

July 2023

Romania's Neptun Deep FID: can it be a regional gamechanger?

On 21st June 2023 Neptun Deep partners OMV Petrom & Romgaz took the long-awaited FID on the development of the Neptun Deep offshore field. The \$4.4 bn project (\$5bn when the associated on-shore pipeline to the grid is added) is to monetise a recoverable gas resource of 100 bcm, with first gas scheduled for 2027. Annual production is projected to climb within a year to 8 bcma (higher than the previous expectation of 5-6 bcma) and sustain this plateau level for 10 years.¹

Given that the companies involved, the Romania gas balance and the regional SE Europe gas market are all relatively small, that Romania has not done a deep offshore project before, and that in the context of decarbonisation there is controversy over new oil and gas projects, this decision is very material. This will be the largest green-field development the EU has seen for many years.

The strategic messaging, much of it explicit, coming from both OMV Petrom and Romgaz regarding both Romania and the SE Europe region, is that Neptun Deep will enhance security of supply, play a positive role in the energy transition by replacing coal, be transforming for both these companies and, by being a bridge, prepare the way for renewables growth.

The significance of this announcement comes at three levels:

- **Romania** will flip from being a small net importer to a small exporter;
- **SE Europe** will get another source of gas supply, in addition to its imports of LNG and Southern Gas Corridor Caspian pipeline gas;
- The **EU** is to see a greenfield upstream gas project (ie, not a re-development) and in a relatively new province, and this indigenous supply plays very well into the agenda for replacing Russian gas supplies.

The implications of the development of Neptun Deep are very wide, including: pricing in SE Europe; infrastructure creation and utilisation; decarbonisation (substitution of lignite); replacing Russian gas supplies; whether producers from outside the EU might see market space removed for their gas.

The purpose of this Insight is to describe the Neptun Deep project and explore these implications.

¹ OMV Petrom compliance note on a significant event to be reported to the authorities is at: <https://www.omvpetrom.com/en/news/adhoc-report-omv-petrom-takes-the-final-investment-decision-for-the-neptun-deep-project-and-together-with-its-partner-romgaz-approves-the-development-plan>

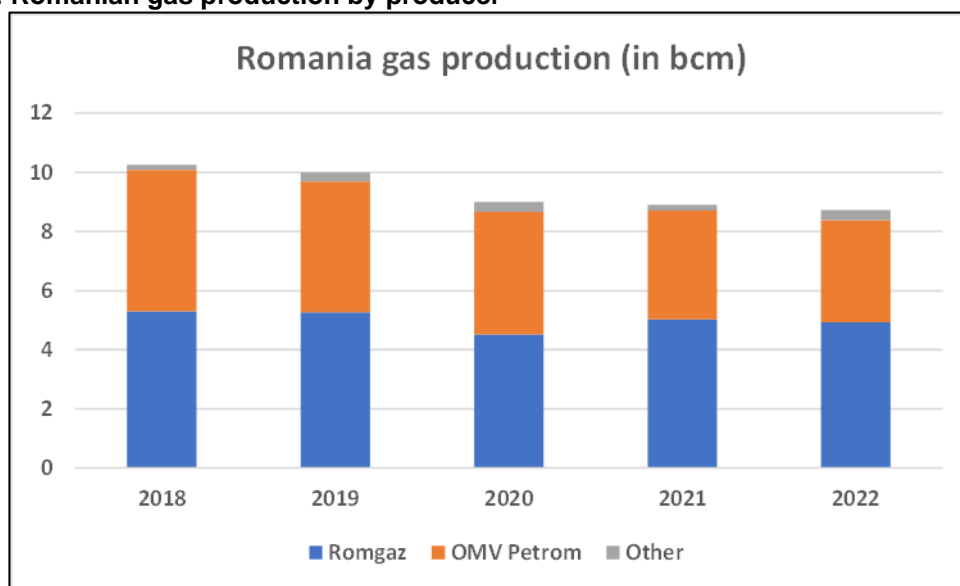
1. Neptun Deep – the project

i) Romania context

Romania is currently the EU's second largest gas producer after the Netherlands. In 1990 output was touching 30 bcm, but it fell sharply over the next 10 years to 14 bcm by 2000. On-shore production is very mature and looks unlikely to contain any surprises. The few discoveries in recent years have moderated the decline but Romania's output has continued to fall slowly at 3% pa over recent years, from 10.3 bcm in 2018 to 8.9 bcm in 2021. However, in 2022 output was almost flat at 8.7 bcm. With Neptun Deep, Romania will most likely become the EU's largest gas producer.

Production in Romania is heavily concentrated. Two companies dominate the Romanian upstream - Romgaz and OMV Petrom. In 2022, Romgaz contributed 4.9 bcm (57%) and OMV Petrom 3.5 bcm (40%) of total country output (See Figure 1).

Figure 1: Romanian gas production by producer



Sources: OMV Petrom and Romgaz annual reports

The solution to a potentially growing gas deficit seems to be development of the offshore, with the Neptun Deep project likely to be the supply gamechanger. Despite some shows over several years of drilling, nothing substantial was found until the Domino-1 well in the Neptun Deep block discovered gas in 2012.² The Romania offshore developments are shown in Map 1 below.

Part of the reason for recent production stabilisation came from the start-up of the Black Sea Oil & Gas (BSOG) offshore Midia project in June 2022. Production was around 0.5 bcm in 2022, and the 1 bcm plateau should be reached during 2023. The Midia project consists of 2 fields, Ana and Doina, about 120 kms offshore in about 70 metres water depth, discovered in 2007 and 1995 respectively. Capex is reported as \$400 million, and FID was taken in 2019. There is 1 subsea well on Doina, 4 platform wells on Ana, and a 126 km pipeline to shore to a gas treatment plant.³ BSOG said in July 2023 that tests on the production facilities have been successful and the company is now talking to the authorities about raising output by up to 25% from 4Q 2023.⁴

² <https://www.offshore-technology.com/projects/neptun-deep-gas-field-project-black-sea/>

³ <https://www.blackseaog.com/black-sea-oil-gas-delivers-first-gas-from-the-mqd-project/>

