolian Pipeline on the Turkish-Greek border, transits Greece and travels further West into Albania and Italy is independent of the DESFA system.

TAP is designed to deliver volumes to the Greek market and through it to Bulgaria as well as transit gas to Italy.

TAP as well as the Revithoussa terminal have proved essential to neighbouring Bulgaria, particularly after Russia suspended gas deliveries at the end of April 2022. Within days after the announcement, there were reports that at least one Bulgaria-based company would import a full cargo via the Greek Revithoussa LNG terminal by mid-May '22 and was looking to offtake half cargoes over the summer months and then well into November.

Bulgaria has also been receiving Caspian pipeline volumes delivered into Greece and currently exported across the border via the existing Sidirokastron-Kulata border point.

Bulgaria holds a 1bcm/year import contract and is expecting to receive Caspian volumes via the Interconnector Greece-Bulgaria once it enters commercial operations. The interconnector will be operated by ICGB AG, a company which includes as shareholders the Bulgarian Energy Holding (BEH) and IGI Poseidon, itself a partnership of the Greek gas incumbent DEPA S.A. and Italy's Edison S.p.A

EU-wide pressure to phase out Russian gas imports has incentivised local companies to plan for more LNG regasification capacity by the middle of the decade.

The Alexandroupolis terminal in northern Greece and close to the Bulgarian border is at an advanced stage of

development and is due to come online in 2023.

Three other FSRUs with a combined sendout capacity of 40mcm/day are expected to cater for the domestic and regional markets.

Finally, the bidirectional interconnector Greece-North Macedonia will link the Hellenic VTP to Gevgelija – in North Macedonia, helping the country to break its full reliance on Russian gas. Firm capacity is expected to be made available when the pipeline is completed.

The interconnector is due to have an initial capacity of 1.5bcm/year, when commissioned in 2025 and could be doubled, depending on demand by 2025. Relevant market tests were due to be carried out in July 2022.

THE GREEK VTP, LNG TERMINAL AND INTERCONNECTIONS

Prior to Russia's invasion of Ukraine and the subsequent push to phase out reliance on Russian gas imports, Greece had been preparing to retire all its coal-fired capacity and replace it with some 2GW of gas-fired capacity this decade.

The policy changes that are now afoot as the EU is pressing ahead for the Russian fossil fuel phaseout has prompted Greece to reconsider its coal plant closure, indicating that it may be delayed.

This means that internal Greek gas demand may not soar to levels expected in 2021, which could help ensure that a significant part of the volumes that are imported into the country could be exported regionally.

Greek gas demand rose more than 10% year on year to 6.1bcm/year in 2021, excluding exports, covering consumption from Russian and Caspian pipeline imports and LNG.

As of mid-2022, four Greek companies held long-term supply contracts with Russia's Gazprom which are delivered via the TurkStream 2 pipeline and the adjoining Bulgarian infrastructure.

LNG imports from the US, Egypt, Angola, Qatar and Algeria accounted for 2.115bcm/year, while Russian pipeline gas supplied via Bulgaria account for 45.5% of imports in 2021.

The remaining volumes have been delivered from the Caspian region via Turkey either through an older interconnector or through the new TANAP-TAP infrastructure which makes up the Southern Gas Corridor.

¹³ Information included in this section was provided by the Greek gas transmission system operator DESFA and the operator of TAP.



LNG SUPPLIES, REGASIFICATION SERVICES, TARIFFS

REVITHOUSA – AGIA TRIADA

LOCATION: Islet of Revithousa, gulf of Pahi/Megara, 45km West of Athens

TOTAL REGASIFICATION CAPACITY: 8.25bcm/year

DAILY SENDOUT: 19.2mcm/day (as of 1 June 2022)

STORAGE CAPACITY: 225,000 cubic metres LNG

VESSEL SIZE: 267.000cubic metres LNG, Q-MAX compatible

COMMISSIONING DATE: In operation, expanded in 2018

OPERATOR: DESFA

CAPACITY BOOKING: On a slot allocation basis. Regasification capacity can also be booked independently, ie not related to unloading.

AVAILABLE CAPACITY FOR BOOKING: <https://www.desfa.gr/userfiles/pdflist/DERY/Guide/LNG%20Access%20Guide.pdf>

TARIFFS: <https://www.desfa.gr/en/regulated-services/lng/tariffs/calculator-of-lng-charges>

The LNG regasification and injection into the natural gas transmission system is done through the LNG entry point "Agia Triada."

The operator offers LNG unloading time windows and

bundled LNG capacity, namely transmission entry capacity at the "Agia Triada" entry point and equal regasification capacity, through different procedures, depending on the submission date of the request.

For information on annual scheduling and capacity auction please consult: <https://www.desfa.gr/userfiles/pdflist/DERY/Guide/LNG%20Access%20Guide.pdf>

LNG terminal and regasification fee

The fee for 2023 is set at €3,0112235/KWh/h/year

Short – term multipliers are applied in case of a booking duration shorter than a year. The service is provided as bundled (unloading, temporary storage for max 18 days and re-gasification).

LNG users are requested to book for the unloading day and each one of the days of the temporary storage period, at least the minimum regasification capacity that corresponds to a specific cargo, which is calculated as a function of the LNG quantity to be unloaded and its temporary storage period.

Any additional fees. There are no additional fees for LNG besides the fee an LNG user pays in case he requests the amendment of the LNG unloading schedule; however, certain fines / penalties are foreseen in case of violation of the NC provisions. In transmission, additional fees are imposed for the reimbursement of operational gas; moreover, certain penalties / charges are imposed as provided for in the Network Code (scheduling fees, balancing charges, overrun charges, violation of quality specs)



INTERCONNECTIONS



Entry point	EIC code	Pipeline	Technical firm capacity in KWh/day
1 Nea Mesimvria	21Z000000000473C	TAP	93,368,256
1 Nea Mesimvria	21Z000000000473C	DESFA system	53,368,256 offered in competition with Kipi
2 Kulata (BG) / Sidirokastron (GR)	21Z000000000020C	TBP	117,265,409
3 Kipoi	21Z0000000004758	TANAP-TAP interconnection point	349,887,515 ¹⁴
4 Kipi (TR) / Kipi (GR)	21Z000000000233W	Entry DESFA	48,592,292 in competition with Nea Messimvria
5 Agia Triada	21Z0000000000422		224,592,985 as of 1 June 2022
Exit point	EIC code	Pipeline	Technical firm capacity in KWh/day
1 Kipi (TR) – Kipi (GR)	21Z000000000233W	Interconnector	0
2 Alexandroupolis	21Z000000000438E		To be announced
4 Komotini/Stara Zagora	21Z000000000472E	IGB	To be announced
6 Kulata (BG) / Sidirokastron (GR)	21Z000000000020C	TBP	64,529,700
7 Nea Mesimvria	21Z000000000473C	DESFA exit – TAP (virtual) entry	93,368, 25615 ¹⁶

¹⁴ This is the technical capacity of the IP Kipoi, entry TAP (Greece) from TANAP (Turkey). This amount of gas is delivered on TAP and only part of its serves the Greek market.

¹⁵ Information on TAP's capacities at its interconnection points can also be found on the ENTSOG Transparency Platform.

¹⁶ At IP Nea Mesimvria, the Virtual entry to the TAP pipeline can be booked in the day-ahead auctions held on PRISMA Capacity Booking Platform as Forward Interruptible Daily Capacity. The amount that can be booked is subjected to the Forward Flow day-ahead Nomination at the IP: the maximum could reach 93,368,256 kWh/d (being the maximum technical capacity at the IP in the entry direction).



All cross-border points offer third-party access in line with the Capacity Allocation Mechanism Network Code (CAM NC).

TAP has received an exemption from the European Commission from third party access rules, ownership unbundling and tariff rules.¹⁷

TAP¹⁸:

- IP Nea Mesimvria (TAP exit – entry DESFA system) allows physical entry flows in Greece and virtual reverse flows into TAP.

For IPs Kipoi (exit TANAP – entry TAP) and Nea Mesimvria (exit TAP – entry DESFA), there are long-term capacity bookings going beyond the gas year 2022/2023.¹⁹

TAP: For more information on the technical, available and booked capacities at IP Kipoi and Nea Mesimvria of TAP, please access TAP’s Electronic Data Platform <https://edp.tap-ag.com/>

DESFA:

- IP Kipi (Turkey – Greek DESFA system) allows physical entry flows into Greece and virtual reverse flows to Turkey.
- IP Kulata (BG) – Sidirokastron (GR) allows physical flows in both directions with different technical capacities, see below.

For Kulata (BG) – Sidirokastron (GR), the capacity bookings for the next gas years are:

GAS YEAR	Booked Capacity (kWh/d)
2023-24	92,958,904
2024-25	92,958,904
2025-26	90,958,904
2026-27	72,753,425
2027-28	72,753,425
2028-29	72,753,425
2029-30	37,753,425

¹⁷ https://ec.europa.eu/energy/sites/ener/files/documents/2013_tap_decision_en.pdf

¹⁸ For more information on TAP and the wider Southern Gas Corridor see the dedicated section included in this report.

¹⁹ More information can be found on TAP’s EDP or on the ENTSOG transparency platform.

For more information on technical firm capacity including booked and available for the next 24 months please check: <https://www.desfa.gr/userfiles/pdflist/DERY/TS/RelevantPointsAndCapacities.xlsx>

For interruptible capacity please check: <https://www.desfa.gr/userfiles/pdflist/DERY/TS/Transmission%20services%20on%20interruptible%20basis.xlsx>

DESFA TRANSMISSION TARIFFS

To calculate entry/exit border tariffs please check: <https://www.desfa.gr/en/regulated-services/transmission/tariffs?msclkid=05cd6d8ecf9f11ec9c8a98a9f4477f97>

The tariff applied at the Agia Triada entry point for 2023 is calculated at the level of €1,6683332/kWh/h/year

You may also use the on-line calculator <https://www.desfa.gr/en/regulated-services/transmission/tariffs/tariffs-coefficients>

Short – term multipliers are applied in case of a booking duration shorter than a year. LNG users are obliged to book entry capacity to the transmission system equal to their booked regasification capacity. Regasification capacity and entry capacity to the transmission system are offered as bundled products.

There is no tariff for accessing the Hellenic VTP.

The exit capacity fee at the Greek-Bulgarian border for year 2023 is set at €4.7934330/KWh/h/year.

Short – term multipliers are applied in case of a booking duration shorter than a Year. This tariff applies also at Nea Mesimvria, Kipi, Sidirokastron (Bulgaria to Greece direction)



DEVELOPMENT PLANS

There are plans to bring online at least four more LNG terminals in the short to medium term, which will also require the expansion of entry capacity to the Greek VTP.

NEW LNG TERMINALS

ALEXANDROUPOLIS LNG TERMINAL, FSRU

LOCATION: Offshore Alexandroupolis, North-East Greece, close to Bulgarian border

TOTAL REGASIFICATION CAPACITY: 5.5bcm/year

DAILY SENDOUT: nominal send out 625,000 m³/h (15mcm/day) – peak send out without redundancy 944,000 m³/h (22.5mcm/day)

STORAGE CAPACITY: 153,500 cubic metres LNG

VESSEL SIZE: approx.170,000 cbm LNG (Q-MAX COMPATIBILITY: To be confirmed upon completion of FSRU conversion)

COMMISSIONING DATE: End of 2023

OPERATOR: Gastrade

CAPACITY BOOKED: For years 1-7 approx. 3bcm/year. For years 8-10 approx. 2.6 bcm/year. For years 11-15 approx. 1.5 bcm/year and lower. (Currently registering high interest from potential or existing users to reserve capacity at the terminal, which means the above figures may increase in the upcoming period.)

AVAILABLE CAPACITY FOR BOOKING: The remaining capacity from 5.5 bcm/year excluding 10% for short-term products and already reserved capacity as mentioned above.

TARIFFS: The Terminal has been exempted from Tariff Regulation in accordance with art. 36 (9) of the EU Gas Directive. This exemption is granted for 25 years and for the total regasification capacity of the project under certain conditions, one of which is to publish at company's website (<http://www.gastrade.gr/en>) the Tariff Code.

ARGO VOLOS, FSRU

LOCATION: Gulf of Corinth, 65 km West from Athens

TOTAL REGASIFICATION CAPACITY: 4.6bcm/year

DAILY SENDOUT: 12.6mcm/day

STORAGE CAPACITY: 170,000 cubic metres of LNG

VESSEL CAPACITY: n/a

COMMISSIONING DATE: (Month?) 2023

OPERATOR: Mediterranean Gas

CAPACITY BOOKED: To be published <https://mediterranean-gas.com/the-company/>

AVAILABLE CAPACITY FOR BOOKING: <https://mediterranean-gas.com/the-company/>

TARIFFS: To be published <https://mediterranean-gas.com/the-company/>

DIORIGA GAS, FSRU

LOCATION: Gulf of Corinth, 70 km West from Athens

TOTAL REGASIFICATION CAPACITY: 4.29 bcm/year

DAILY SENDOUT: 11.76 m Nm³/day

STORAGE CAPACITY: in the range of 170,000 – 210,000 cubic metres of LNG

VESSEL CAPACITY: Q-MAX compatible

COMMISSIONING DATE: End of 2023

OPERATOR: Dioriga Gas S.A.

CAPACITY BOOKED: Binding market test for capacity booking to commence in Q3 2022, details to be published <https://dioriga.gr/>

AVAILABLE CAPACITY FOR BOOKING: 100% of the terminal capacity as per the binding market test provisions, details to be published <https://dioriga.gr/>

TARIFFS: To be published in the context of the binding market test

THESSALONIKI FSRU²⁰

LOCATION: Thermaikos Gulf, off Thessaloniki

TOTAL REGASIFICATION CAPACITY: Maximum regasification capacity of 7.3bcm/year. Nominal regasification capacity of 4.8bcm/year

DAILY SENDOUT: Maximum sendout 20 mcm/day. Nominal sendout 13.4 mcm/day

STORAGE CAPACITY: 170,000 cubic metres of LNG

VESSEL CAPACITY: N/A

COMMISSIONING DATE: 2025

OPERATOR: Elpedison

CAPACITY BOOKED: To be published

AVAILABLE CAPACITY FOR BOOKING: To be published

TARIFFS: To be published

²⁰ According to information published in <https://ngprime.com/europe/elpedison-plans-new-greek-fsr-project/48396/> last accessed 3.06.2022



TRANSMISSION CAPACITY

Entry capacity into the national transmission system is set to be expanded by 2024 when two new compressor stations and the upgrade of the existing one is carried out.