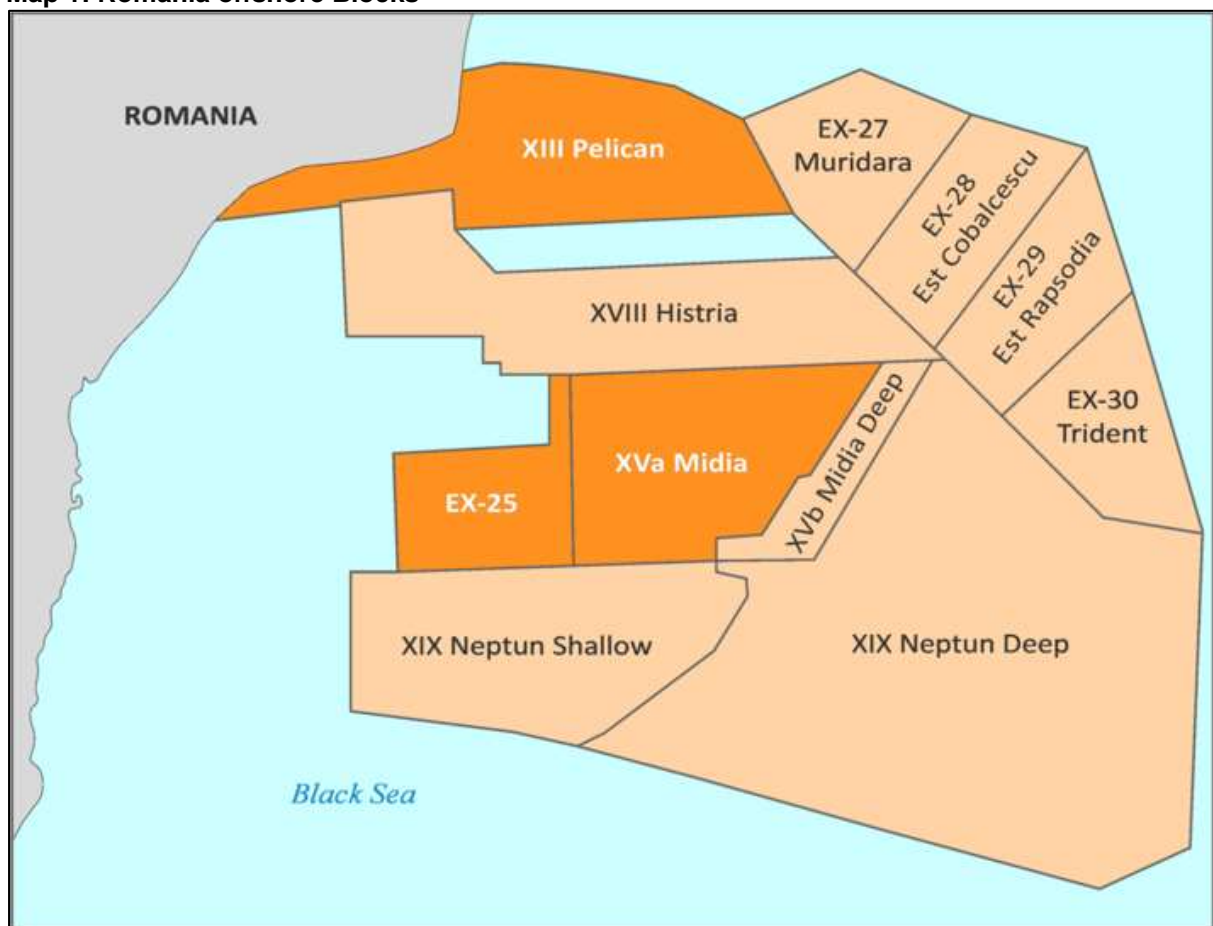
⁴ https://www.blackseaog.com/black-sea-oil-gas-transitions-to-renewable-energy-projects-through-permitting-for-the-first-power-corridor-in-the-romanian-black-sea/?mc_cid=debd430206&mc_eid=cd1f92f96c

Meanwhile, Neptun Deep was making only slow progress. It has had a long history. In 2008 OMV Petrom and ExxonMobil formed a JV to explore Neptun Deep, and the Domino-1 exploration well found gas. The JV then spent around \$1.5 bn over 2008-16 on further extensive exploration and appraisal work, including eight exploration and appraisal wells and two 3D seismic programmes.⁵

The reservoir is in water depths varying between 100 and 1000 metres,⁶ and the reserve base was variously estimated at between 50 and 84 bcm, usually at the higher end.

With production potential estimated at the time at around 6 bcma, and a fairly flat demand outlook, it was clear its development would transform Romania from being a small importer to small exporter. However, FID was frequently delayed, because of partners' (OMV Petrom & Exxon) complaints about Romania's offshore law being unattractive, but also by the major disruption caused by Exxon's announcement of exit.

Map 1: Romania offshore Blocks



Source: Keyfacts Energy (Nov 2018) at <https://www.keyfactsenergy.com/news/2711/view/>
 Exxon announced its intention to leave the project in 2020. While the main reason cited was the 2018 Romania offshore law, there was also perhaps an element of portfolio clean-up: from an Exxon perspective this might have looked to be an asset in a non-core piece of its business geography. Romgaz emerged as the frontrunner buyer, and in March 2022 the Romgaz Board endorsed a share purchase agreement to acquire the ExxonMobil shares.⁷ The purchase price was \$1.06 bn, and the

⁵ <https://www.omvpetrom.com/en/our-business/exploration-and-production/neptun-deep>

⁶ <https://www.omvpetrom.com/en/news/omv-petrom-and-romgaz-announce-the-decision-to-develop-neptun-deep-the-largest-natural-gas-project-in-the-romanian-black-sea>

⁷ <https://www.romgaz.ro/en/press-release-romgaz-neptun-deep-project-straight-line>

share sale & purchase agreement was signed on 3rd May 2022.⁸ Project operatorship was transferred to OMV Petrom.

At an OMV press conference in March 2022, the OMV CEO Alfred Stern said “The Neptun Deep asset in the Black Sea represents a unique opportunity for Romania and Europe to become less dependent on imports. OMV Petrom will be the operator of the block with Romgaz as a partner. Depending on a new offshore law in Romania, we expect final investment decision to be taken in 2023, with first gas in 2027”.⁹

ii) FID June 2023 – upstream & midstream

a) Upstream

In the event, FID was officially announced on 21st June 2023. The main surprise was a higher resource base and higher production. Key components of the upstream project are:

- Recoverable gas reserves estimated at 100 bcm,
- First gas in 2027 and a one-year ramp up to the 8 bcma plateau from 2028 for 10 years, with a slow decline thereafter.
- Total development capex of \$4.4bn, with unit cost of €3/boe. Most of the capex spend will be over 2024-26.
- Sub-sea development, with wells tied back to a shallow-water unmanned platform for processing. Gas quality is a lean gas, requiring very little processing. There are to be 6 wells on Domino (1000 metres water depth) and 4 wells on Pelican South (120 metres water depth).
- A 160km sub-sea pipeline to a shore metering station and the connection to the Transgaz pipeline network.

On an investor webcast on 22nd June 2023, the OMV Petrom CEO Christina Verchere emphasised many wider general and strategic points for both Romania and OMV Petrom. For Romania, at plateau production rates, Neptun Deep’s 8 bcma will double Romanian gas output (8.7 bcm in 2022) and anchor Romania firmly as the EU’s largest gas producer. Romania will move from being a net importer of gas to being a net exporter (although she did not elaborate on the marketing plan). As a deepwater development it will be a first of its kind for Romania, and OMV Petrom has already started bringing deep water expertise into its organisation. Overall, the project will put €20bn into the State budget and its overall project added value is €40bn. Gas prices are expected to be aligned with main European hubs, and for 2027 a range of €25-30 MWh has been assumed.¹⁰

Very little has been said about marketing and the contractual sales framework underpinning the project. Our assumption is that the 2 companies will rely on their ability to move gas into Romania and, through an increasingly flexible and interconnected SE European market, into adjacent countries which are all short of gas. In our view, old style long-term contracts are not required in this market environment. One other purpose of this Insight is to place this project within the context of recent regional market developments.

b) Midstream: Tuzla-Podisor 300 km pipeline

Neptun Deep is not just an upstream project; it is also a major €0.5 billion pipeline project for TSO Transgaz. Two important agreements were made before the June upstream FID was taken. Firstly, on 16th March 2023 Transgaz, OMV Petrom and Romgaz signed gas transmission contracts for capacity

⁸ Romgaz 1Q 2022 Results presentation, slides 7 & 15, at https://www.romgaz.ro/sites/default/files/2022-05/Romgaz%20Presentation%20Q1%202022%20-%20en_0.pdf

⁹ <https://seenews.com/news/omv-to-make-final-investment-decision-on-romanian-offshore-gas-project-in-2023-ceo-777253>

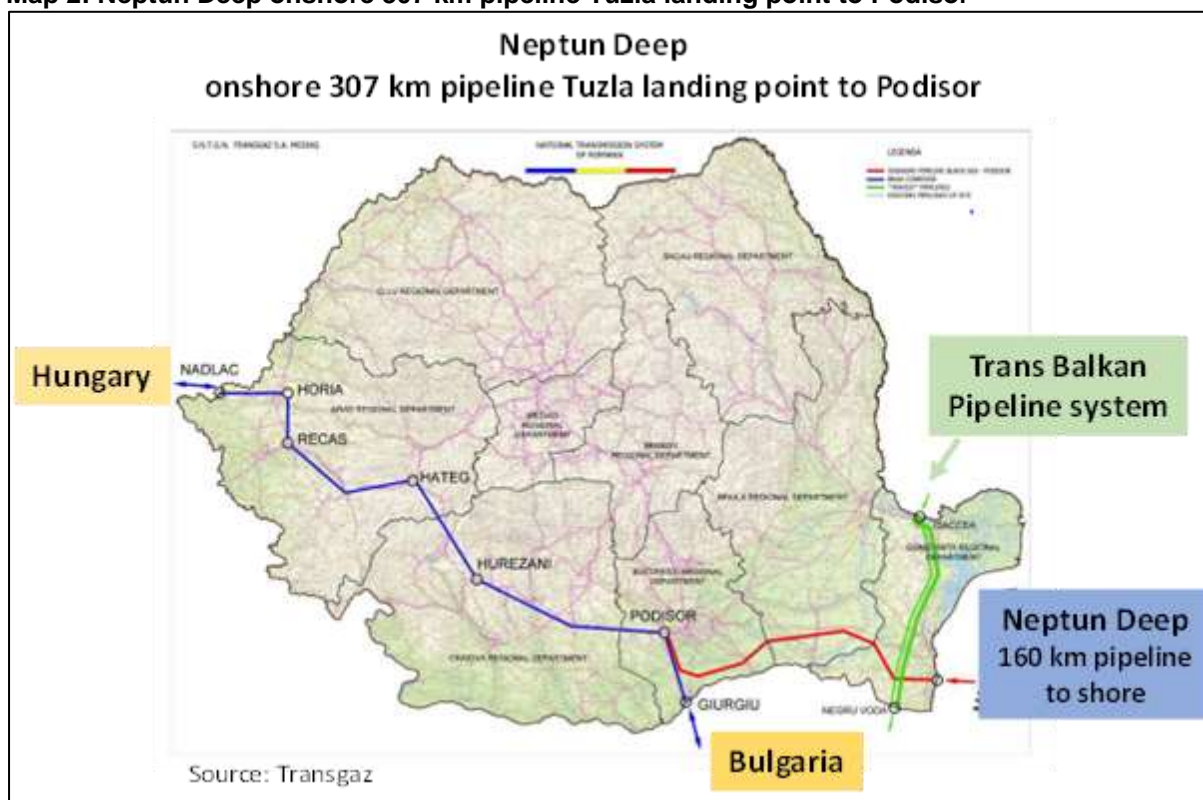
¹⁰ OMV Petrom webcast 22nd June 2023. Much of this was also in the OMV Petrom compliance note cited in footnote 1.

at the Tuzla Black Sea shore entry point into the Transgaz system. Binding commitments were made for capacity allocation from May 2026 to October 2042.¹¹

Then five days *before* the upstream FID was taken, on 16th June 2023, Transgaz signed a contract (a work commencement order) with the major Turkish construction contractor Kalyon İnşaat Sanayi ve Ticaret A.Ş for the construction of the 307 km Tuzla -Podisor pipeline connecting the landing point with the main Transgaz network. Kalyon’s previous experience includes construction of parts of the TANAP pipeline project.

Map 2 is derived from a Transgaz map, showing the 307 km pipeline from the Black Sea coast to the connection point at Podisor.¹²

Map 2: Neptun Deep onshore 307 km pipeline Tuzla landing point to Podisor



Source: Transgaz

The map shows the location of the Tuzla-Podisor pipeline (in red), its connection with the Trans Balkan pipeline and the main connection point at Podisor. It also shows some cross border connection points with Hungary and Bulgaria. It does not show the connection points with Moldova and Ukraine.¹³

The Tuzla-Podisor pipeline, which is an EU PCI project (project 6.24 in the 5th PCI list of Nov 2021), has an estimated capex of €478 and has two sections:

- a short 32 km 48” section from Tuzla to Amzacea, capacity 12 bcma
- the main 275 km 42” section from Amzacea to Podisor, capacity 9 bcma.¹⁴

¹¹ Transgaz press releases on 16th March 2023 at <https://www.transgaz.ro/sites/default/files/Release%2016.03.2023.pdf> and <https://www.transgaz.ro/sites/default/files/Release%20OIL-Tuzla-Podisor-16.06.2023.pdf>

¹² https://www.transgaz.ro/sites/default/files/uploads/users/admin/information_leaflet_for_black_sea-podisor_project_v2.pdf

¹³ For a detailed map of Romania and the whole region, see the Gas Infrastructure Europe GIE map at <https://www.gie.eu/publications/maps/system-development-map/>

¹⁴ Details from the Transgaz 16th March press release

The pipeline will have two main interconnection points. At Podisor it will connect into the BRUA system (Bulgaria-Romania-Hungary-Austria corridor). BRUA I was completed in 2020.¹⁵ It will be expanded under BRUA II, at which point interconnector capacity with Hungary will be raised to 4.4 bcma. There is also to be a connection point with the Trans Balkan system (the three north-south transit pipelines, which pre-Turk Stream brought Russian gas south into SE Europe and Turkey) or, more precisely, with the line T1 of this system. Target date for construction completion is 2025.¹⁶

c) The Companies – OMV Petrom & Romgaz

For the two companies involved, Neptun Deep is a very material and transformative undertaking. It is also one where the Romanian State has a direct interest through its 21% shareholding in OMV Petrom and a majority 70% in Romgaz. The €4 billion capex exceeds the current Romgaz market capitalisation (although Romgaz has a 50% share, €2bn remains a big number relative to the size of Romgaz).

Figure 2: OMV and Romgaz shareholding structure

Company shareholding structure & market cap	
OMV Petrom	
OMV Aktiengesellschaft	51.2%
Romania State (through Ministry of Energy)	20.7%
Natural & legal persons	28.1%
	100.0%
Romgaz	
Romania State (through Ministry of Energy)	70.0%
Legal persons	24.8%
Natural persons	5.2%
	100%
Market capitalisation June 2023	in € billion
OMV Petrom	5.8 €
Romgaz (June 2023)	3.2 €
sources:	
https://www.omvpetrom.com/en/investors/share-and-gdr/shareholder-structure	
https://www.romgaz.ro/en/shareholder-structure	

The 4 bcma of gas each will receive when Neptun Deep is on plateau is clearly very material in the context of 2022 production of 4.9 bcm (Romgaz) and 3.5 bcm (OMV Petrom).

Figure 3: OMV and Romgaz oil and gas production in 2022

	Oil & condensate		Gas		Total m n boe
	million tonnes	m n boe	bcm	m n boe	
OMV-P	2.9	20.9	3.5	22.6	43.5
Romgaz	0.03	0.2	4.9	31.7	31.9

sources: OMV Petrom & Romgaz annual reports 2022

¹⁵https://www.transgaz.ro/sites/default/files/Release%20completion%20project%20BRUA%20-%20phase%201_0.pdf

¹⁶ See Transgaz 2022-31 TYNDP, page 49:

<https://www.transgaz.ro/sites/default/files/Downloads/Development%20Plan%20for%20the%20National%20Gas%20Transmission%20System%202022-2031.pdf>

d) Strategic context

As the Transgaz announcement says, this pipeline will have multiple benefits both for Romania, through enabling Neptun Deep gas to enter the Romanian domestic market, and for the region, through the several cross-border connection points, in particular west to Hungary, north to Moldova and Ukraine, and south to Bulgaria. Therefore, it enables the “transmission of natural gas to be extracted from the Black Sea; increasing the security of natural gas supply to Romania and Europe; diversifying natural gas supply sources.”¹⁷

In its annual report 2022, OMV Petrom says “The increase in equity gas will also support the country’s efforts to decarbonize, as gas can replace coal in power generation and enable integration of renewable capacities. Our target is to reach 70% share of gas in 2030 in the company’s total hydrocarbon production (2022 was 52%), reflecting the pivotal role of natural gas as a transition fuel in the energy mix in Romania”.¹⁸

As for Romgaz, its CEO Razvan Popescu said on 21st June 2023 that “Neptun Deep is a strategic project for Romania and the region from the perspective of securing the required natural gas and the country’s energy transition. Starting with 2027, we will have a new natural gas source with potential to significantly increase the country’s natural gas production, thus securing safety of supply.”¹⁹

The following two sections look at the implications for the Romanian and SE European markets from the development.