This will include:

Northern entry point

- Expansion works will be carried out at the Sidirokastron, Nea Mesimvria, Kipi (existing points), Alexandroupolis FSRU (new entry point). There will be an increase of the total firm capacity by 5mcm/day. After the entry in operation of the new compressor unit at Nea Mesimvria and the new compressor station at Ampelia, no competing auctions between Kipi and Nea Mesimvria entry points will be conducted anymore.
- Additional entry capacity up to 10.7mcm/day to supply exclusively IGB from Alexandroupolis FSRU. So far, this entry point has not been established in the national gas transmission system. Information on the capacity of this entry point will be announced by DESFA when

the relevant arrangements, foreseen by the regulatory framework, are completed.

- Additional entry capacity of 1.9mcm/day under specific operation conditions from the new Alexandroupolis FSRU. So far, this entry point has not been established in the national gas transmission system. Information on the capacity of this entry point will be announced by DESFA when the relevant arrangements, foreseen by the regulatory framework, are completed.

Southern entry points:

- Additional entry capacity of 11.76mcm/day out of which 10.56mcm/day under specific operation conditions from the new Dioriga FSRU. If completed, the unit will be connected to the national gas transmission system at Agioi Theodori. So far, this entry point has not been established in the national gas transmission system. Information on the capacity of this future entry point will be announced by DESFA when the relevant arrangements, foreseen by the regulatory framework are completed. As of Jun 2022 no final investment decisions (FID) had been taken on the construction of Dioriga FSRU.



REPUBLIC OF NORTH MACEDONIA²¹

The Republic of North Macedonia, a Contracting Party, has been fully dependent on Russian gas imports, which has been historically offtaken by two buyers primarily for electricity generation.

Imports had been sourced via Bulgaria, which was in turn importing via the Trans-Balkan pipeline.

Although supply routes changed when the TurkStream corridor was commissioned and flows were diverted away from the Trans-Balkan route in 2020, nothing changed in effect for the Republic of North Macedonia because molecules continued to flow via the existing Bulgarian section of the Trans-Balkan line towards the North Macedonian border.

NORTH MACEDONIAN GAS SECTOR AND INTERCONNECTIONS

The implementation status of the EU acquis has stagnated for the Energy Community's second reporting period in a row in 2021.

A recent action by the government to resolve a long-standing dispute with the private supplier Makpetrol, brokered by the Energy Community Secretariat's Dispute Resolution and Negotiation Centre, was expected to allow the establishment of an unbundled transmission system operator.

The issue was settled by the transfer of Makpetrol's shares in GA-MA, a company operating as transmission system operator between the North Macedonian-Bulgarian border and Skopje, to the government.

The establishment of a functional transmission system operator should ultimately unlock progress on other pending issues, such as the proper implementation of the EU's network codes, related to capacity allocation, congestion management, tariffs, balancing, interoperability

²¹ Information included in this section was provided by the North Macedonian gas transmission system operator GA-MA

and cooperation with neighbouring transmission system operators.

Nevertheless, there is an ongoing issue regarding the signing of an interconnection agreement with Bulgaria and the release of interconnection capacity on the Bulgarian side of interconnector.

The annual capacity of the Kyustendil/ Židilovo IP with Bulgaria is close to 1bcm. The Russian producer Gazprom has booked 2.7mcm/day of capacity through to 2030 but the IP has been used at half or less its capacity over the last six years.

Bulgartransgaz could release the unused capacity based on the EU use-it-or-lose-it (UIOLI) principle. However, it is under no obligation to do so because North Macedonia is not an EU Member State, which would have mandated the application of the UIOLI principle had it been one.

As a goodwill gesture, Bulgartransgaz offered to release the capacity subject to GA-MA signing an interconnection agreement. There were reports in June 2022 that GA-MA had sent a letter to Bulgartransgaz, expressing readiness to finalise the draft interconnection agreement, which had been on the discussion table for two years.

In July 2021, North Macedonia and Greece signed an agreement for the construction of a gas interconnector of 1.5bcm annual capacity. A public tender for the North Macedonian part of the IP with Greece was due to be announced in June 2022.

The company Nacionalni Energetski Resursi which is tasked with the expansion of the transmission infrastructure, has been working on several projects, including, Klecovice - Negotino and Negotino - Bitola, linking the eastern to western parts of the country were due to be finished by the end of 2021. The pipelines are designed to integrate into the single national transmission grid.

The country has only one interconnection point which is unidirectional from Bulgaria and has a firm capacity of 25GWh/day.

Its capacity can be increased but with compressor stations located on the Bulgarian side of the border as North Macedonia does not have or operate any compressor stations.

Almost all the capacity has been booked on a firm basis and there is no interruptible capacity.



Entry/exit points	Direction	EIC code	Technical firm capacity in GWh/day
1 Kyustendil (BG) - Židilovo (MK)	Bulgaria - North Macedonia	21Z000000000137S	24.72
1 Kyustendil (BG) - Židilovo (MK)	North Macedonia - Bulgaria	-	0

TRANSMISSION TARIFFS

The North Macedonian gas transmission system operator, GA-MA and Bulgartransgaz have not signed an interconnection agreement yet and GA-MA does not apply CAM/CMP on this interconnection point.

The two shippers who hold capacity are required to be in compliance with the technical agreement they hold with supplier Gazprom Export.

The national regulator is working on setting new tariffs based on the postage stamp model. Currently, tariffs are set in a way that allows GA-MA to recover the tariff as commodity charge.

DEVELOPMENT PLANS

GA-MA network development plans include the commissioning of an interconnector with Greece that would allow it to offtake natural gas imported as LNG from the Greek terminal at Alexandroupolis. The interconnector is expected to be brought in commercial operation in 2025 at the latest.

There have also been discussions to make the existing interconnector with Bulgaria bidirectional and to establish new links with Kosovo and Serbia but more details are yet to emerge.



TURKEY²²

The Turkish gas market has expanded at an accelerated rate both in terms of demand as well as supply routes and supply sources in recent years.

In 2021 alone, its domestic gas consumption soared 27% year on year to just over 61 billion cubic metres, making it one of the largest gas markets in Europe and globally.

The increase has been largely due to post-covid economic recovery, the expansion of the gas distribution grid to all 81 provinces as well as a combination of fundamental factors including coal to gas fuel switching and drought, which led to a fall in hydro production that needed to be offset by gas-fired electricity generation.

Policymakers have been braced for soaring demand for many years which meant that much of the importing and transmission infrastructure has been expanded.

Turkey has relied for nearly 100% of its consumption on natural gas imports in recent years, building four LNG import terminals as well as supply routes for pipeline offtakes from Azerbaijan, Iran and Russia.

Historically it has depended for more than 50% of its imports on Russian gas and offtakes from Iran and Azerbaijan, with LNG making up around 20% of total annual supplies.

However, there have been numerous changes afoot that could spark renewed regional interest in Turkey.

Thanks primarily to the expansion of its regasification capacity, the share of LNG imports has increased close to 30% in recent years, with volumes sourced across the globe.

As of May 2022, Turkey had 17 entry import points with a total sendout of 320 million cubic metres/day.

Most of the imports had been tied up under long-term contracts but with soaring demand in 2021, the incumbent BOTAŞ started purchasing additional volumes on a spot basis from all available pipeline supply routes.

Since 2020, Turkey has also become a transit route for Russian gas exported via TurkStream2 to the Balkans and for Caspian gas heading West towards Bulgaria, Greece and Italy along the Southern Gas Corridor.

Despite the volumes imported in Turkey or transited Westwards, there has been negligible cross-border spot trading and no access²³ by domestic or regional companies to internal import terminals.

22 Information included in this section was compiled based on author's own notes, TANAP and TAP operators, publicly available sources including the latest IEA Turkey report of 2021 https://iea.blob.core.windows.net/assets/cc499a7b-b72a-466c-88de-d792a9daff44/Turkey_2021_Energy_Policy_Review.pdf, BOTAŞ Electronic Bulletin Board (EBT)

23 This refers to the import of LNG for injection into the national transmission system

Turkey has been one of the world's largest importers of LNG but nearly all volumes unloaded at its terminals were offtaken by the incumbent BOTAŞ.

Domestic and regional companies have long shown an interest in trading on the border but there have been numerous political and regulatory barriers that prevented it.

As of May 2022, Turkey was preparing to commission a fifth LNG terminal, having reportedly completed relevant regional infrastructure and there were expectations that the terminal could be used by regional buyers. There were also expectations that the transmission system operator BOTAŞ and its Bulgarian and Greek counterparts – Bulgartransgaz and DESFA – would sign interconnection agreements, or, at a minimum, technical protocols that would help facilitate the start of cross-border trading.

There were reports in June 2022 that Bulgaria was importing natural gas which had been imported as LNG into a Turkish terminal but the information could not be officially confirmed.

Finally, after years of wildcat drilling, Turkey announced it found reserves in excess of 500 bcm in its offshore zone of the Black Sea,²⁴ meaning that the country could become a producer in its own right by 2023, as announced by the government.

TURKISH TRANSMISSION SYSTEM, LNG TERMINALS AND INTERCONNECTIONS

Although the country had been preparing to liberalise its gas market since 2001, when it passed its landmark Natural Gas Market Law 4646, it is yet to unbundle its transmission operations, deregulate gas prices and establish market competition.

The incumbent BOTAŞ remains firmly in charge of the market, controlling more than 80% of it and offtaking most of the volumes imported from Azerbaijan, Iran, Russia as well as LNG.

The remaining 20% are shared among independent importers, which had secured long-term contracts with Gazprom and are off-taking volumes via TurkStream1.

The Turkish branch of the Azeri company, SOCAR, which operates the STAR refinery and the Petkim petrochemicals plant Turkey, also offtakes some 1.5 bcm/year, most of which are used for internal needs.

Gas volumes are typically sold on a yearly basis from 1 January to 31 December. If buyers require more volumes than those sold under contracts they may secure them on a spot basis although the only company that has been able to sell in recent years has been BOTAŞ.

This is because retail prices are regulated and well below market levels, which means that no one other than the

24 Cohen, A., 'Turkey finds enormous gas field in the Black Sea but tricky process ahead,' Forbes, 2020 <https://www.forbes.com/sites/arielcohen/2020/09/18/turkeys-new-natural-gas-find-in-the-black-sea-exciting-but-tricky-process-ahead/> (Last accessed 03.06.2022)



state company can afford to sell at subsidised levels.

Furthermore, despite the fact that LNG terminals offer third party access, domestic companies have not been able to book capacity either because of unprofitable market conditions internally or because of barriers encountered at terminals such as lack of tariff and slot transparency.

LNG TERMINALS

ALIAGA, ONSHORE

LOCATION: Izmir, Aegean Sea
TOTAL REGASIFICATION CAPACITY: 14.6bcm/year
DAILY SENDOUT: 40mcm/day
STORAGE CAPACITY: 280,000 cubic meters LNG
VESSEL CAPACITY: Q-Max compatible
COMMISSIONING DATE: In operation
OPERATOR: EgeGaz
CAPACITY BOOKED: Yes
AVAILABLE CAPACITY FOR BOOKING: N/A
TARIFFS: N/A

DÖRTYOL, OFFSHORE

LOCATION: Ceyhan, Mediterranean Sea
TOTAL REGASIFICATION CAPACITY: 10.2bcm/year
DAILY SENDOUT: 28mcm/day
STORAGE CAPACITY: 170,000 cubic meters LNG
VESSEL CAPACITY: Q-Max compatible
COMMISSIONING DATE: In operation
OPERATOR: BOTAŞ
CAPACITY BOOKED: Yes
AVAILABLE CAPACITY FOR BOOKING: Single user
TARIFFS: N/A

ETKI LIMAN, OFFSHORE

LOCATION: Izmir, Aegean Sea
TOTAL REGASIFICATION CAPACITY: 10.2bcm/year
DAILY SENDOUT: 28mcm/day
STORAGE CAPACITY: 166,613 cubic meters LNG
VESSEL CAPACITY: Q-Max compatible
COMMISSIONING DATE: In operation
OPERATOR: Kolin-Kalyon JV
CAPACITY BOOKED: Yes
AVAILABLE CAPACITY FOR BOOKING: N/A
TARIFFS: N/A

MARMARA EREGLISI, ONSHORE

LOCATION: Tekirdag, 95km West of Istanbul, Marmara Sea
TOTAL REGASIFICATION CAPACITY: 12.8bcm
DAILY SENDOUT: 35.14mcm/day
STORAGE CAPACITY: 255,000 cubic meters LNG
VESSEL CAPACITY: Q-Max compatible
COMMISSIONING DATE: In operation
OPERATOR: BOTAŞ
CAPACITY BOOKED: Yes
AVAILABLE CAPACITY FOR BOOKING: Single user
TARIFFS: N/A

LNG TERMINALS REGASIFICATION FEES: N/A



INTERCONNECTIONS



Entry point	Direction	Pipeline	Entry capacity mcm/day
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1 Durusu	Russia- Turkey	Blue Stream	47
2 Strandzha (BG) / Malkoclar (TR)	Bulgaria-Turkey EIC: 21Z000000000157M	TBP	2.9
3 Kiyıköy	Russia- Turkey	TurkStream1	46
4 Gürbulak	Iran-Turkey	Iran-Turkey	34.1
5 Türkgözü	Azerbaijan-Georgia-Turkey	BTE	19.08
6 Seyitgazi	Azerbaijan-Georgia-Turkey	TANAP	16.2 ²⁵
7 Trakya	Azerbaijan-Georgia-Turkey	TANAP	8.2

Exit Point	Direction - EIC	Pipeline	Exit capacity mcm/day	Availability
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2 Strandzha (BG) / Malkoclar (TR)	Turkey - Bulgaria 21Z000000000157M	TBP	20 ²⁶	Available
2 Strandzha 2 (BG) / Malkoclar (TR)	Turkey - Bulgaria 58Z-00000015-S2M	TurkStream 2	41.6	10% available
8 Kipoi	Turkey - Greece 21Z0000000004758	TANAP/TAP	30 ²⁷	Transit
8 Kipi (TR) / Kipi (GR)	Turkey- Greece 21Z00000000233W	Interconnector	4.5	Booked

For more information on entry/exit capacities, check: https://ebt.BOTAŞ.gov.tr/Public/SIS_MAKDUYURU2.aspx?pg=lp

25 As reported by TANAP in May 2022.

26 As reported by BOTAŞ in March 2022.

27 As reported by TANAP in May 2022.



CASE STUDY: STRANDZHA 1 (BG)-MALKOÇLAR (TR)

Although Turkey has numerous interconnection points with neighbouring countries, the most important and relevant link for regional companies remains the Strandzha (BG) – Malkoçlar 1 (TR) border, the former end point of the Trans-Balkan pipeline.