2. Romania – from net importer to net exporter

Romania’s current balance to 2022 is shown in Figure 4. Romania’s production is on a shallow decline, and demand was down almost 20% in 2022 to just under 10 bcm from the impact of extremely high prices. Net imports in 2022 accounted for around 20% of demand. Imports mainly come from Russia, but delivered now with Turk Stream in operation via Bulgaria instead of from the north via Ukraine and Moldova. Other smaller volumes enter from Hungary.

Figure 4: Romania gas balance (bcm) 2019 - 2022

Romania gas balance (in bcm)				
	2019	2020	2021	2022
Production	10.0	9.0	8.9	8.7
Imports	2.7	2.1	3.6	2.8
Exports	0.01	0.1	0.7	0.9
Net imports	2.7	2.0	2.8	1.9
Total supply	12.7	11.0	11.8	10.6
Gross inland demand	11.2	11.8	12.1	9.8

source: monthly Buletin Statistic de Industrie, Institutul National de Statistica, at for example:
https://insse.ro/cms/sites/default/files/field/publicatii/buletin_statistic_de_industrie_nr02_2019.pdf

¹⁷ Transgaz press release 16th March 2023. The Transgaz seven connection points with Hungary, Bulgaria, Moldova and Ukraine are detailed in the Transgaz Consolidated Report issued by the Board of Administration for 2022, pp 25-26 at <https://www.transgaz.ro/sites/default/files/users/user360/Consolidated%20annual%20adm.%20report%202022.pdf>

¹⁸ OMV Petrom annual report 2022 page 20, at <https://www.omvpetrom.com/services/downloads/00/omvpetrom.com/1522237385458/omv-petrom-group-2022-annual-report.pdf>

¹⁹ https://www.romgaz.ro/sites/default/files/2023-06/Press%20Release%20-%20Decision%20to%20invest%20in%20the%20Neptun%20Deep%20Project_1.pdf

Figure 5 shows Bulgaria’s increasing gas exports to Romania and elsewhere in SE Europe. From the start of 2023, Romania is also to get small volumes of Azeri gas, to be delivered via the Southern Gas Corridor and the ICGB Greece-Bulgaria interconnector.²⁰

Figure 5: Bulgaria gas exports (bcm) 2019 - 2022

Bulgaria gas exports in bcm					
	2019	2020	2021	2022	reasons for flow change
Greece	2.2	2.8	3.1	2.6	Greek demand rising, then declining in 2022
Rep of North Macedonia	0.3	0.3	0.4	0.3	
Serbia		0.0	2.6	7.1	Turk Stream start-up Jan 2020 (note – 5 bcm goes on to Hungary)
Romania		0.2	2.8	1.9	Turk Stream & Trans Balkan reversal
Turkey	4.3	0.1	0.0	0.0	Trans Balkan not used for north-south flow, all Russian gas now via Blue Stream & Turk Stream
Total exports	6.9	3.3	8.9	11.8	

source: Bulgartransgaz Consolidated Annual Activity Reports, 2020 page 15 & 2021 page 16 and 2022 from Bulgartransgaz annual separate activity report 2022, page 17

The development of Neptun Deep, and its planned rapid rise to a plateau of 8 bcm within 1 year, will clearly alter the shape of the balance radically. It will mean that the need for imports to achieve balance will disappear and turn Romania into a net exporter and a source of supply for the wider SE Europe (including Hungary) region. Romania is already connected with Moldova, Ukraine, Bulgaria and Hungary, and there are plans within the BRUA II pipeline project to expand the interconnection with Hungary to 4.4 bcm. Hungary, Bulgaria and Moldova are all in gas deficit and these (plus perhaps Ukraine once the present conflict is resolved) form its natural market envelope.

However, the question is how large might these export volumes be. Within this question there are two enquiry areas: what is the likely decline in current production, ie the rate of decline of ‘base production’; and what will demand look like as gas substitutes for the country’s lignite. Combined, these factors make it possible that exports might not be as impressive as Romania might like.

We have used the latest Transgaz ten-year network development plan (TYNDP) covering 2022-2031 as the basis for Figure 6, but have adjusted it where necessary. We do have some concerns that in many respects the latest plan is hardly more than a cut-and-paste job from the 2020-29 TYNDP. For one, the 2022-31 TYNDP has Neptun Deep on-stream in 2024, which clearly was not going to happen even when this document was prepared. It also has not updated its projections on the Romgaz and OMV Petrom gas production profiles without Neptun Deep, ie the base production. Nor does it look at a lignite removal scenario (see Appendix 1 on regional lignite production).

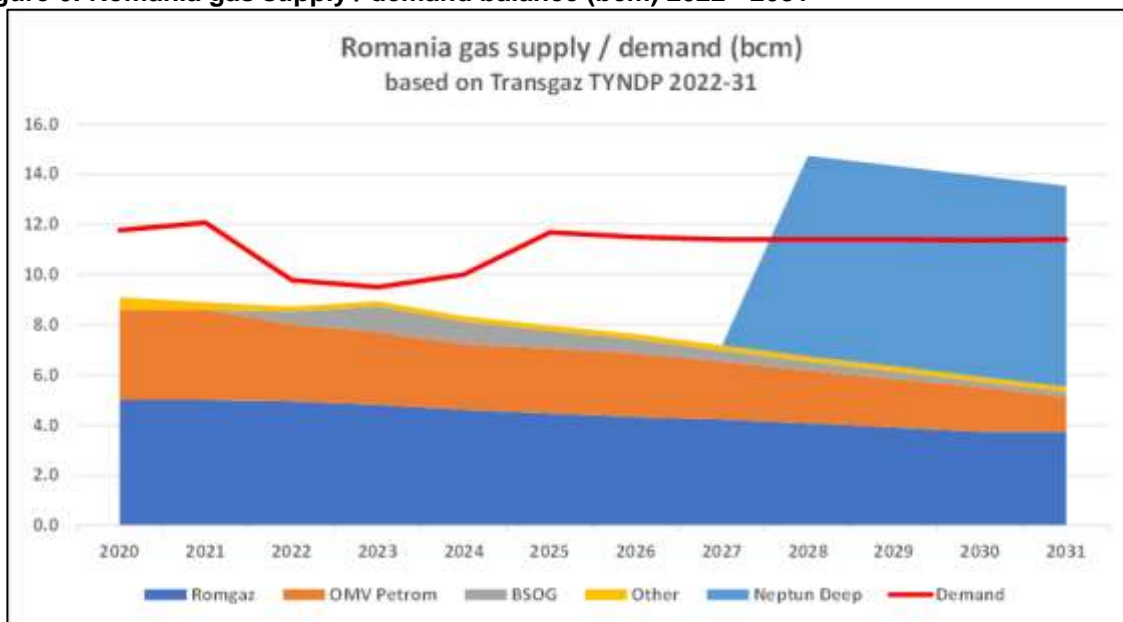
The numbers indicate that with a decline in the base production and a broadly flat demand profile from 2025:

- Imports cease abruptly in 2027
- Exports are around 3.5 bcm in 2028, but then decline as base production continues to fall.