This is because the border point could provide access to natural gas imported in Turkey either as LNG or, in the longer-term, as pipeline gas sourced in the Caspian region.

Turkish companies used to receive 14bcm/year from Russia along the Trans-Balkan pipeline linking Ukraine to its and neighbouring Balkan countries via Moldova and Romania.

However, since Russia commissioned the 31.25bcm/year TurkStream 1 and 2 corridors connecting southern Russia to north-western Turkey underneath the Black Sea, most of the transit volumes shipped along the Trans-Balkan pipeline had been diverted, freeing up the old exit point.

This means that under current arrangements there are two interconnection points linked to the Bulgarian section of the Trans-Balkan pipeline:

1. Strandzha 1 (BG) – Malkoçlar (TR) - > bidirectional, with a technical entry capacity into Turkey of 2.9mcm/day and a technical exit capacity of 20mcm/day²⁸
2. Strandzha 2 (BG)– Malkoçlar (TR) - > unidirectional, with a technical exit capacity from Turkey of 41.6mcm/day.

²⁸ As reported by BOTAŞ in March 2022

Since the rerouting of the gas to TurkStream, the interconnection point was used only once for Russian spot offtakes delivered on the Bulgarian-Turkish border.

The delivery was carried out within the framework of a technical agreement held by the Russian producer Gazprom at the border under earlier long-term supply contracts to Turkey.

However, any other deliveries that would not involve Gazprom would require a separate technical agreement between BOTAŞ and Bulgartransgaz.

The two companies have been discussing for several years the signing of an interconnection agreement but have so far been unable to do so.

In theory, neither Greece nor Bulgaria would need to sign an interconnection agreement with Turkey because the country is not an EU member and therefore is under no obligation to comply with the requirement.

However, transmission system operators would still need to conclude a technical agreement to align key factors such as the minimum quality requirement of the transported natural gas, metering and online data exchange, nomination and allocation procedures, the start and end of the gas day, the allocation of border capacity.

TRANSMISSION FEES

Transmission tariffs in the VTP have two components – transmission and capacity.

The regulator has only published exit fees for the Turkish-Greek interconnector.

Capacity	(TL/sm ³ /day)	(TL*/KWh/day)
Entry into VTP	0,000870	0,00008177
Exit VTP	0,032641	0,00306776
Exit direction Greece (interconnector)	0,069780	0,00655827

*TRY1 = €0.054 at the spot rate of 10.09.2022

For more information on tariffs check <https://epdk.gov.tr/Detay/Icerik/23-2-1007/mevzuat> (in Turkish only).



DEVELOPMENT PLANS

Most of the expansion projects that BOTAŞ has been working on have focused on storage, internal infrastructure and building the necessary berthing for a fifth FSRU in the Gulf of Saros, in inlet of the northern Aegean Sea, north of the Gallipoli peninsula.

According to BOTAŞ the terminal and jetty as well as a pipeline linking the location of the new FSRU up across the north-western Trakya province to the existing BOTAŞ transit grid should be complete by Q3 2022.

Initially, it was expected that the *Ertuğrul Gazi FSRU* currently moored at Dörtyol in the eastern Mediterranean could also serve the Gulf of Saros terminal, with the vessel being moved from one terminal to the other depending on need. It is unclear whether Turkey would seek to charter or buy a new vessel specifically for the Gulf of Saros.

If there is rising demand internally as well as regionally, a new FSRU could be brought in.

GULF OF SAROS, OFFSHORE

LOCATION: Gallipoli peninsula, northern Aegean Sea

TOTAL REGASIFICATION CAPACITY: 7.3bcm/year

DAILY SENDOUT: 20mcm/day

STORAGE CAPACITY: n/a

VESSEL CAPACITY: Q-Max compatible

COMMISSIONING DATE: N/A

OPERATOR: N/A

CAPACITY BOOKED: N/A

AVAILABLE CAPACITY FOR BOOKING: N/A

TARIFFS: N/A



BULGARIA²⁹

Like many regional gas markets, Bulgaria has also undergone significant changes in recent years, moving from almost complete dependence on Gazprom supplies to the full curtailment of Russian imports at the end of April 2022.

Its strategy has been to tap alternative supplies such as Caspian gas and LNG imported via Greece as well as to position itself as a transit route for Russian gas exported Westwards to Serbia and Hungary or northwards to Romania, Moldova and Ukraine.

This meant that by May 2022, when it was no longer off-taking any Russian gas following Gazprom's decision to halt deliveries in response to its refusal to comply with a ruble payment scheme, Bulgaria did not witness immediate supply shocks.

The incumbent Bulgargaz had suggested earlier in the year it would not seek the renewal of its long-term 2.96bcm/year Russian contract when it expires at the end of 2022.

Even though Russian deliveries were stopped prematurely, it could substitute them with regasified LNG or Caspian volumes imported via Greece.

The incumbent Bulgargaz holds a 1bcm/year supply contract via this route and started importing the first Caspian volumes in 2021.

Bulgaria has also been expanding its importing infrastructure to take advantage of alternative sources reaching the region or to facilitate the transit of gas to neighbouring countries.

One of the major projects involved the expansion of the Bulgarian gas transmission system linking north-eastern Bulgaria to the Serbian border.

Around 80% of the new capacity at the IP Kireevo (BG)-Zaychar (RS) was long-term booked to ship gas imported via TurkStream2 Westwards to Serbia and Hungary.

The remaining 20% of the exit capacity at this interconnection point is available.

It also carried out upgrade works to the existing Trans-Balkan pipeline to allow bidirectional flows, including exports into Romania via the existing Negru Vodă 1 (RO)/Kardam (BG) border point.

The gas transmission system operator, Bulgartransgaz, has also acquired a 20% share in Gastrade, the operator of the Greek Alexandroupolis terminal, located immediately across the border in northern Greece.

Most importantly, Bulgaria is expected to commission the 3bcm/year Interconnector Greece-Bulgaria (IGB) at the end of the year and expand its Chiren storage facility by the end of 2024, which will allow it to increase its Caspian gas offtakes and tap more LNG volumes.

BULGARIAN VTP AND INTERCONNECTIONS

Spot trading has been developing in recent years following the launch of a gas release programme, which required the incumbent to sell limited volumes to the market in a bid to help whip up competition. There are currently two active gas trading exchanges although liquidity has been limited so far.

Nevertheless, the development of liquidity on the Bulgarian gas market is uncertain now after Gazprom stopped flows to the country. This is because the gas release programme initiated by the incumbent Bulgargaz involved transferring volumes from its Russian import contract to the market.

There has been regional interest either for swaps involving LNG sourced in Greece or physical exports from the Bulgarian VTP to Romania along the Trans-Balkan pipeline or the smaller Ruse-Giurgiu interconnector.

²⁹ Some of the information included in this chapter was provided by the Bulgarian gas transmission system operator, Bulgartransgaz



INTERCONNECTIONS



Entry points	EIC code	Pipeline	Firm technical capacity in KWh/day
1 Kireevo (BG) / Zaychar (RS)	58Z-00000007-KZ	TurkStream-BalkanStream	335,274,038
2 Kulata (BG) / Sidirokastron (GR)	21Z00000000020C	Trans-Balkan Pipeline	64,529,700
3 Negru Vodă I (RO) / Kardam (BG)	21Z00000000159I	Trans-Balkan Pipeline	215,015,065
4 Negru Vodă II, III (RO) / Kardam (BG)	21Z00000000160X	Trans-Balkan Pipeline	n/a
5 Ruse (BG) / Giurgiu (RO)	21Z000000002798	Interconnector	45,338,883
5 Strandzha (BG) / Malkoçlar (TR)	21Z00000000157M	Trans-Balkan Pipeline	10,570,000
7 Strandzha 2 (BG) / Malkoçlar (TR)	58Z-0000015-S2M	TurkStream-BalkanStream	572,061,327
7 Stara Zagora		Interconnector Greece-Bulgaria	To be announced

Exit points	EIC code	Pipeline	Firm technical capacity in KWh/day
1 Kireevo (BG) / Zaychar (RS)	58Z-00000007-KZ	Bulgarian GTS	398,137,920
2 Kulata (BG) / Sidirokastron (GR)	21Z00000000020C	Trans-Balkan Pipeline	117,265,408
6 Kyustendil (BG) / Zidilovo (MK)	21Z00000000137S	Trans-Balkan Pipeline	27,385,187
3 Negru Vodă I (RO) / Kardam (BG)	21Z00000000159I	Trans-Balkan Pipeline	155,727,070
4 Ruse (BG) / Giurgiu (RO)	21Z000000002798	Interconnector	26,831,559



CASE STUDY: REGULATORY AND TECHNICAL PROBLEMS RELATED TO IPs

The Strandzha (BG) / Malkoçlar (TR) border with Turkey used to be the exit point for the Trans-Balkan pipeline but has not been used after Russia's Gazprom rerouted exports via the TurkStream corridor because as of May 2022, there was no interconnection agreement, or, at a minimum, a technical agreement between the Turkish and Bulgarian gas transmission system operators, BOTAŞ and Bulgartransgaz.

Since 2019, there had been a finalised draft agreement, which facilitated the physical reversal of flows at Malkoçlar but was subsequently abandoned by BOTAŞ. From a technical point of view the IP Strandzha (BG) / Malkoçlar (TR) is ready for operation but as of mid-May 2022 there were no agreed common procedures and rules for operation.

Traders reported possible imports of natural gas sourced as LNG via one of the Turkish terminals at

the end of May or beginning of June. Despite multiple reports by sources, the information was never officially confirmed by Turkey or by Bulgaria.

The interconnection points with Romania – Negru Vodă 2, 3 (RO)/Kardam (BG) – are also idle and there is no interconnection agreement between Bulgaria and Romania because there is not enough utilisation of the competing capacities at the border point.

Finally, the second border point with Turkey, Strandzha 2(BG)/Malkoçlar (TR), allows Russian gas flows exiting Turkey via TurkStream2 to merge with a section of the Trans-Balkan pipeline linking the border point to Provadia in north-eastern Bulgaria via Lozenets.

There are currently discussions to expand the import capacity at the Turkish-Bulgarian border point, including the possibility of offering 17mcm/day at Strandzha 1 and another 6mcm/day at Strandzha 2.³⁰

³⁰ The information is not officially confirmed with the Bulgarian and Turkish gas transmission system operators

VTP AND INTERCONNECTION TRANSMISSION TARIFFS

For further information on internal and border tariffs,³¹ please check: https://bulgartransgaz.bg/files/useruploads/files/prozrachnost-tarifi/TAR%20Period%202021_2022/Prices_2021_2022_en.pdf

<https://bulgartransgaz.bg/en/pages/tra-template-tariffs-132.html>

<https://bulgartransgaz.bg/en/pages/tariffs-28.html>

DEVELOPMENT PLANS

With expectations of further supply diversification, Bulgaria anticipates increased interest in entry and exit capacity at border points with neighbouring countries.

Interconnection points along the Trans-Balkan pipeline are likely to attract interest and, as of June 2022, Bulgartransgaz was in the process of carrying out a demand assessment for incremental capacity later that year.

The most critical border points will include:

1. Negru Vodă 1 (RO)/Kardam(BG). There are currently bidirectional flows, but capacity allocated from Bulgaria to Romania is lower than in opposite direction. The technical exit capacity to Romania at the border is currently 13.783mcm/day, following the increase in compression from 38Bar to 45Bar. Any further increas-

es in technical capacity would require investments in incremental capacity. The cost will be determined by the additional capacity that is required, according to Bulgartransgaz.

2. Negru Vodă 2,3 (RO)/Kardam (BG). The border point is available but there is no capacity offered. Bulgartransgaz and the Romanian counterpart Transgaz need to sign an interconnection agreement. IP Negru Vodă 2,3 has been uni-directional before the rerouting of gas to the TurkStream corridor. The technical capacity in the Romania-Bulgaria direction can increase the total technical capacity of a potential virtual interconnection point (VIP) Negru Voda/Kardam upon merging with Negru Voda1 (RO)/Kardam (BG). However, all available technical capacity in the Bulgaria-Romania direction is already allocated at the IP Negru Vodă 1/ Kardam in line with Regulation (EC)984. To increase the technical capacity of the merged VIP Negru Voda/ Kardam in the Bulgaria-Romania direction more investments would be needed.
3. Kulata (BG) / Sidirokastron (GR) – The interconnector with Greece is bidirectional and has a 5.7mcm/day entry capacity into Bulgaria and an 10.358mcm/day exit capacity to Greece. There are no requirements for further compression. However, if the capacity of the upcoming 3bcm/year Interconnector Greece-Bulgaria is expanded to 5bcm/year, subject to market demand, further compression may be required at Ihtiman, in south-western Bulgaria.

³¹ As of June 2022



Bulgartransgaz has been in discussions with the Romanian counterpart, Transgaz to organise a demand assessment under the provisions of regulation (EU)2017/459 for the period 2023/2024 – 2033/2034 as early as during upcoming yearly auctions to be held in July 2022. There was no further update as of end of August 2022.

Depending on market interest and/or financing under EU programmes (for example REPowerEU/RRF, CEF), Bulgartransgaz has expressed an interest in building a 63km pipeline looping which would allow to increase the total technical capacity of the Negru Vodă 1/Kardam and Negru Vodă 2,3/Kardam, into a single virtual point to up to 25mcm/day.

Furthermore, depending on market interest and/or financing under EU programmes (REPowerEU³²/RRF,³³

³² REPowerEU, is the European Commission's plan to make Europe free of Russian fossil fuel imports well before 2030.

³³ The EU's Recovery and Resilience Fund (RRF) was established to

CEF³⁴) Bulgartransgaz is also interested in building a 43km looping DN700 and 50km new gas pipeline DN500 which would allow to:

- Increase the total technical capacity of the IP Kulata(BG)/Sidirokastron (GR) to up to 10mcm/day
- Increase the total technical capacity of the IP Kyustendil (BG)/Zhidilovo (MK) to up to 3mcm/day. This project proposal is in line with plans by the Greek gas grid operator DESFA for upgrading the Greek gas transmission system and increasing the exit capacity on the Greek side of the IP Kulata (BG)/Sidirokastron (GR).

finance new projects designed to boost economic recovery in the aftermath of covid-19.

³⁴ Connecting Europe Facility (CEF) is the EU's funding programme to implement the Trans-European Networks for Energy policy



ROMANIA³⁵

The Romanian gas market is a medium-sized market, with an annual demand in excess of 11bcm and boasting domestic resources and relatively limited dependence on imports.

Its supply dynamics have been changing in recent years.

Underinvestment in infrastructure, delays over its offshore Black Sea projects and regulatory complications have augmented its reliance on Russian imports and offtakes from Hungary. At the same time, domestic production's importance in the energy mix and particularly in ensuring security of supply remained strong.

This has meant that despite the fact that Romania holds some of Europe's largest onshore and offshore gas reserves, it became a premium market in 2021 and earlier in 2022, reflecting not only an increase in demand linked largely to the expansion of its distribution networks but also the effect of underinvestment, which have been accumulating over the years. At the same time, it has to be noted that important developments have taken place towards neighbouring countries, co-financed by the European Union.

After years of delay, the first offshore volumes from the Black Sea's Midia Gas Development project operated by Black Sea Oil and Gas were brought online in June 2022, with production set to ramp up to 1bcm/year by 2023.

Historically, Romania has been a transit country for Russian gas exported via the Trans-Balkan pipeline via Ukraine and Moldova and shipped further to the Balkans and Turkey.

The corridor, which splits into four lines once it enters Romania from Ukraine, was not only important because it provided transit revenue but also because one of the lines was connected to the internal system, allowing Romanian companies to offtake volumes for their own needs.

During peak winter demand, the country was also importing via a northern interconnection point with Ukraine at the Tekovo- Medieşu Aurit border.

However, with the rerouting of Russian gas to TurkStream and the expiry of several transit agreements held by the Romanian and Ukrainian gas transmission system operators with Gazprom in recent years, supply dynamics changed.

Romania signed an interconnection agreement for one of the three transit lines (T1) with Ukraine and Bulgaria which was not followed by extending it to the northern Tekovo-Medieşu Aurit border point and to the second transit line of the Trans-Balkan route (T2).

The third line (T3) is thought to be still controlled by Gaz-

prom under a legacy transit agreement which is due to expire in 2023.³⁶

With the rerouting of gas imports, the direction of flows along the Trans-Balkan pipeline changed, which meant that in 2021, Romania imported most of the volumes in reverse from Bulgaria along the T1.

Flows were once again reversed at the start of 2022, with volumes entering the country from Ukraine.

As Europe is now looking to diversify away from Russian gas, Romania has also signalled its intention to change its offshore legislation to attract more investments and fast-track its offshore production.

It could play an important regional role not only as producer and regional supplier but also as a transit country along the Trans-Balkan pipeline.

So far exports have been limited, prompting infringement procedures from the European Commission following concerns the transmission system operator Transgaz was blocking them amid claims of pressure differences between Romanian and neighbouring transmission systems or unattractive tariffs.

In June 2022, the regulator ANRE amended regulations to allow the export of gas from the Romanian VTP to Bulgaria via the Trans-Balkan line but not to Ukraine.

There are now discussions that Romania could sign another interconnection agreement for T2 with Bulgaria and possibly with Ukraine, which would allow more volumes secured as LNG in Greece and Turkey to be exported or transited in reverse into Romania and further to Moldova and Ukraine.

Romania was also expecting to create a southern transit corridor linking Bulgaria and volumes from the Romanian Black Sea region to Hungary and Austria via the BRUA pipeline.

The project, which attracted close to €500m in EU funds and was expected to combine both existing transmission and new infrastructure built primarily in Romania underwent multiple changes over the years, including the removal of Austria as a possible market. It failed to attract interest amid protracted delays over Black Sea gas production. Nevertheless, the realised investments enhanced the connection with Hungary and provide a basis for further development would the Black Sea upstream developments be realised.

ROMANIAN VTP AND INTERCONNECTIONS

The development of the Romanian gas market has gone through stops and starts with liquidity building up during periods of liberalisation and shrinking after the introduction of several emergency ordinances intervening in the market.

³⁵ Information included in this section is based on publicly available data published on the website of the Romanian gas transmission system operator, Transgaz as well as the EU's ENTSOG platform

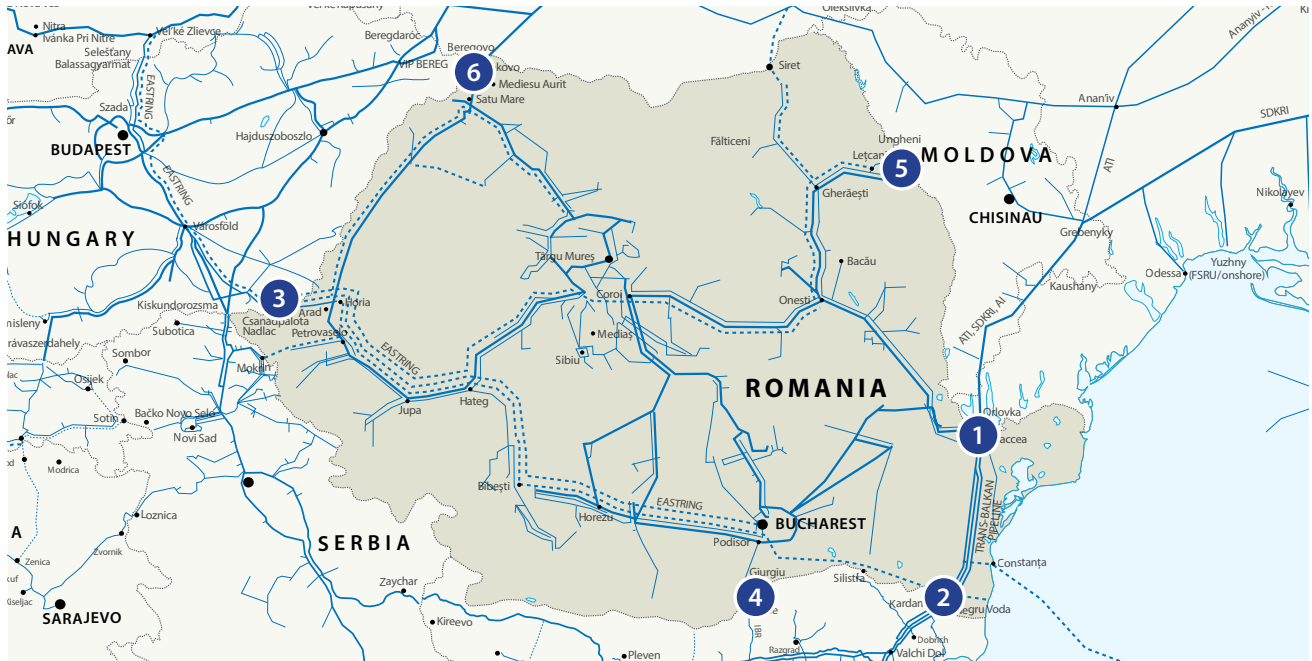
³⁶ Transgaz did not comment on this point.



Despite the regulatory unpredictability of recent years, the market did develop, with trading happening largely on the private exchange BRM. The bourse is one of the most active regionally, boasting not only increasing liquidity but also a diversity of products that can be traded on a daily basis.

Rising demand has promoted increased trading activity on the Hungarian-Romanian border, with import capacity being repeatedly oversubscribed.

Despite building or expanding interconnectors with Bulgaria, Hungary and Moldova, cross-border trading has been limited.



Entry points	EICcode	Pipeline	Firm technical capacity in KWh/day
1 Isaccea (RO) - Orlovka (UA) I	21Z000000000304Z	Trans-Balkan pipeline	201,893,536
1 Isaccea (RO) - Orlovka (UA) II	21Z000000000305X	Trans-Balkan pipeline	No interconnection agreement
1 Isaccea (RO) - Orlovka (UA) III	21Z000000000306V	Trans-Balkan pipeline	No interconnection agreement
2 Negru Vodă I (RO) / Kardam (BG)	21Z000000000159I	Trans-Balkan pipeline	155,735,517
2 Negru Vodă II	21Z0000000003022	Trans-Balkan pipeline	No interconnection agreement
2 Negru Vodă III	21Z0000000003030	Trans-Balkan pipeline	No interconnection agreement
3 Csanádpalota	21Z000000000236Q	Interconnector	77,462,166
4 Ruse (BG) / Giurgiu (RO)	21Z0000000002798	Interconnector	27,521,078
5 Ungheni	21Z000000000356G	Interconnector	21,470,804
6 Mediesu Aurit (RO) - Tekovo (UA)	-	Interconnector	No interconnection agreement

Exit point	EIC code	Pipeline	Technical firm capacity in KWh/day
1 Isaccea (RO) - Orlovka (UA) I	21Z000000000304Z	Trans-Balkan pipeline	0 (allocated bundled with capacity at Negru Vodă1 - Kardam)
1 Isaccea (RO) - Orlovka (UA) II	21Z000000000305X	Trans-Balkan pipeline	No interconnection agreement
1 Isaccea (RO) - Orlovka (UA) III	21Z000000000306V	Trans-Balkan pipeline	No interconnection agreement
2 Negru Vodă I (RO) / Kardam (BG)	21Z000000000159I	Trans-Balkan pipeline	188,191,493
2 Negru Vodă II	21Z0000000003022	Trans-Balkan pipeline	No interconnection agreement
2 Negru Vodă III	21Z0000000003030	Trans-Balkan pipeline	No interconnection agreement
4 Ruse (BG) / Giurgiu (RO)	21Z0000000002798	Interconnector	45,341,343
5 Ungheni	21Z000000000356G	Interconnector	55,377,637
3 Csanádpalota	21Z000000000236Q	Interconnector	50,269,048



CASE STUDY: CAPACITY ALLOCATION ON T1

With the expiry of the legacy transit contracts in Ukraine and Romania, the two countries and Bulgaria signed an interconnection agreement for the Isaccea (RO) - Orlovka (UA) I and Negru Voda I (RO) / Kardam (BG) in-terconnection points on T1, one of the three lines making up the Trans-Balkan route across Romania.

Although the agreement allows third parties to book capacity at either border, any reservations must be paired up with similar reservations at the other end. The rationale behind this has been the fact that the pipeline has historically allowed transit only.

However, the Romanian gas transmission system operator has carried out some upgrades in recent years, which allows T1 to be linked to the domestic VTP.

This means that in case there are simultaneous requests for transit and VTP entry capacity, competitive auctions would have to be organised.

Transgaz does not offer firm capacity for exit at Isaccea 1, only interruptible capacity which is subject to the booking of entry Negru Vodă 1.

More recently, the regulator ANRE amended regulations to allow the firm exit capacity to Bulgaria from the Romanian domestic market. The changes do not apply to the exit capacity to Ukraine.

If there is interest in both Romanian entry capacity and transit capacity, the two would compete with each other and the allocation would have to be carried out on a competitive basis, in line with EU rules.

Transgaz has claimed exports from the Romanian VTP to the Ukrainian gas market could not be carried out because of the mismatch in the methane content between the two countries.

Romanian gas has a methane content of 70% compared to Ukraine's 90% and Bulgaria's 75%.

Under the existing interconnection agreement signed by Transgaz and its Ukrainian counterpart GTSOU for T1, the two grid operators agreed for the methane content to be set at 90% for gas transiting Romania.

In May 2020, the Romanian watchdog ANRE ruled that the methane content in the gas exported to Hungary should increase from 70 to 85%.

The methane content only matters if the gas is offtaken by operators in the chemical industry. This may be the case with Hungary for example, where the country developed a chemical industry and requires a higher methane content in the volumes exported from Romania.

With growing regional interest for further interconnection capacity to be made available, Transgaz is likely to come under pressure to decide on its position regarding the alignment of methane content with neighbouring countries.

For more information on technical firm, booked, available and interruptible capacity check: <https://www.transgaz.ro/en/technical-booked-and-available-capacity-forecasted>

VTP and border capacity tariffs

Capacity booking tariffs for 2022/23 are available here: <https://www.transgaz.ro/sites/default/files/uploads/users/admin/Tarifele%20de%20rezervare%20de%20capacitate%20afacente%20serviciilor%20de%20transport-eng.pdf>

DEVELOPMENT PLANS

Bulgartransgaz has been in discussions with the Romanian counterpart, Transgaz to jointly offer long-term capacity for the period 2023/2024 – 2033/2034 as early as during upcoming yearly auctions to be held in July 2022.

Depending on market interest, Bulgartransgaz has expressed an interest in building a 63km pipeline looping which would allow to increase the total technical capacity of the Negru Vodă 1 and 2, potentially merged into a single virtual interconnection point (VIP) to up to 25mcm/day.

Transgaz however, insists on increasing border capacity at the two points from 10mcm/day to 20mcm/day without additional upgrades and that the expanded capacity of the merged Negru Vodă 1, 2 VIP ought to match the capacity of the Strandzha-Malkoçlar exit point from Turkey. Transgaz expects the exit capacity on the Turkish side into Bulgaria to be 20mcm/day.