It is clear that a revised official view of the gas balance is required. First, we need an updated view of Romania’s base production outlook. As things stand, the OMV Petrom claim, in its investor webcast announcing the Neptun Deep FID, that it will double Romania’s production could be both correct and incorrect: incorrect if the base is today’s production level; correct if the base is from the lower production expected in 2027. With a flat demand outlook, much of Neptun Deep will be staying in Romania both to replenish the declining base production and remove imports. Without a better view of the balance, there is perhaps a risk that Transgaz could overbuild its export capacity. Secondly, we need a better idea of how the gas can bridge the way to a non-lignite and renewables future, and see this reflected in future TYNDPs.

²⁰ Platts European Gas Daily 16th December 2022

Figure 6: Romania gas supply / demand balance (bcm) 2022 - 2031



Source: Transgaz, Development Plan for the National Gas Transmission System 2022-2031, available at <https://www.transgaz.ro/sites/default/files/Downloads/Development%20Plan%20for%20the%20National%20Gas%20Transmission%20System%202022-2031.pdf>

In 2022 lignite production was 18.2 million tonnes, and virtually all was used for power generation. If all this lignite was substituted by gas, it would require 4.0 – 4.5 bcma.²¹

Clearly, small changes to either supply or demand can make an appreciable difference to export volumes. However, the uncertainty here should not make much difference to regional market developments, as there are several other projects elsewhere either already completed or nearing completion which will add to improving regional supply diversity and interconnectivity. (These LNG import projects and interconnector expansions are discussed in the next section). Neptun Deep is but one of these.²²

3. SE Europe

SE European overall demand is 25 bcma, with all countries in the region importing all or most of their gas requirements. The only exception is Romania, which is 80% covered by domestic production. Figure 7 illustrates the size of individual imports in 2022 (2021 in the case of Serbia & Hungary). Romania has direct and indirect connections with all these countries: direct with Hungary, Bulgaria and Moldova, and indirect with Greece (via Bulgaria) and Serbia (via Hungary).

A major theme of the last 2-3 years has been the changes to gas supply. New sources of gas have become available through improved access to the global LNG market (expansion of Revythoussa in Greece; start-up of Croatia LNG; ability of Bulgaria to access LNG landed in Turkey) and a major new pipeline system in the Southern Gas Corridor giving access to Caspian gas from Azerbaijan. This gas has become available to most countries in the region through improvement in interconnectivity to move the gas inland. Also, while the use of Turk Stream does not mean a change of supply, it has meant that the Trans Balkan pipeline system bringing Russian gas in from Ukraine through to Romania and Bulgaria and then to Greece, Rep of North Macedonia and Turkey has become empty. It is now being

²¹ Conversion factor taken from the energy balances in Table 14 of the monthly Buletin statistic de industrie, op cit.

²² These projects are catalogued in a recent OIES paper on SE Europe: Julian Bowden, SE Europe gas markets – reconfiguring supply flows and replacing Russia Gas, OIES paper NG 177 December 2022

partially used in reverse for a south-north flow. While the detail of the flow changes is beyond the scope of this insight, Figure 5 illustrates the point well.²³

Figure 7: SE Europe gas markets demand and imports (bcm) 2022

SE Europe gas markets - 2022 supply position			
	Demand	Net Imports	sources of imports
Romania	9.8	1.9	Russia, Hungary (Az from 2023)
Bulgaria	2.7	2.9	Azerbaijan, LNG via Greece
Greece	4.9	4.9	Russia, Az, LNG
Serbia	3.0	2.4	Russia via Turk Stream (2021 position)
Hungary	11.1	9.1	Russia, Croatia LNG, (2021 data)
Moldova	0.9	0.9	Ukraine, Romania

source: individual national energy balances

This process of greater access to the international LNG and pipeline markets, and more interconnectivity between the region's markets, is continuing. More LNG regas terminals are being built, and existing ones expanded, and more and expanded interconnectors are also being constructed.

In Greece, the Alexandroupolis FSRU (5.5 bcma ultimate capacity) is reported to be on-track for an end-year completion, and on the Bulgaria-Serbia 1.8 bcma interconnector construction work is under way for commissioning in October 2023.²⁴ The Greece-Bulgaria interconnector ICGB, which started up in October 2022, looks likely to be expanded from 3 bcma to 5 bcma in the near future.

Ability to bring multiple sources of LNG and pipeline gas and distribute that gas through the region is attracting new market entrants. The recent non-binding market test by the Greek TSO DESFA to support its plans for expanding its system attracted some 27 companies to request capacity allocation.²⁵ Bulgaria's TSO Bulgartransgaz is about to start its own market test with similar high interest expectations.²⁶

In the last 3-4 years, the region's gas sector has been transformed by more LNG and long-distance pipeline imports from the Southern Gas Corridor entering the supply mix, and interconnectors such as ICGB being completed and enabling this gas to be moved on into the region. The region's ability to replace Russian volumes (around 10 bcma in recent years) is within reach.²⁷ Neptun Deep adds to this transformation. Its 8 bcma alone is not far short of recent Russian imports, and it far exceeds the 2-3 bcm the region itself receives from the Southern Gas Corridor (where most of the gas goes through to Italy). Romania itself will see its production decline abruptly halted as Romania becomes a net exporter of gas. It is also possible that Neptun Deep could stimulate more exploration effort in the Romanian sector of the Black Sea. There is some activity elsewhere (discussed in Appendix 2), and not far away Turkey's Black Sea Sakarya field came on-stream in April 2023.

What all this means for pricing and the potential for hub development is discussed in the next section.

²³ These projects, and resultant changes to gas flow patterns, are detailed in Julian Bowden SE Europe gas markets – reconfiguring supply flows and replacing Russia Gas, OIES paper NG 177 December 2022.

²⁴ Bulgartransgaz press release 1st Feb 2023 at <https://bulgartransgaz.bg/en/news/interkonektorat-balgariya-sarbiya-shte-diversificira-gazovite-dostavki-v-regiona-745.html>

²⁵ See DESFA press release 29th June 2023 at <https://www.desfa.gr/en/press-center/press-releases/ayjhmenh-zhthsh-sthn-prwth-mh-desmeytikh-fash-toy-market-test-toy-desfa-gia-thn-epektash-toy-e8nikoy-systhmatos-fysikoy-aerioy>

²⁶ <https://bulgartransgaz.bg/en/news/bulgartransgaz-ead-startira-pazaren-test-za-tarsene-na-kapacitet-v-tochkite-na-mejdu sistemno-svarzване-780.html>

²⁷ This was discussed fully in SE Europe gas markets – reconfiguring supply flows and replacing Russia Gas, OIES paper NG 177 December 2022.

4. Pricing, hub formation and hub relationships

There is no doubt that the Neptun Deep field will not only bring stability to Romania's gas supply at a time when its existing sources are starting to decline, but also that within a year or so from start up, it will turn the country into a net exporter. The implications for Romania's traded gas market, and indeed for the SE European traded gas market as a whole, are very exciting, but could this possibly lead to the creation of some form of regional trading hub?

a) South East European hubs to-date

The notion of such a regional hub has been talked about for some years now, whether a national Romanian, Bulgarian, or Greek hub that serves as a reference for the region, or the European Commission's (EC) vision at one point of a Mediterranean gas hub.²⁸ There could also be a more regional hub, especially in SE Europe, which might include Greece, Bulgaria and Romania. One should also bear in mind that Turkey, although not in the EU, does border with Greece, exports gas to Europe via Greece, has a large and rising gas demand and acts as a transit route for Russian, Caspian and in due course possible East Mediterranean gas flows.

Despite a relatively slow start to the development of traded gas hubs in this region,²⁹ compared to the gas hubs in north-west Europe, the situation did progressively improve in the late 2010s so that, by 2020, the Romanian gas TSO (Transgaz) signed a cooperation agreement with the Austrian CEGH to establish and operate the PVT³⁰ virtual gas hub in Romania from February 2020. Trading got off to a good start and although there was, and still is effectively no OTC market in the country, wholesale gas trading has been taking place for some time on the two regulator licensed 'centralised gas markets', the state owned OPCOM and the private Romanian Commodity Exchange (BRM).³¹ From what can be ascertained, the trading was primarily exchange physical forwards and not cleared futures derivatives, some of it executed in auction sessions and some in continuous trading. The BRM had about 93% of total volumes in 2020 but since then, there appears to have been no further gas trades on the OPCOM platform.³²

The EC had been pushing for a physical gas hub to be created in Bulgaria for several years, something that became part of the Bulgarian government's approved 2020 energy strategy.³³ The country has been heavily dependent on imports, primarily from Russia, and has been very keen to develop Inter-Governmental Agreements to develop cross-border gas infrastructure to enable a more diversified supply of gas; indeed, it does now have LNG supply contracts that can be landed in either Greece or Turkey, with the regasified gas then flowing through interconnectors to Bulgaria. It also believes that this will place it in a good position to be a south-east European regional hub both physically and commercially.

To that end, the government approved two major policies:³⁴ to set up a gas release programme (GRP) and that the state-owned TSO, Bulgartransgaz, should set up a centralised gas market. The gas release programme was part of the amended Energy Act adopted in October 2019 to increase liquidity and to

²⁸ For more detail, see Heather (2015), pp.50-55: Heather, Patrick: "The evolution of European traded gas hubs"; OIES Paper NG104, December 2015: <https://www.oxfordenergy.org/publications/the-evolution-of-european-traded-gas-hubs/>

²⁹ For more detail, see Heather (2021), pp.10-12: Heather, Patrick: "European Traded Gas Hubs: German hubs about to merge"; OIES Paper NG170, June 2021: <https://www.oxfordenergy.org/publications/european-traded-gas-hubs-german-hubs-about-to-merge/>

³⁰ Punctul Virtual de Tranzactionare; operational from 2020.

³¹ <https://www.europex.org/members/brm/>

³² The webpage was last updated on 21st August 2020: <https://www.opcom.ro/pi-gn-rapoarte-rezultate/en#url>

³³ See: "Integrated Energy and Climate Plan of the Republic of Bulgaria 2021–2030", pp.221-222,275:

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwiP8tXfl4SAAxVgq_0HHVHpD0oQFnoECBcQAQ&url=https%3A%2F%2Fenergy.ec.europa.eu%2Fsystem%2Ffiles%2F2020-06%2Fbg_final_necp_main_en_0.pdf&usq=AOvVaw33Xihq2rmm2mOz0qANrnH4&opi=89978449

³⁴ Details given in Heather (2020), p.11: Heather, Patrick: "European traded gas hubs: the supremacy of TTF"; OIES Energy Comment, May 2020: <https://www.oxfordenergy.org/publications/european-traded-gas-hubs-the-supremacy-of-ttf/>

provide access to a competitive environment; the first auction was conducted on 9th December 2019, for gas delivered at the new virtual trading point (VTT)³⁵ in January 2020.

Interestingly, the trading platform that Bulgartransgaz set up in 2019 and which went live on 2nd January 2020 is called the Balkan Gas Hub (BGH), indicating its regional aspirations. It offers spot and forward contracts, as well as a brokering service, conducted on the Trayport Exchange Trading System. The BGH website states that the trading platform provides “the first, Bulgaria based, liquid trading gas hub in the South Eastern Europe region”.³⁶

Greece has since the early 2010s expressed publicly its desire to become a south-east European gas hub, either on its own or as part of a regional hub. This was supported by geopolitical factors, namely the tensions between the EU and Russia since the Ukraine crisis of 2014 and the Russian desire to bypass Ukraine for its gas exports to Europe through the building of the Nord Stream pipelines. However, the infrastructure to carry large volumes of transit gas did not exist in Greece or the rest of the Balkans until very recently, following a number of capacity improvements to the interconnections, especially between Turkey, Greece, Bulgaria, Serbia and Romania.

Greece finally established its virtual gas hub (HTP)³⁷ in 2018, after many years of aspirational discussion, although the HEnEx gas platform did not go live until March 2022. Prior to this date only very small quantities of balancing gas were registered on the Desfa (TSO) platform. The delay was due to various political, regulatory and IT issues. The HEnEx platform is currently offering just spot and prompt products, with Month-ahead and near curve products to be added at a later stage.

As with Greece, Turkey has expressed an interest since the early 2010s in developing its traded gas market and in providing a gas hub for the region.³⁸ Until now however, there have been many political, commercial and logistical reasons why this has not happened and it remains unlikely in the near future.

b) SE European hubs trading results in 2022

The 2022 trading results³⁹ for Romania, Hungary, Bulgaria, Slovakia, Greece, and Turkey are shown in Table 1.⁴⁰ All of the hubs in the table, with the exception of the Bulgarian VTT and the Turkish UDN, recorded lower volumes in 2022 compared to the previous year.

The Romanian PVT volumes were halved from the 2021 level following the introduction in September 2022 of a new 98% tax that would retrospectively apply to wholesale electricity and gas transactions in Romania. Unfortunately, the Romanian government has had a track record of interfering with the liberalised gas and electricity markets but somehow the traded volumes had risen year on year and reached 53TWh in 2020 and 54TWh in 2021, of which 51TWh were curve contracts; the total in 2022 was down to 31TWh, of which just 16TWh were curve trades.

³⁵ Virtualna Türgovska Tochka.

³⁶ See: <https://www.balkangashub.bg/en/about-us/company>

³⁷ Hellenic Trading Point.

³⁸ For more detail, see: Heather (2015), p.53, para.1: Heather, Patrick: “The evolution of European traded gas hubs”; OIES Paper NG104, December 2015: <https://www.oxfordenergy.org/publications/the-evolution-of-european-traded-gas-hubs/>

³⁹ For further information on the Emerging hubs in 2022, see: Heather (2023), pp.11-12: Heather, Patrick: “European Traded Gas Hubs: their continued relevance”; OIES Paper NG183, July 2023: <https://www.oxfordenergy.org/publications/european-traded-gas-hubs-their-continued-relevance/>

⁴⁰ This is a condensed version of Table 4 in Heather (2023), p.11: Heather, Patrick: “European Traded Gas Hubs: their continued relevance”; OIES Paper NG183, July 2023: <https://www.oxfordenergy.org/publications/european-traded-gas-hubs-their-continued-relevance/>

Table 1: Selected Hubs Trading Volumes 2022

2022		SELECTED EMERGING HUBS TRADED VOLUMES (TWh)						
HUB	Country	OTC			EXCHANGE			TOTAL
		PRMT	CURVE	TOTAL	SPOT	CURVE	TOTAL	
PVT*	Romania	No activity reported			15.06	15.73	30.79	30.79
MGP	Hungary	n/a	n/a	1.27	26.01	Nil	26.01	27.28
VTT	Bulgaria	No activity reported			4.03	9.98	14.01	14.01
SVOB	Slovakia	n/a	n/a	4.05	no exchange trading			4.05
HTP**	Greece	No activity reported			2.87	n/a	2.87	2.87
UDN***	Turkey	No activity reported			2.23	n/a	2.23	2.23

* total physical trades transacted on the Romanian Commodity Exchange (BRM) but not necessarily conducted at the PVT.
**HENEx's Gas Trading Platform finally went live 21st March 2022; prior to this, all trades were 'balancing trades' on the Desfa platform.
***the Turkish exchange EPIAŞ went live on 1st October 2018.