From the Romanian point of view, the increased capacity should have been offered before the annual auctions in July 2022. On auctions date held on 5 July 2022, only 25.6GWh/day were allocated out of a total of 141GWh/day offered for the Gas Year 2022/23.

No additional capacity was offered for Negru Vodă 2.

<https://www.transgaz.ro/sites/default/files/PDSNT%202021-2030.pdf>



MOLDOVA³⁷

Historically, the Moldovan gas market has been fully dependent on Russian gas imports, lacking its own storage facilities and supply routes other than the Trans-Balkan pipeline linking it to Russia via Ukraine.

However, with major reform in the Ukrainian gas markets, the expiry of some of Gazprom's legacy transit contracts in the region and the construction of an interconnector with Romania, Moldova has been able, for the first time ever to tap alternative sources.

It could inject gas in Ukrainian storage in 2020 and purchase volumes on a spot basis for a brief period of time in October 2021.

In May 2022, the Moldovan gas transmission system operator, Moldovatrangaz, registered the first ever transaction on the country's virtual trading point (VTP) between two suppliers, the incumbent Moldovagaz and state wholesaler, Energocom.

Although it continues to be supplied by Russia via the Ukrainian section of the Trans-Balkan pipeline, it lost its transit role across this corridor when exports were rerouted to TurkStream 1 and 2.

In practical terms, this meant loss of transit revenue. Local policymakers have been trying to ignite regional interest in bidirectional flows. With the exception of occasional physical transit to Romania and some minor test flows carried out from Greece to Ukraine in 2020, there have been no consistent shipments across this route for the last two years.

There are several reasons why transit has stopped short on the Romanian-Ukrainian border without continuing further into Moldova.

Firstly, transmission tariffs had been high, prompting the transmission system operator to reduce them by 45% from around €10.00/MWh for entry and exit in 2022.

Secondly, companies view Moldova as a risky transit country because the Trans-Balkan line swerves in and out of Moldovan and Transnistrian territory and is also to the war zone in eastern Ukraine.

Transnistria is an unrecognised breakaway republic under Russian control, which could pose geopolitical risk particularly now that the Russian war against Ukraine is within relatively close proximity. Nevertheless, Moldovatrangaz (MTG) has signed a contract with Tiraspoltranzgaz, the Transnistrian operator, whereby MTG assumes all contractual and operational obligations for natural gas transmission through the Transnistrian region, assuming responsibility for unforeseen situations. The contract was signed at the end of 2020. This means that the risk for traders is essentially excluded, according to MTG.

Thirdly, companies interested in importing natural gas sourced in Greece or Turkey into Ukraine could bypass Moldova by carrying out swaps. For example, physical volumes could be delivered on the Romanian-Ukrainian border and swapped for similar volumes delivered in other parts of Ukraine.

However, in order to carry out such operations there is a need to implement virtual reverse flows, also known as backhaul in Moldova, but the country's customs authorities have been delaying enforcing it since January 2021. Failure to implement backhaul is causing the country to lose millions of euros in transit revenue as well as blocking the integration of regional markets along this route.

MOLDOVAN GAS MARKET AND INTERCONNECTIONS

As a Contracting Party, Moldova has committed to transposing in legislation and implementing the EU's Third Energy Package as well as the natural gas network codes.

It has made important progress, particularly with regards to the implementation of the codes but the unbundling and certification of an independent gas transmission system operator and the establishment of a competitive wholesale and retail gas market remain much delayed.

In May 2022, MTG registered the first transaction on the VTP but as long as there are only two suppliers in the country, VTP trading liquidity will be very low.

Access to VTP will be regulated by the contract for balancing, which still needs to be approved by the Moldovan regulator, ANRE. All the network users who sign the contract for balancing will have automatic access to the VTP.

MTG was designated as the Balancing Entity of the Republic of Moldova following an ANRE decision from June 2021.

Balancing mechanisms have already been prepared but can only be applied after approval by ANRE. The process was still ongoing in mid July 2022.

Importantly, MTG needs to identify balancing solutions for Transnistria, including the identification of the balancing responsible party for gas imbalances.

According to market rules, the balancing zone is considered the whole territory of Republic of Moldova and MTG, as balancing entity, is entitled to balance the area covered by Tiraspoltranzgaz as well.

In terms of actual trading, the incumbent Moldovagaz, which includes Gazprom as a majority shareholder, has been importing Russian gas under a 3bcm/year supply agreement with the producer and has not required any spot purchases until the end of October 2021 when Russia limited supplies.

State wholesaler, Energocom, was tasked to organise auctions for limited daily volumes indexed to a hub price.

³⁷ Information included in this section was provided by the Moldovan gas transmission system operator, Moldovatrangaz



Although the tenders were organised only for a few days, the volumes sold from Ukraine under this arrangement broke new ground, helping to tide Moldova over until it succeeded in securing a new supply contract with Gazprom, effectively proving that the country was no longer entirely dependent on Russia.

In the meantime, the completion of the Iași-Ungheni pipeline to Romania and the connecting infrastructure from the border to the capital, Chișinău, last year adds further diversity to Moldova’s gas market, even though cross-border flows carried out across this route so far have been for technical purposes only.

In November 2020, MTG and Vestmoldtransgaz, the company operating the infrastructure linking up with the Iași-Ungheni interconnector, concluded an operating agreement.

It establishes the principles, clauses and conditions, the procedures for operating the interconnected natural gas

transport networks, including data exchange and interoperability.

While the interconnector could give Moldova access to alternative sources of supply from Romania, the Trans-Balkan line could reinvigorate transit and help the country raise associated revenue.

The Moldovan section of the Trans-Balkan pipeline is very complex, including several border points with Ukraine in the north and in the south.

Transmission lines split into three at Grebenyky and travel south via Kaushany to Orlovka – Isaccea on the Ukrainian – Romanian border.

The Moldovan transmission system operator offers south-bound transmission capacity between Grebenyky and Kaushany of 36mcm/day at both IPs in regular flow and 4mcm/day at Grebenyky and 12mcm/day at Kaushany in reverse mode.



Entry capacity	EIC code	Pipeline	Technical firm capacity in GWh/day
1 Ungheni	21Z000000000356G	Interconnector Transgaz - Vestmoldtransgaz	48.35
2 Ananiiv (UA) (MD)	21Z000000000176I	Trans-Balkan pipeline	78.12
3 Grebenyky	21Z000000000178E	Trans-Balkan pipeline	355.97
4 GMS Caushany	21Z000000000179C	Trans-Balkan pipeline	118.65
5 Lymanske (UA) / (MD)	21Z000000000360P	Trans-Balkan pipeline	0
6 Oleksiivka	21Z000000000182N	Trans-Balkan pipeline	78.12



Exit capacity	EIC code	Pipeline	Technical firm capacity in GWh/day
1 Ungheni	21Z000000000356G	Interconnector Transgaz - Vestmoldtransgaz	19.58
2 Ananiiv (UA) (MD)	21Z000000000176I	Trans-Balkan pipeline	0.14
3 Grebenyky	21Z000000000178E	Trans-Balkan pipeline	39.16
4 GMS Caushany	21Z000000000179C	Trans-Balkan pipeline	118.65
5 Lymanske (UA) / (MD)	21Z000000000360P	Trans-Balkan pipeline	0
6 Oleksiivka	21Z000000000182N	Trans-Balkan pipeline	118.66

TARIFFS MOLDOVATRANGAZ

Capacity	€/1000m ³
Entry (UA-MD)	3.3
Exit (MD- UA)	2.2
Exit distribution	5

For more information, visit: <https://moldovatrangaz.md/en/clients/tarife-aplicate>

TARIFFS VESTMOLDTRANSGAZ

Capacity	€/1000m ³
Entry (RO-MD)	4.5
Exit (MD-RO)	4.97
Exit distribution	3.42

For more information, visit: https://www.vmtg.md/images/doc/racordare/H_ANRE_privind_aprobar_ea_tarifelor_de_tipul_intrareie%28%99ire_pentru_serviciul_de_transport_al_gazelor_naturale_prestat_de_c%28%83tre_S.R.L._VESTMOLDTRANSGAZ_nr_447_12_octombrie_2021.pdf

DEVELOPMENT PLANS

The most pressing need is the introduction of backhaul at Moldovan border points to streamline transit and reduce risk to physical flows.

The most important steps that Moldova needs to take to streamline transit and reduce risk to physical flows are:

- Strengthening and reinforcing the role of the country as a transit corridor and developing a competitive and regionally integrated gas market. This includes the development and implementation of cross-border trading instruments such as backhaul.
- Diversification of gas supply routes
- Developing the existing gas infrastructure

Construction of the new 100km Ungheni-Drochia pipeline is included in the development plans of Moldovatrangaz and Vestmoldtransgaz. The 4.5mcm/day line will facilitate the interconnection between the Romanian gas transmission system and the north-western part of Ukraine, including access to the Bohorodchany underground storage in the Ivano-Frankivsk province. The project aims to consolidate energy security and facilitate regional gas flows.



UKRAINE³⁸

The Ukrainian gas market has made remarkable progress in terms of aligning its legislation with EU rules and regulations and enforcing them in recent years.

For nearly five decades, Ukraine has been the main westward route for Russian gas, shipping at its peak in the 1990s, over 140bcm/year. With Russia building alternative transmission routes, that role has been shrinking as volumes dropped to 40bcm/year from 2021.

Its internal supply dynamics also changed dramatically. Up until 2015, Ukraine was heavily dependent on Russian gas imports for domestic needs but following Russia's annexation of Crimea and the start of war in the eastern Donbas and Luhansk provinces, Ukraine stopped all imports and started to offtake volumes in reverse from neighbouring Hungary, Poland and Slovakia.

Following the expiry of its legacy long-term transit contract with Gazprom and the signing of a new five-year ship-or-pay agreement, the transmission system operator GTSOU signed numerous interconnection agreements with all neighbouring countries, introduced short-haul for the cross-border transport of gas over shorter distances or into domestic storage facilities and implemented virtual interconnection points with Hungary and Poland.

Up until 2022, many companies expecting to inject gas in storage were netting transit volumes out inside Ukraine, without physically transporting them across the border and then moving them back in.

The arrangements were practised on the border with Poland and Hungary, where capacity had been offered only in virtual mode.

The transmission services introduced since the signing of the new transit contract, coupled with a customs warehouse regime, whereby companies could import gas and hold it in storage for three years without customs clearance helped Ukraine to attract more than 100 non-resident companies looking to inject gas and become active locally.

The threat of Russian supply disruptions following Moscow's war against Ukraine in February 2022, prompted GTSOU to work with neighbouring operators in central Europe to offer physical cross-border capacity.

³⁸ Information provided in this section was mostly provided by the Ukrainian gas transmission system operator GTSOU

This meant that by March 2022, the total firm physical capacity at border points with Hungary, Poland and Slovakia doubled to 54mcm/day from 27mcm/day at the end of last year.

Even so, it remains well below the exit capacity of the Ukrainian gas transmission system, which at the Slovak border alone is close to 200mcm/day.

The ongoing threat of Russian gas export curtailments and Europe's push for diversification is likely to prompt Ukraine to seek alternative supplies and routes in line with the changes that are now afoot regionally and across the wider European gas markets.

UKRAINE VTP AND INTERCONNECTIONS

The introduction of reform, the establishment of a balancing market and the deregulation of end consumer prices helped to bring competition and liquidity at borders as well as, internally, on the newly established Ukrainian virtual trading point (UAVTP).

Activity concentrated mainly on spot and front month products, which have been trading largely on the local exchange UEEX. Liquidity failed to consolidate beyond these products because of counterparty credit risk.

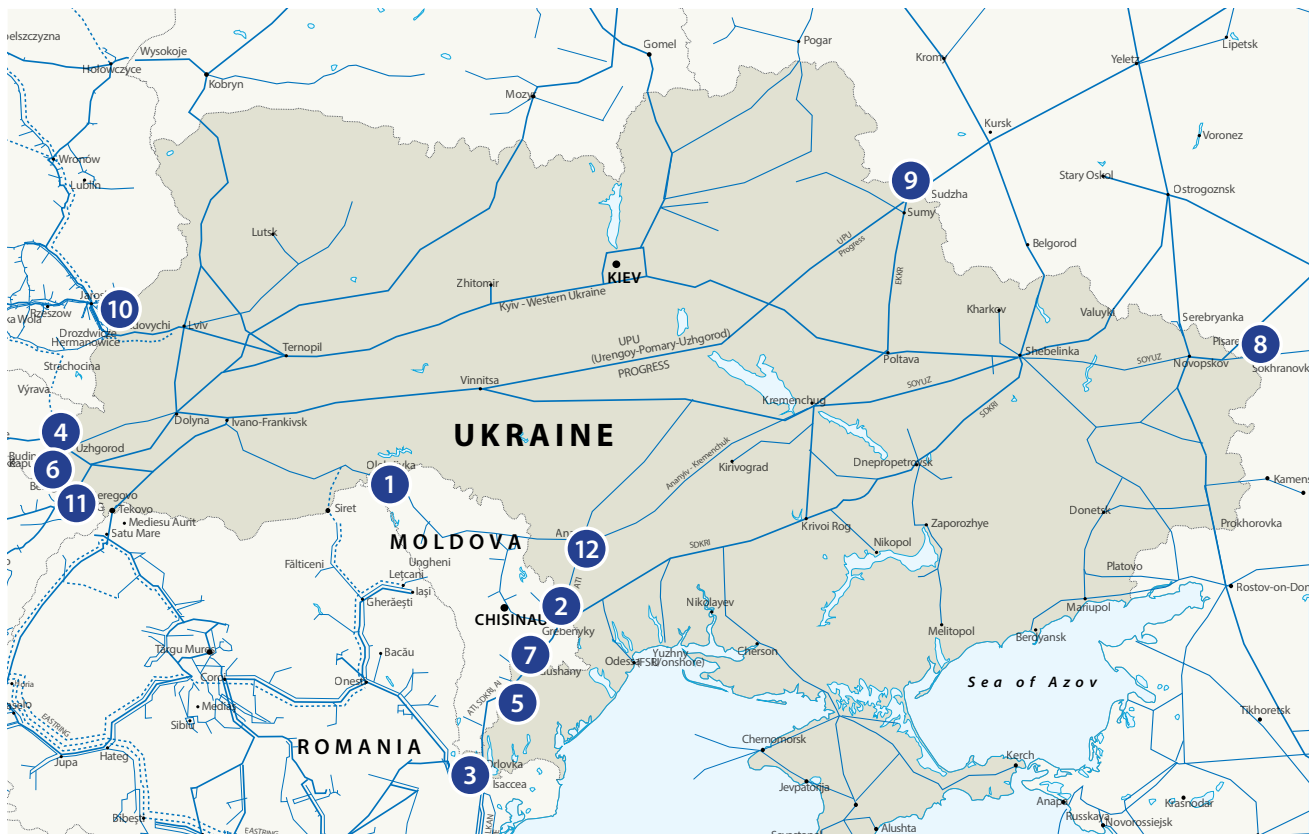
However, the adoption of a new financial market law in 2020 and the pending introduction of clearing services were expected to draw more trading interest.

Border trading which had been active in recent years as domestic and regional companies were looking to source gas to inject in local storage came to a halt as the war was raging on.

High storage interest in Ukraine helped trigger a spurt of trading activity on the border with Slovakia, Hungary and Poland and on the domestic VTPs of these countries.

The onset of war put a halt to plans, with many projects including the introduction of clearing services or the official switch from old-style cubic meter measurements to energy units being put back.

Even if the war ends and Ukraine emerges victorious, geopolitical risk may remain a major challenge, which policymakers would have to address. To draw more international interest, they could consider scrapping an obligation to pay value added tax (VAT) on trades, which would also eliminate an obligation to set up a local subsidiary for VAT payment purposes.



Period from	Period to	Entry point	EIC code	Technical firm capacity in KWh/day
2021-06-01 08:00	2022-03-31 08:00	1 Oleksiivka	21Z000000000182N	0
2021-07-16 08:00	2022-03-31 08:00	2 Grebenyky	21Z000000000178E	0
2021-07-16 08:00	2022-03-31 08:00	3 Isaccea (RO) - Orlovka (UA)	21Z000000000304Z	0
2021-09-20 08:00	2022-03-31 08:00	4 Uzhgorod (UA) – Velké Kapušany (SK)	21Z000000000085L	0
2021-09-30 08:00	2022-03-31 08:00	5 Lymanske (UA) / (MD)	21Z000000000360P	22,906,346
2021-06-01 07:00	2022-02-03 08:00	6 Budince	21Z000000000357E	286,200,000
2022-02-04 07:00	2022-03-31 08:00	6 Budince	21Z000000000357E	445,956,000
2022-03-27 08:00	2022-03-28 08:00	7 GMS Caushany	21Z000000000179C	318,532,200
2022-03-27 08:00	2022-03-28 08:00	8 Sokhranovka (RU) / Ukraine (UA)	21Z000000000187D	398,560,000
2022-03-27 08:00	2022-03-28 08:00	9 Sudzha (RU) / Ukraine (UA)	21Z000000000188B	922,200,000
2022-03-28 08:00	2022-03-29 08:00	7 GMS Caushany	21Z000000000179C	318,366,600
2022-03-28 08:00	2022-03-29 08:00	10 GCP GAZ-SYSTEM/UA TSO	21Z000000000508J	31,967,986
2022-03-29 08:00	2022-03-30 08:00	7 GMS Caushany	21Z000000000179C	318,450,600
2022-03-29 08:00	2022-03-30 08:00	10 GCP GAZ-SYSTEM/UA TSO	21Z000000000508J	31,974,730
2022-03-30 08:00	2022-03-31 08:00	7 GMS Caushany	21Z000000000179C	318,519,000
2022-03-30 08:00	2022-03-31 08:00	10 GCP GAZ-SYSTEM/UA TSO	21Z000000000508J	31,990,184
		11 VIP Bereg (HU) / VIP Bereg (UA)	-	84,768,360

39 The Sudzha IP is offered at 922,220,000 KWh/day (87mcm/day) but the actual technical capacity of the IP is much higher, at 244mcm/day.



Period from	Period to	Exit point	EIC code	Technical firm capacity in KWh/day
2021-07-16 08:00	2022-03-31 08:00	5 Lymanske (UA) / (MD)	21Z000000000360P	0
2021-07-25 08:00	2022-03-31 08:00	7 GMS 5aushany	21Z000000000179C	0
2022-03-03 07:00	2022-03-31 08:00	6 Budince	21Z000000000357E	201,400,000
2022-03-09 07:00	2022-03-31 08:00	12 Ananiiv (UA) (MD)	21Z000000000176	83,740,000
2022-03-27 08:00	2022-03-28 08:00	4 Uzhgorod (UA) – Velké Kapušany (SK)	21Z000000000085L	1,643,000,000
2022-03-27 08:00	2022-03-28 08:00	2 Grebenyky	21Z000000000178E	318,000,000
2022-03-27 08:00	2022-03-28 08:00	1 Oleksiivka	21Z000000000182N	83,740,000
2022-03-27 08:00	2022-03-28 08:00	10 GCP GAZ-SYSTEM/UA TSO	21Z000000000508J	136,740,000
2022-03-27 08:00	2022-03-31 08:00	3 Isaccea (RO) - Orlovka (UA) I	21Z000000000304Z	202,460,000
2022-03-28 08:00	2022-03-29 08:00	2 Grebenyky	21Z000000000178E	318,000,000
2022-03-28 08:00	2022-03-29 08:00	1 Oleksiivka	21Z000000000182N	83,740,000
		11 VIP Bereg (HU) / VIP Bereg (UA)	-	

For more information on technical, firm/interruptible, booked/available border capacity, please visit: <https://tsoua.com/en/transparency/available-capacities/>

TRANSMISSION TARIFFS FOR THE PERIOD 2020 – 2024

The name of the IP	entry/exit	Tariff for the entry/exit point USD/1000m ³ per day (without VAT)	Tariff for the entry/exit point USD*/1 MWh per day (without VAT)
GCP "GAZ-SYSTEM/UATSO"	entry	4.45	0.418
Budince	entry	4.45	0.418
Uzhgorod / Velké Kapušany	entry	4.45	0.418
VIP Bereg	entry	4.45	0.418
Ananiiv	entry	-	0.000
Grebenyky	entry	0.00	0.000
Kaushany	entry	0.00	0.000
Lymanske	entry	4.45	0.418
Oleksiivka	entry	-	-
Isaccea 1 (RO) / Orlovka 1(UA)	entry	4.45	0.418
Sokhranovka	entry	16.01	1.505
Sudzha	entry	16.01	1.505
Tekovo/Medieşu Aurit	entry	4.45	0.418
Virtual point of the Republic of Moldova	entry	-	0.000
GCP "GAZ-SYSTEM/UATSO"	exit	9.04	0.850
Budince	exit	9.68	0.910
Uzhgorod / Velké Kapušany	exit	9.68	0.910
VIP Bereg	exit	9.25	0.869
Ananiiv	exit	8.17	0.768
Grebenyky	exit	8.17	0.768
Kaushany	exit	1.13	0.106
Lymanske	exit	8.17	0.768
Oleksiivka	exit	9.71	0.913
Isaccea 1 (RO) / Orlovka 1(UA)	exit	1.13	0.106



Sokhranovka	exit	-	-
Sudzha	exit	-	-
Tekovo/Mediesu Aurit	exit	8.78	0.825
Virtual point of the Republic of Moldova	exit	0.56	0.053

*USD1 = €0.93 at the spot conversion rate of 03.06.2022

GTSOU adds a multiplier for quarterly, monthly, daily products. For more information on VTP tariffs visit:
<https://tsoua.com/en/business-services/tariffs/>

DEVELOPMENT PLANS

With uncertainty over the Russian transit route, GTSOU has been exploring the possibility of joining regional transmission corridors which could emerge around supply hubs.

POLAND-UKRAINE SUPPLY CORRIDOR

The first relates to a possible Polish-Ukraine transmission corridor, which could open up access to natural gas imported as LNG or Norwegian pipeline gas.

The Polish TSO (GAZ-SYSTEM) temporarily made the capacity not contracted under previously available longer products (annual, quarterly, monthly) available at the interconnection point GCP GAZ-SYSTEM / UA TSO in the direction from Poland towards Ukraine as firm capacity in day-ahead and intra-day products⁴⁰ (approximately 3.7 mcm/day). GTSOU would insist the exit capacity from Poland towards Ukraine be offered on a permanent basis.

GTSOU and Gaz-System conducted an independent assessment of potential demand for incremental capacity at joint interconnection points within the incremental capacity process at the IPs in 2021. The findings were discussed earlier in the relevant chapter on Poland and are also publicly available on the GTSOU's official website.

It was suggested to expand import capacity at the current IP GCP GAZ-SYSTEM/UA TSO (towards UA) between Poland and Ukraine, taking into account the proposal of two levels 3,869,863 kWh/h or 5,775,696 kWh/h by Q2 2030.

As the expanded capacity will only be offered later this decade, there is a possibility Ukraine could import more Polish-sourced gas via Slovakia, as the interconnection capacity between the two countries is set to expand in 2022 (see relevant information in the chapter on Poland).

In 2022, the Slovak TSO (eustream) temporarily made the entire existing capacity of IP Budince 42mcm/day (previously existing 27 mcm/day plus 15 mcm/day) firm for gas transportation from Slovakia to Ukraine.

CROATIA - HUNGARY – UKRAINE CORRIDOR

GTSOU has already created other guaranteed routes for gas imports to Ukraine. GTSOU and the Hungarian Gas TSO (FGSZ) agreed on the extension of firm capacity for gas transportation from Hungary to Ukraine in the

amount of 3,532,015 kWh/h (approximately 8 mcm/day) until March 2023.

Currently, the agreement is operating in pilot mode, while TSOs are working on the introduction of firm capacity for imports from Hungary on a permanent basis, as well as on maximisation of its level⁴¹.

Expanded cross-border capacity could allow companies to import natural gas sourced as LNG in Croatia and either transit physically from the Croat Krk LNG terminal or swap it in Hungary.

THE TRANS-BALKAN ROUTE

Historically, Ukraine has been one of the most important transit countries along the corridor when natural gas was shipped from the north to the Balkan countries and Turkey.

With the reversal of flows, it could start importing natural gas sourced as LNG or Caspian gas in Greece in Turkey subject to the removal of hurdles along the route at various border points as discussed earlier.

Ukraine itself would have to carry out a number of upgrades to allow more physical inflows.

As of June 2022, there was interruptible entry capacity of 3,96 mcm/day at the Grebenyky IP with Moldova.

As there is physical gas flow in the direction from Ukraine to Moldova (transit of Russian gas through the territory of Ukraine), the physical gas flow in the opposite direction, from Moldova to Ukraine, is currently impossible.

Potentially the capacity of 3,96 mcm/day could be offered on a firm basis without the need to make any technical changes in the system but the absence of backhaul from Moldova's side is the main obstacle.

In this regard the biggest problem is Moldova's legal restriction on providing a virtual reverse flow between Moldovan and Ukrainian interconnection points. Solving this issue is crucial for providing firm entry capacity at the Grebenyky IP. The virtual reverse would allow simultaneous transportation of gas in both directions, as well as enhance the energy security of Moldova and Ukraine.

The firm capacity at Grebenyky IP in the direction from

40 <https://www.Gaz-System.pl/en/for-media/press-releases/2022/march/04-03-2022-Gaz-System-will-offer-firm-capacity-towards-ukraine.html>

41 <https://tsoua.com/en/news/for-the-first-time-ukraine-and-hungary-offer-firm-capacity-for-gas-imports-on-the-quarterly-basis/>; <https://fgsz.hu/en/home/news/hungarian-and-ukrainian-transmission-system-operators-agree-on-prolonging-the-test-period.html>



Moldova towards Ukraine could be increased up to 21 mcm/day, but it requires technical developments in the system.

A consultation was held between 18 January – 17 March 2022 but no answers were received.

ROMANIA – UKRAINE

Transmission system operators in Ukraine and Romania held consultations on the possibility of offering maximum bidirectional capacity of 3,059,667 kWh/h at the existing IP Tekovo/Medieşu Aurit by Q3 2026.

CASE STUDY TRANS-BALKAN PIPELINE – TRANSMISSION COSTS, REGULATORY, TECHNICAL OBSTACLES (GREECE – UKRAINE)

With Greece and Turkey set to expand their LNG importing capacity to provide 10 terminals in the short to medium term, the Trans-Balkan pipeline is likely to become an attractive supply corridor.

The aggregated regasification capacity of the ten terminals, including those whose regasification capacity has been expanded, could facilitate the import of nearly 110bcm/year to the region but much of whether these volumes will be imported and how they are likely to be shipped regionally will depend on the evolution of global LNG prices as well as on removing inherent obstacles and the attractiveness of transmission tariffs.

So far, however, regional companies have only been able to tap LNG imported via the Greek terminal, Revithousa, as Turkey's four existing ports remain inac-

cessible because of political and regulatory barriers.

The Greek LNG terminal, Revithousa has been at the centre of regional attention in the last three years, as Bulgarian, Romanian and even Ukrainian companies have expressed an interest in sourcing volumes and exporting them in reverse across the Trans-Balkan route.

ENTSO data show the terminal has been used at more than 50% of capacity, which indicates heightened market interest.

An analysis of annual transmission and capacity fees for the Gas Year 2021/22 from the Greek terminal Revithousa up to the northernmost Grebenyky delivery point on the Moldovan – Ukrainian border could cost as much as **€3.85/MWh**.

If however, the Moldovan leg is excluded and natural gas transited from Greece only up to the Isaccea 1 – Orlovka interconnections on the Romanian – Ukrainian border, the cost drops to **€3.24/MWh**.