Sources: ICIS, BRM, CEEGEX, HUDEX, BGH, HEnEx, EPIAŞ; P. Heather

There is no OTC trading in Romania but there are two recognised exchanges offering gas contracts, the government owned OPCOM and the private BRM. The former does not appear to have traded in any of the contracts since August 2021, whilst on the BRM platform the 'spot' volumes are made up of 6% balancing trades and 94% other spot contracts. The website does not differentiate between the various forward contracts, just giving an annual total.⁴¹

The Hungarian MGP volumes have remained buoyant, and although at 27TWh a little lower in 2022 than the 34TWh in 2021, this was still above the 24TWh in 2020. Hungary is also the only country other than Slovakia to have OTC trading, although this is a very low 1.3TWh. All of the trading was effected in spot contracts, mainly for portfolio adjustment and balancing ahead of delivery.

Following the introduction of the Bulgarian GRP in 2019, the liquidity of the gas market increased significantly, leading to a sustained rise in traded volumes at the VTT: from a total 3.4TWh in 2020, to 12.5TWh in 2021, and 14TWh in 2022; this last increase was wholly due to an increase in spot trading from 2.4TWh in 2021 to 4TWh in 2022. However, the GRP was suspended on 1st January 2023 on the pretext of reduced Russian supplies, which does not augur well for hub liquidity and for traded volumes in the future.

Gas trading in Slovakia is predominantly in the forward contracts and is carried out on the OTC market only; the overall traded volumes have fallen significantly over the past three years, from 17.7TWh in 2020 to just 4.1TWh in 2022. It is not clear exactly why this is but the fall in Russian gas flows has been said to have reduced the amount of trading. In particular, there has been a marked drop in the volumes of spot gas⁴² that Gazprom sold at, and physically arrived into, the Slovak VTP hub.⁴³

Greece's virtual hub only became operational in 2018, with exchange trading starting in March 2022. There were very few balancing 'trades' on the Desfa platform up to 2020, then a 'surge' in registered trades in 2021 to 57.4TWh, although 56.7TWh were registered bilateral (OTC) and just 0.7TWh cleared trades. In 2022, there was a low 2.87TWh of spot trades recorded; there is still no OTC trading recorded in Greece.

⁴¹ It is possible to get a full breakdown if you are a member of the exchange or subscribe to their data feed.

⁴² In 2022 there will still be about 140-145TWh of contractual gas flowing through Slovakia, of which about 90TWh will be exported to Austria and the Czech Republic.

⁴³ Source: Gazprom Export and Argus: Sales on the ESP platform in 2021 totaled just 2.6TWh, compared to 57.2 TWh in 2020 and 26.7TWh in 2019; there were no sales in 2022. Physical deliveries at the SKVTP were 27.2TWh in 2019, 47.0TWh in 2020, 9.4TWh in 2021, just 3.2TWh in 2022, and a residual 0.3TWh in 2023.

Despite the Turkish UDN hub being set up in 2011, there was very little further development until the EPIAŞ exchange started offering gas contracts in October 2018. This could be seen as surprising considering the increasing demand for gas in the country, the established pipeline network, especially the east-west transit pipes, and the various political statements in the 2010s stating Turkey's vision of being a regional hub. The reality is that there has not actually been the political will to see this vision progress and indeed Botaş, the incumbent gas company, has been afforded renewed dominance at the expense of the several small energy companies that had been formed. This has meant that, since exchange trading became available, the actual traded volumes were less than 1TWh in both 2018 and 2019, and have been just 2.2TWh in both 2020 and 2022, with a dip to 1.3TWh in 2021.

The current situation therefore is one of much discussion over regional cooperation, and the potential for a regional gas hub, whether that is truly cross-border or one country's hub acting as a reference price for the region. However, when comparing the total 2022 traded volumes for the SEE hubs with those established hubs in western and central Europe,⁴⁴ they fall far short of all but the two lowest⁴⁵ volume established hubs.

c) Prospects for a genuine hub in SE Europe

The question posed at the beginning of section 'a' of this chapter was whether gas production from Neptun Deep, and Romania becoming a small net exporter of gas, could change this situation and lead to there being some form of regional trading hub. Are these new volumes of gas, which are due to arrive in 2027, the missing link that could finally stimulate the traded markets in the SE European region, allowing for the creation of a reference price and its subsequent use in the pricing of physical gas contracts?

The new extra volumes of gas brought into the Romanian market will certainly be an economic boost to the country and could potentially help develop liquidity at the PVT. However, although the existing 98% tax on wholesale transactions does not apply to sales from producers, it would limit the ability of producers and their buyer/s to hedge their positions on the PVT. Both Romgaz and Petrom have understandably not disclosed how they plan to commercialise the production but they are unlikely to be using the PVT to hedge their positions. Similarly, if the tax regime persists, the extra volumes of gas in the Romanian system are unlikely to alter the current decline in liquidity at this hub. This would indicate, at this stage, that Romania is unlikely to become the focus of a regional hub.

The Hungarian gas system is still heavily dependent on Russian gas,⁴⁶ which it now receives through the recently commissioned Turkstream pipeline via Bulgaria and Serbia. Despite this and other new interconnectivity (and the forthcoming BRUA II that will add extra capacity), there has not so far been any noticeable impact on traded volumes; furthermore, the type of trading done implies that it is primarily for portfolio adjustment and balancing ahead of delivery. At this stage Hungary is therefore also very unlikely to become a regional hub.

Bulgaria is the only country other than Romania to record any curve trading volumes, and the hub with the third largest total traded volumes; this, along with its geographical position between Greece (with an LNG terminal, ICGB and TANAP pipelines), Turkey (exporting Russian and Azeri gas towards Europe), and Romania (with indigenous production), places it as a contender to be a SE European regional hub. However, the announcement at the beginning of 2023 that it is suspending the gas release programme does not augur well for hub liquidity and for traded volumes in the future.

⁴⁴ For an in-depth analysis, refer to: Heather (2023), chapter 3.3, pp.6-16; and in particular Table 3, p.10:

⁴⁵ The Belgian Zeebrugge hub traded 35TWh and the Czech VOB 90TWh; all other hubs traded >250TWh, with the top three hubs trading 3305TWh (German THE), 6335TWh (British NBP), and 43135TWh (Dutch TTF).

⁴⁶ Hungary receives 4.5bcm from Russia, some 80-85% of its demand, under a 15-year deal signed in 2021 and signed an agreement in April 2023 for additional volumes "for preparations for winter or filling up storages"; see Reuters, 23rd April 2023, "Hungary agrees on option for more Russian gas shipments, oil transit fees": <https://www.reuters.com/business/energy/hungary-agrees-option-more-russian-gas-shipments-oil-transit-fees-2023-04-11/>

Slovakia, despite its excellent geographical position at the heart of Europe, linking the south eastern countries and Ukraine, with Poland to the north, and the Czech Republic and Austria to the west, unfortunately now has very low traded volumes since the drop in Russian flows⁴⁷ to western Europe; the country also has a large storage capacity compared to consumption⁴⁸ which could engender trading. However, there is no gas trading exchange and none is currently planned. Traded volumes currently look to remain very low, and Slovakia does not look today a candidate to become a regional hub.

Greece has had a poor record in its path to a fully liberalised gas market and, despite there appearing to be the political will in the early 2010s to effect change, it actually took until 2018 to set up a virtual hub, and a further four years to reach the stage of having an exchange-based gas trading platform. So far, the traded volumes have been very low and do not favour Greece becoming a regional hub.