Capacity type	€/MWh
Regasification Agia Triada LNG (€/MWh/h)	0.33
Greece-Bulgaria (Sidirokastron DESFA exit) (€/MWh/h)	0.47
Greece - Bulgaria (Kulata Bulgartransgaz entry) (€/MWh/h)	0.34
Commodity fee Bulgartransgaz (€/MWh)	0.15
Bulgaria- Romania (Bulgartransgaz exit Kulata) (€/MWh/h)	0.42
Bulgaria - Romania (Negru Vodă 1 Transgaz entry) (€/MWh/h)	0.43
Commodity fee Transgaz (€/MWh)	0.22
Romania-Ukraine (Isaccea Transgaz exit) (€/MWh/h)	0.37
Romania- Ukraine (Orlovka GTSOU entry without VAT) (€/MWh/h)	0.41
Ukraine - Moldova (Kaushany GTSOU exit) (€/MWh/h)	0.1
Ukraine - Moldova (Kaushany Moldovatransgaz entry) (€/MWh/h)	0.41
Ukraine - Moldova (Grebenyky Moldovatransgaz exit) (€/MWh/h)	0.2
Ukraine - Moldova (Grebenyky GTSOU entry) (€/MWh/h)	0

Such tariff pancaking⁴² can be prohibitive because of its complexity, deterring new sources, which would

have to cross several zones, from reaching out to different regional markets.

⁴² Tariff pancaking happens when gas flows across multiple – generally small – zones are charged with successive tariffs for each respective zone crossed.



GUIDANCE ON TARIFF PANCAKING⁴³

The Energy Community Secretariat consulted relevant ACER recommendations and found the following:

Overall, natural gas has to cross four networks along the Trans-Balkan route in addition to accessing the system via a regasification terminal. The tariffs⁴⁴ reflect the costs of crossing these networks.

Leaving aside the Ukrainian-Moldovan border, for which ACER did not assess the reference price methodology (RPM),⁴⁵ tariffs [charged by other transmission system operators] seem cost reflective.

ACER analyses took into account a number of principles and not only cost reflectivity.

At the same time, they provided a number of recommendations. Compliance on cost reflectivity is not the only requirement.

In a normal setting, reductions in the overall cost could be made by removing the applicable commodity tariff but this might not hold any more under current conditions.

- If the intent is to transport gas counter to a dominant flow, the reverse bookings would actually decrease the net volume of gas transported. This implies that cost decrease, rather than increase

This means the introduction of a commodity charge might not make sense from a cost-reflectivity perspective.

In addition, it is worth noting that the tariff pancaking still benefits from the LNG discounts to the Greek LNG entry point and from the socialisation to Greek end-users of part of the regasification costs (via levy).

A few points that could be considered to simplify the payment of tariffs along the route:

Removing commodity tariffs. In the past there were flows in the direction North-South (Ukraine -> Romania -> Bulgaria -> Turkey). It could be argued that the commodity tariffs in opposite direction Bulgaria -> Romania -> Ukraine would not be justified. This is because they would not trigger an increase of flows and therefore of costs but would have the opposite effect (flows would be netted, so flowing gas in this direction would actually trigger a decrease in flow costs). However, this argument is not compliant with the Gas Tariff Network Code (NC TAR), which requires flow-based charges remain the same at all points. In the current context, where flows have changed (there are no more flows to Bulgaria from the direction North to South), this argument does not seem to hold anymore.

For Greece there is a discount to the LNG point (transmission), which leads to the socialisation of costs across Greek points that already benefit (northwards) flows to Ukraine. A part of the regasification costs from the LNG facility are socialised to Greek end users. This also benefits potential flows to Ukraine. The exit point to Bulgaria is high but this is partially justified by the limited use and distance of the point from the domestic transmission system. The discussion remains open as tariff consultation is pending in Bulgaria.

In Romania, tariffs are set based on the postage stamp methodology, which means there is not much flexibility in terms of offering reductions. The alternative would be to change to a location-based methodology but this would entail reviewing the reference price methodology.

Some of these tariffs could be interruptible, which means they could be subject to discounts. For more information on interruptible tariff discounts, check Romanian ANRE Order 32/2021 (section 2) and the Methodology for the application of regulated transmission tariffs of 15/03/2019 (section 2.4)

⁴³ Information provided by ACER in response to specific questions related to tariff pancaking

⁴⁴ Tariffs along the Trans-Balkan corridor include regasification tariffs as well as capacity and commodity tariffs.

⁴⁵ According to the Tariff Network Code (TAR NC), the reference price methodology ('RPM') only applies to the 'capacity' part of the transmission services revenue which must be the major part. RPM is based on specific cost drivers, such as capacity and distance, and is used to derive reference prices at entry and exit points. Capacity-based transmission tariffs are set using reference prices



CHECKLIST TO STREAMLINE TRANSMISSION ACROSS THE TRANS-BALKAN CORRIDOR

Other issues that would need to be addressed in order to ensure flexible flows along the corridor include:



TASKS	CAPACITY	RESPONSIBLE PARTY
Expansion of Sidirokastron, Nea Mesimvria, Kipi (existing points), Alexandroupolis FSRU (new entry point).	5mcm/day	DESFA
Additional entry capacity to supply exclusively IGB from Alexandroupolis FSRU	10.7mcm/day	DESFA
Additional entry capacity under specific operation conditions from the new Alexandroupolis FSRU	1.9mcm/day	DESFA
Additional entry capacity in the south at the new FSRU at Agia Triada (Dioriga FSRU)	11.76mcm/day out of which 10.56mcm/day under specific operation conditions	DESFA
Offering exit capacity at Strandzha 1(BG) - Malkoçlar (TR)	20mcm/day	BOTAŞ
Signing interconnection agreement Turkey - Bulgaria		BOTAŞ/BULGARTRANGAZ
Signing interconnection agreement Turkey - Greece		BOTAŞ/DESFA
Building additional compression to increase border capacity Strandzha 1 - Malkoçlar/Kardam- Negru Vodă 1	20mcm/day	BULGARTRANGAZ
Offering capacity on T2 (Negru Vodă 2 - Isaccea 2)		TRANSGAZ/BULGAR-TRANSGAZ/GTSOU
Merging Negru Vodă 1,2,3 in virtual interconnection point	20mcm/day	TRANSGAZ/BULGAR-TRANSGAZ
Merging Isaccea 1, 2, 3 into virtual interconnection point		TRANSGAZ/GTSOU
Addressing methane content mismatch		TRANSGAZ
Introducing backhaul at Moldova's borders with Ukraine and Romania		MOLDOVATRANGAZ
Offering and increase firm exit capacity at Grebenyky on Ukraine border with Moldova	21mcm/day	GTSOU



	General observations	Greece	North Macedonia	Turkey	Bulgaria	Romania	Moldova	Ukraine
What is your experience of dealing with regional transmission system operators?	Good	Good	Good	Difficult	Difficult	Difficult	Good	Good
What is your experience of booking border capacity in this region?	Standard procedure with bookings on the Hungary-based RBP platform for most regional border points	Standard procedure with bookings on the Hungary-based RBP platform for most regional border points	No border capacity offered for auctions. Border capacity booked by Gazprom on long-term basis	Transmission system operator BOTAŞ does not offer border capacity on Strandzha 1 - Malkoçlar border point. Strandzha 2- Malkoçlar border point booked mostly by Gazprom on a long-term basis.	More bidirectional capacity should be made available on Bulgarian-Romanian border at Negru Vodă 1 and offer new, bidirectional capacity at Negru Vodă 2, 3	<ul style="list-style-type: none"> Limited bidirectional capacity at Isaccea 1 (Ukraine-Romania), Negru Vodă 1 (Romania – Bulgaria); No bidirectional capacity at Isaccea 2, 3 (Ukraine – Romania), Negru Vodă 2, 3 (Romania – Bulgaria). Transmission capacity not offered by Transgaz, which does not sign interconnection agreements with Bulgaria and Ukraine. No firm exit capacity from Romania to Ukraine at Isaccea 1. Capacity only offered on an interruptible basis subject to bookings of entry at Negru Vodă 1. It is not possible to exit gas at Isaccea 1 from the Romanian national transmission system. In case of no forward flows (Ukraine to Romania direction), the capacity is most likely to be offered on an interruptible basis. Capacity congestions at Csanádpalota interconnection point on Hungary-Romania border No capacity offered by Transgaz at Tekovo-Mediesu Aurit interconnection on Ukraine – Romania border point. 	No backhaul available. Capacity offered on a physical basis only with bookings being made on the Hungary-based RBP platform.	Standard procedure with bookings on the Hungary-based RBP platform.
What is your experience of sourcing natural gas and transporting it in the region?	Generally poor liquidity on forward organised markets, limited on the Romanian gas exchange, BRM, almost no liquidity on the Bulgarian Balkan Gas Hub and non-existent trading on the Greek organised market, with slightly better liquidity on spot markets	Volumes accessed via LNG terminal or pipeline. Liquidity on the exchange is very limited, with some reduced activity on the spot market. Trading mostly on OTC.	Due to lack of interconnection capacity and Gazprom's export monopoly, traders are unable to secure alternative supplies regionally.	Country has access to multiple sources of supplies via alternative multiple pipeline routes and LNG terminals. However, regional traders are barred from accessing supplies via Turkey because no border capacity has been made available by the transmission system operator, BOTAŞ.	Companies have been able to secure alternative supplies via the Greek LNG terminal and Southern Gas Corridor. Unclear what will happen to liquidity on the Balkan Gas Hub since there are no more volumes that the incumbent Bulgargaz can release from a long-term contract with Gazprom.	<p>The country benefits from own production, which covers over 70% of annual demand. Imports have been mainly from Russia entering the country either from the north via the Orlovka - Isaccea 1 interconnection on the border with Ukraine or via Negru Vodă 1 - Kardam border point with Bulgaria. Additional supplies have also been sourced in Hungary and more recently from Greece via Bulgaria. The latter were potentially swap deals.</p> <p>Liquidity on the gas exchange BRM has been erratic in recent years because of constant market intervention by the government. A gas release programme, initiated in 2020 helped to whip up activity but recently introduced price caps have had a negative impact on liquidity.</p> <p>Recent amendments to the offshore law may improve the investment climate but traders say the changes are still confusing and heavy-handed because producers would be obliged to offer volumes to the state first and only enter agreements with private buyers if the state does not express interest in buying.</p>	So far highly dependent on Russian gas. However, recent transactions on the VTP and attempts to source volumes in neighbouring Romania or Ukraine could help improve market flexibility. In 2020, the Moldovan transmission system operator, Moldovatransgaz and the newly established operator, Vestmoldtransgaz signed an agreement which establishes the clauses, conditions, procedures for operating the inter-connected natural gas networks, including data exchange and interoperability.	The country has been importing from central European neighbouring countries, Hungary, Slovakia, Poland. Attempts had been made to import volumes sourced in Greece in reverse via the Trans-Balkan pipeline. Imports via this route have been very limited because of multiple border points, high tariffs and regulatory barriers blocking flexible shipments.



	General observations	Greece	North Macedonia	Turkey	Bulgaria	Romania	Moldova	Ukraine
How would you describe transmission tariffs (expensive/attractive/complex)?	Complex: the level of local tariffs is in general fine, however, cross-border trade with physical delivery via multiple markets limits access and competition. No wonder that swap deals began to occur in the region. In the current geopolitical and price environment, however, not tariffs are the main concern.		Domestic transmission tariffs are some of the highest in Europe and do not stimulate gas consumption			Expensive, particularly those related to short-term capacity	<ul style="list-style-type: none"> Tariffs charged by Vestmoldtransgaz are expensive. Tariffs charged by Moldovatransgaz are expensive. 	
What are the main impediments to market integration?	<ul style="list-style-type: none"> Lack of interconnection agreements between EU Member States and Energy Community Contracting Parties or observers. Highly unstable regulatory regimes Heavy licensing obligations Onerous reporting requirements Limited transmission capacity on certain borders Lack of transparency and accessibility to infrastructure in Turkey 		<ul style="list-style-type: none"> Gazprom booking border capacity on a long-term basis. Lack of governmental and regulatory initiative to sign an interconnection agreement with the adjacent transmission system operator, Bulgariastransgaz. No capacity booking methodology. 	<ul style="list-style-type: none"> Lack of interconnection agreement with Bulgaria and Greece. BOTAŞ does not offer bidirectional border capacity with Bulgaria and Greece. Lack of transparency related to booking and access to LNG terminals. Heavily regulated gas market 	<ul style="list-style-type: none"> Lack of interconnection agreement with North Macedonia and Turkey. Limited bidirectional capacity on Romania-Bulgaria border. Potential for congestion with Greece in the mid to long-term if no additional border capacity is offered 	<ul style="list-style-type: none"> Romania offers the most unstable regulatory setting in all of the EU, being the gas market with the most severe and sudden regulatory changes across the bloc. The gas transmission system operator, Transgaz, does not offer additional border capacity at Isaccea 2, 3 and Negru Vodă 2, 3 border points on the Trans-Balkan line. The gas transmission system operator, Transgaz, creates regulatory barriers by insisting on gas quality differences among regional countries. The gas transmission system operator, Transgaz, does not offer firm exit capacity from the Romanian national transmission system to Ukraine. The gas transmission system operator, Transgaz does not offer border capacity on the Ukrainian-Romanian Tekovo-Mediesu Aurit border point. Transgaz does not sign additional interconnection agreements for border points along the Trans-Balkan line and at Mediesu Aurit. 	<ul style="list-style-type: none"> Political risk and proximity to the Ukrainian theatre zone are the biggest factors in blocking transit across the route 	<ul style="list-style-type: none"> Proximity to the theatre zone in Eastern Ukraine is the biggest risk to transit across this section of the Trans-Balkan pipeline.