Turkey is equally unlikely to become a regional hub, given the dominance of Botaş and the lack of political will to change towards a more competitive gas market. Despite the liberalisation of the Turkish traded gas market in the early to mid-2010s, there has since been a reversal towards allowing Botaş to keep its grip on all segments of the market. In order for there to be a true liquid traded gas hub in the country, this monopoly would need to be effectively unbundled first.

What might be possible in due course is that several of these countries club together to create some sort of combined trading area. This is something that has proved difficult elsewhere in Europe, for a number of reasons, in particular physical infrastructure constraints and political non-alignment. It is interesting to note, however, that all these SE European countries are now members of the CESEC initiative:⁴⁹ The Central and South Eastern Europe energy Connectivity was set up by Austria, Bulgaria, Croatia, Greece, Hungary, Italy, Romania, Slovakia, Slovenia and the EU in February 2015, although Slovakia is no longer a member since 2021. The group aims to integrate the electricity and gas markets of Central and SE Europe. With greater integration, and the arrival of a new source of gas into the region from Neptun Deep, this group might be in a position, leading up to and post 2027, to develop some form of regional market and/or pricing initiative.

There is much discussion, many initiatives and positive talk from governments and institutions but, at the moment, there are still too many hurdles, as described above, for there to be an effective development of a regional hub, although this could of course happen in time. Until then, the additional volumes that Neptun Deep will bring into SE Europe will likely increase the already existing tendency for gas shippers and traders to use either a prominent Central European hub such as the Austrian VTP, or most likely, they will use Europe's leading price reference hub, the Dutch TTF, for their hedging and risk management trades.

5. Conclusions

Neptun Deep will produce 8 bcma when it reaches plateau production in 2028 assuming that the announced schedule is adhered to. It is a major project for Romania and the two companies involved and should provide a platform for Romania to influence the role of gas in the region as it becomes a net exporter. It will also be a welcome new source of gas in the EU.

Given the continued decline in Romania's production, this will result in a net addition of between 6-7 bcma for Romania to share between its domestic market and exports, with gas exported to its SE European neighbours through the existing or expanded interconnectors.

Overall Project risk is judged to be mostly low. Looking at the various risk components separately:

⁴⁷ Both contractual and spot.

⁴⁸ The GIE AGSI Transparency Platform shows that Slovakia has a storage capacity of 38TWh, which is about 72% of its annual consumption of 53TWh. See: <https://agsi.gie.eu/#/>

⁴⁹ See: https://energy.ec.europa.eu/topics/infrastructure/high-level-groups/central-and-south-eastern-europe-energy-connectivity_en

Market risk is extremely low. Romania is a small importer. Neptun Deep can remove these imports from the balance and, depending on the decline in the country's base production, Romania will have 3-4 bcm to export to neighbours with a gas deficit from 2028. Further additions to SE Europe's LNG import capacity together with more intra-regional interconnector capacity (Bulgaria-Serbia IBS, expansion of the Greece-Bulgaria ICGB, expansion of the Romania-Hungary connection, for instance) will all mean more supply diversity and opportunity for supply envelopes to adjust. It is hard to see any supply being crowded out, because any surplus around 2030 can be moved further westwards.

Technical risk is also judged to be low. Water depths are deep but not extreme, and there is considerable experience now of sub-sea developments in the broader region (Shah Deniz 2, Turkey's Sakarya).

Pricing risk is low to medium. It is possible that Neptun Deep will come on-stream at the same time as substantial LNG expansions. On present plans, Qatar expansion should see first gas by end-2025, while its North Field South FID is expected at the end of 2023. From the USA, first gas from Golden Pass is expected in 2024, Plaquemines Phase 1 in 2024 and Phase 2 in 2026, and expansion of Corpus Christi by end-2025. Much depends on global market ability to absorb this gas, which in the main means demand in Asia. Neptun Deep could possibly add to oversupply around 2027-8 or, depending on demand, it could help ease a market threatening to become tight.

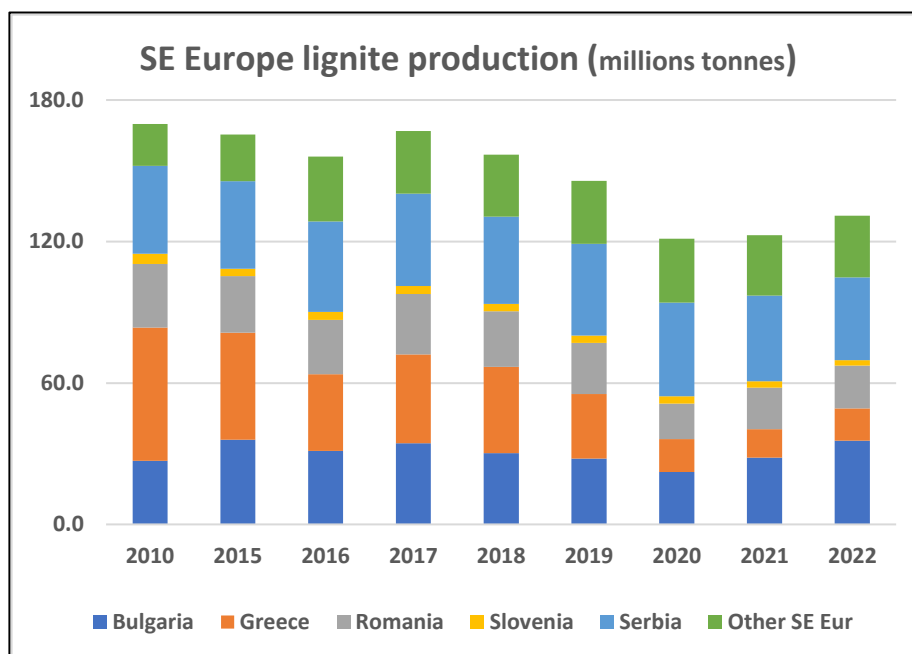
Political risk is possibly where the greatest risks lie. Romania's record on legislative and regulatory stability is not good. On the other hand, with shareholdings in both OMV Petrom and Romgaz, the State has a direct interest in ensuring that this project succeeds. There is also EU risk, with a new Commission to be in place in 2025, with potentially new policy directions for the energy transition.

Whether the Neptun Deep volumes will prove to be sufficient to establish a liquid gas trading hub, either in Romania or the broader SE Europe region, it is hard at this stage to say. There is much other work to be done before a hub could evolve to the point where it can become a recognised and trusted pricing point.

Appendices

Appendix 1: Romania lignite production

SE Europe is a major producer of lignite, with its 4 EU members (Romania, Bulgaria, Greece and Slovenia) accounting for 24% of EU lignite output. Main producers in the region are Bulgaria and Serbia with over 35 million tonnes each. Romania is a large producer. Output rose slightly in 2022 by 3% to 18.2 million tonnes (approximately equivalent to 5-6 bcma). While this is well down on the 27 million tonnes it produced in 2010, it remains an obvious priority target in the country's decarbonisation policy.



Source: Euracoal market reports and its annual data map

Appendix 2: OMV Petrom other upstream activity

OMV Petrom has exploration activity in other parts of the Black Sea, offshore Bulgaria and Georgia.

The clear speculation is whether the Neptun Deep FID and the recently on-stream Sakarya field offshore Turkey will stimulate more exploration activity in the Black Sea.

In Bulgaria, OMV Petrom's focus is the Han Asparuh prospect. Operator TotalEnergies (57.1%) and OMV Petrom (42.9%) preparations have started for an exploration well to be drilled in 2023-2024.⁵⁰

In Georgia, work on Block II has slowed and seismic acquisition is now on hold.

⁵⁰ OMV Petrom Annual Report 2022, pages 20, 29, 30.