	General observations	Greece	North Macedonia	Turkey	Bulgaria	Romania	Moldova	Ukraine
What projects should be carried out to guarantee better interconnectivity and access to supplies?	<ul style="list-style-type: none"> Expand region's importing capacity by building new regasification capacity in Greece and opening up access to Turkish LNG terminals. Increase capacity at congested border points Open up new interconnection points along the Trans-Balkan pipeline (Isaccea 2,3/ Negru Vodă 2/3) Merge physical border points on the Trans-Balkan pipeline into virtual interconnection points Offer additional capacity regionally such as Tekovo-Mediesu Aurit border point between Ukraine/Romania 	<ul style="list-style-type: none"> The Interconnector Greece-Bulgaria is due to enter commercial operation in 2022. Greece is in the process of bringing online four more LNG terminals. Border capacity either via the existing Sidirokastro-Kulata IP or IGB could be expanded depending on demand. 	<ul style="list-style-type: none"> The country needs to sign an interconnection agreement with Bulgaria. North Macedonia and Greece are in the process of building a new interconnector. 		<ul style="list-style-type: none"> The Interconnector Greece-Bulgaria is due to enter commercial operation in 2022. Interconnection agreement with North Macedonia and freeing up border capacity that is not used by Gazprom 	<ul style="list-style-type: none"> Sign interconnection agreements with Ukraine for Tekovo-Mediesu Aurit IP, Isaccea 2, 3 and with Bulgaria for Negru Vodă 2, 3 Merge Trans-Balkan border points into virtual interconnection points. Offer exit capacity from Romanian VTP to Ukraine. Expand border capacity with Hungary. 		
What can be done to streamline transmission operations in the region?	<ul style="list-style-type: none"> Sign interconnection agreements between EU Member States and Energy Community Contracting Parties. Introduce backhaul in Moldova Reduce transmission tariffs/minimise tariff pancaking 	Streamline licensing procedures which are very burdensome.	Establish capacity booking mechanism	Operate in a transparent manner				
Other remarks	The region has a high unstable regulatory environment which ought to be addressed as a matter of urgency				Clarify issues related to gas release programme initiated by Bulgargaz	<ul style="list-style-type: none"> The country must create a predictable regulatory environment. Latest proposals to the licensing regime could create further problems because of requirements proving that licensees hire people with the right experience. The country has very intrusive reporting requirements to the regulator, ANRE. Due to vague wording in legislation, the regulator can ask everything, including asking shippers to provide contracts not only for delivery in Romania but also in other countries. 	<p>Moldova is in the process of implementing a balancing regime. However, it needs to identify solutions to establish a balancing responsible party for Transnistria. According to market rules, the balancing zone is considered the balancing zone is considered the whole territory of the Republic of Moldova and the balancing entity is entitled to balance operations in Transnistria as well.</p>	

Chapter IV

THE SOUTHERN GAS CORRIDOR





THE SOUTHERN GAS CORRIDOR⁴⁶

Ever since it was first mooted, the Southern Gas Corridor positioned itself as an alternative route to Russian gas supplies, aiming to bring much-needed diversification.

The first volumes, produced in the Azeri offshore zone of the Caspian Sea reached Turkey in June 2018 along the newly completed Trans-Anatolian Pipeline (TANAP) linking the eastern Turkish border with Georgia to western Turkey.

In 2020, TANAP was joined up with the southern European leg – the Trans-Adriatic Pipeline (TAP) at the Kipi border point with Greece.

Under current supply arrangements, a total of 16bcm/year are shipped via the route, with Turkey receiving 6bcm/year, Bulgaria and Greece around 1bcm/year each, while the remaining 8bcm/year are directed further to Italy for offtakes by seven EU-based companies.

The corridor is made up of major legs including the expansion of the South Caspian Pipeline⁴⁷, the construction of the Trans-Anatolian Pipeline (TANAP) stretching East to West across Turkey, the Trans-Adriatic Pipeline (TAP), linking up with TANAP on the Turkish-Greek border and travelling West to Italy across Greece.

A few regional projects connecting to the Southern Gas Corridor (via TAP) such as the completion of the Interconnector Greece – Bulgaria, the development of the Vlorë LNG terminal in Albania as well as the construction of the Ionian Adriatic Pipeline (IAP) could help establish an integrated southern European – Balkan gas market.

Furthermore, the commissioning of the IGB line as well as the possible expansion of the Turkish-Bulgarian interconnecting infrastructure could help to the Southern Gas Corridor to join up with the Trans-Balkan corridor.

TANAP

The pipeline travels 817km West from the Georgian-Turkish border to the Greek border and has two delivery points into the Turkish domestic system. One is located at Eskişehir, a city in north-western Turkey, the other further to the north-west, in Thrace.

Entry point	Bcm/year
Eskişehir	5.748
Trakya	0.349

46 Information included in this section was provided by the operators of TANAP and TAP.

47 The South Caucasus Pipeline (SCP) starts at the Sangachal Terminal in Azerbaijan and runs underground to its endpoint at the Georgia-Turkey border. Following the establishment of the Southern Gas Corridor, SCPX expands the existing 7bcm/year SCP system to accommodate a further 16 bcm/a with a new 48-inch pipeline loop, constructed parallel to the existing SCP.

48 According to TANAP figures published in May 2022

49 According to TANAP figures published in May 2022

Volumes have been so far delivered via the Eskişehir point. The Trakya delivery point has been used for tests but not for commercial purposes.

The pipeline’s shareholders include the Southern Gas Corridor Company (51%), BOTAŞ (30%), BP Pipeline (TANAP) Limited (12%) and SOCAR Turkey Enerji A.S (7%).

The transmission tariff has not been officially confirmed.⁵⁰

DEVELOPMENT PLANS

The pipeline currently transits 16bcm/year but can be expanded to 24bcm/year in a first phase and to 31bcm/year towards the end of the decade subject to market interest and additional investments.

TAP

Interest in Caspian imports surged in the aftermath of Russia’s war in Ukraine, with flows increasing from 23.8million standard cubic meters (mscm)/day in February to over 27mscm/day in March and April 2022.

The European leg of the Southern Gas Corridor starts at Kipoi on the Turkish-Greek border and travels 878km Westwards to Italy via Greece, Albania and the Adriatic Sea.

There are three physical delivery points on TAP.

Delivery points (maximum flows)	KWh/day
Kipoi (entry TAP)	378,175,627
Nea Mesimvria (exit TAP)	61,191,408
Melendugno (exit TAP)	338,693,966

As published by TAP on 17.05.2022

- IP Nea Mesimvria allows physical entry flows into the Greek VTP and virtual reverse flows into TAP
- IP Kipoi (TANAP-TAP) allows physical entry flows into TAP.
- IP Melendugno allows physical entry flows into the Italian PSV hub and virtual reverse flows into TAP with physical exit into Greece and further towards Bulgaria.⁵¹

TAP may also allow physical reverse flows in case of emergency under Regulation (EU) 2017/1938 concerning measures to safeguard the security of gas supply.

Although the bulk of TAP’s initial capacity (10 bcm/year) was offered to its initial long-term shippers, with which TAP has concluded 25 years long-term gas transportation agreements, a considerable amount of short-term capacity (ranging between 19GWh/day to 40GWh/day during peak demand) can also be offered on a day-ahead ba-

50 Market sources have reported the transmission tariff at \$75.00/1000m3 (€6.68/MWh) but the information has not been officially confirmed.

51 TAP’s Network Code provides for 3 (three) commercial reverse flow routes: Route 1 – Melendugno – Nea Mesimvria; Route 2 – Melendugno – Komotini; Route 3 – Nea Mesimvria – Komotini. Offering routes 2 and 3 depend on the availability and commercial operations readiness of IGB.



sis, depending on actual ambient conditions, operational constraints and actual gas quality (GCV).

As of June 2022, a total of 18 registered parties could reserve short-term capacity, which is auctioned on the PRISMA capacity booking platform.

During a public consultation on the draft Project Proposal of the 2021 Market Test of TAP (which ended on 18 March 2022), TAP signalled the possibility of expanding the transmission capacity of the pipeline, quoting four thresholds: 40.5mscm/day, 42.9mscm/day, 50.4mscm/day, 60.2mscm/day.

In addition to non-binding capacity requests, TAP received non-binding connection requests for:

- an exit point at Relievi Roskovec, Albania with a technical capacity of 7,500,000 KWh/d.
- An exit point at Kuçovë, Albania with a technical capacity of 7,500,000 KWh/d.
- Two non-binding connection requests concerning Fier, potentially making the interconnection point bi-directional.

For detailed information on the results of the public consultations, please visit: <https://www.tap-ag.com/transparency/public-consultations>

TAP has a specific regulatory framework and it follows rules from its own TAP Network Code,⁵² TAP Tariff Code⁵³ (as approved by the Italian, Greek and Albanian National Regulatory Authorities) in line with exemption granted by the EU from the requirements on third party access, tariff regulation and ownership unbundling.⁵⁴

THE ALBANIAN LNG-TAP CLUSTER

Although TAP currently transits Albania, a Contracting Party, no physical supplies are entering the market, which

52 <https://www.tap-ag.com/shippers/contractual-arrangement-with-shippers>
 53 <https://www.tap-ag.com/shippers/tariff-information>
 54 https://ec.europa.eu/energy/sites/ener/files/documents/2013_tap_decision_en.pdf

remains under development.

Albgaz, a state-owned company established to kickstart gas imports in Albania has not commenced any activities yet. The country adopted the gas network code, which was approved by the regulatory authority, ERE.

Transmission operations were unbundled and certified under the ownership model as a combined operator for transmission and distribution. Not having any meaningful infrastructure for transmission and distribution in place means that Albgaz' network code remains unimplemented in practice.

Albania has been in talks with US-based LNG integrated services provider Exceleerate, ExxonMobil as well as Italian gas transmission system operator Snam for the construction of an LNG terminal and adjoining infrastructure at Vlorë, on the Adriatic coast in central Albania.

In July 2021, TAP and the Albanian ministry of infrastructure and energy signed a cooperation and handover agreement for the construction of the Fier gas exit point, which will facilitate the connection of TAP to the internal transmission system.

The exit point will be located 37km northEast of the Vlorë terminal, potentially allowing for regasified LNG to be shipped via TAP.

THE IONIAN ADRIATIC PIPELINE (IAP) – TAP CLUSTER

The IAP aims to integrate the gas markets of Croatia and Albania via Montenegro, with the possibility to extend to Bosnia and Herzegovina (BiH), which is currently supplied by Russia via Serbia.

If completed, the 5bcm/year pipeline could join up with TAP at Fier in Albania, allowing it to access Caspian gas or LNG imported via the Vlorë terminal.

Albania and BiH could use 1bcm/day each, Montenegro could offtake 0.5bcm/year, while Croatia could take 2.5bcm/year.



Source: ICIS



THE SOUTHERN GAS CORRIDOR – IGB- THE TRANS-BALKAN CORRIDOR

The Trans-Balkan pipeline is currently connected to Caspian gas supplies reaching Greece via TAP as Bulgaria is off-taking part of its contracted 1bcm/year via the Kulata (BG)/Sidirokastron (GR) interconnection point.

With the completion of the Interconnector Greece-Bulgaria in July 2022 and its commissioning expected before the end of the year, the Bulgarian system will be directly connected to TAP via this 3bcm/year interconnecting line.

IGB is due to ship not only Caspian gas but also regasified volumes imported via the Alexandroupolis FSRU and could be expanded to 5bcm/year depending on regional market demand.

The volumes could then be transported further north along the Trans-Balkan infrastructure linking Bulgaria to Ukraine via Romania and Moldova, as discussed in earlier chapters.

There is a further possibility for the Southern Gas Corridor to connect directly with the Trans-Balkan pipeline via Turkey.

As explained earlier, TANAP includes a second delivery point in the north-western Turkish Trakya province. The delivery point has never been used for commercial purposes.

The delivery point could be connected to the Trans-Balkan pipeline via the old Strandzha – Malkoçlar border point with Bulgaria or through a dedicated interconnector between the two countries.



MARKET FEEDBACK

	TANAP	TAP
What is your experience of dealing with regional transmission system operators?		Good
What is your experience of booking border capacity in this region?		The TAP pipeline plays a critical role in the transportation of Azeri gas to delivery points in Greece, Bulgaria and Italy but it could play an even greater role in this respect by contributing to the integration of the overall south-east European region.
What is your experience of sourcing natural gas and transporting it in the region?	Limited additional Caspian gas volumes could be imported into Turkey on a spot basis and exported regionally, providing exit capacity to Greece or Bulgaria is offered.	Capacity allocation mechanisms in place and the capacity products currently on offer are such that companies buying Shah Deniz II (SDII) (Caspian) gas via the TAP pipeline and with contractual delivery in Italy are financially incentivised to do so only on the Italian hub PSV and discouraged from diverting their supply to Greece and/or Bulgaria. This is because SDII buyers diverting their supplies along the route to deliver to Greece and/or Bulgaria are exposed to costs, which could be avoided with no or limited impact on TAP's revenue level guaranteed by existing firm capacity bookings.
How would you describe transmission tariffs (expensive/attractive/complex)?	Expensive	Costs include: <ul style="list-style-type: none"> • The cost to exit the Italian Snam transmission system, which is charged even if no molecules have actually entered the Italian gas system • The cost of TAP commercial reverse flow, which is charged even if deliveries at an earlier Eastward delivery point save TAP the cost of fuel gas
What are the main impediments to market integration?	Lack of additional exit capacity from Turkey	Inflexible capacity booking mechanism
What projects should be carried out to guarantee better interconnectivity and access to supplies?		A new mechanism should be established to give shippers who have booked capacity at one exit point in TAP the opportunity to move the use of that capacity to an alternative point by participating in auctions for shorter term capacity products (than the duration of the capacity product initially procured) taking place later in the year. In case of successful outcome of the auction, the shipper moving capacity from West to East would do this at no additional cost, unless the auction clears with a premium, in which case the premium would be payable. The shipper moving instead capacity from East to West would pay the difference between the initial cost and the clearing price of the auction.
What can be done to streamline transmission operations in the region?		<ul style="list-style-type: none"> • The seller of SDII gas to move the default TAP exit point in their (TPA exempted) bookings to different exit points at no or limited additional costs • SDII buyers to ask the SDII seller to move the agreed default delivery point in their SDII contracts without AGSC incurring any or limited additional costs • New TAP shippers to buy capacity with an optionality value which would be, most likely, reflected in increased demand for TAP incremental capacity • Eliminate any unnecessary market segmentation effect generated by the cost to transport gas from Italy to Greece and Bulgaria, while leaving TAP the necessary revenue to recover its financing cost and generate its regulated allowed returns
Other remarks		

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