

# THE SOUTHERN GAS CORRIDOR: ACHIEVEMENTS AND FUTURE PROSPECTS

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**Abstract:** The launch of the Transadriatic Pipeline (TAP) has spearheaded the export of gas from the Caspian to Italy and Southeast Europe and inaugurated the much-discussed Southern Gas Corridor. Greece and its Balkan neighbors are set to derive economic and political benefits from the diversification of supplies. Azerbaijan might gain further market share in the region in the 2020s should TAP double its capacity. However, such an outcome is contingent on the development of cross-border connections as well as regulatory and institutional reforms in both EU member states and the candidate countries of the Western Balkans. Russia's Gazprom will therefore remain a leading supplier in the 2020s but face stiffer competition from other gas exporters.

The Southern Gas Corridor connecting the EU and the hydrocarbon-rich Caspian region is now a reality. The Transadriatic Pipeline (TAP) started operation on November 14, 2020, and now consumers in Italy have access to natural gas from the Shah Deniz offshore field in Azerbaijan.<sup>1</sup> It is hard to overestimate the significance of this new development for Azerbaijan and Turkey, as well as Southeast Europe. The new pipeline runs over 878 km from the Turkish-Greek border through Greece and Albania, crosses the Adriatic Sea, and terminates in Melendugno, in Italy's southern Italian province of Puglia. TAP has an annual capacity of 10 billion cubic meters (bcm) which, according to the Shah Deniz consortium of energy companies, could be doubled to 20+ bcm in the 2020s.<sup>2</sup> That is a significant volume for Southeast Europe where Greece and Bulgaria each have signed contracts to buy 1 bcm of Azerbaijani gas yearly. TAP furthermore consolidates Turkey's new role as a transit country and adds Azerbaijan to the list of suppliers on the European gas market.

### **How did we get here?**

TAP is the product of a long-standing effort, by both states and energy multinationals, to establish export routes for hydrocarbons from the Caspian basin and Central Asia to the West. It was an objective Turkey and the United States (U.S.) converged over in the 1990s and 2000s. For Ankara, energy connectivity meant stronger ties with Azerbaijan and the Turkic republics in Central Asia as well as a diversification of supplies. For Americans, cross-

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border infrastructure schemes offered a foothold in the post-Soviet region. Ultimately, Central Asian crude oil has made its way to the West, but natural gas has been exported to Russia and then to China starting from 2007 when a pipeline between Turkmenistan and the western Chinese province of Xinjiang began work.

Azerbaijan by contrast made full use of the western route. In 2005, it inaugurated the Baku-Tbilisi-Ceyhan (BTC) oil pipeline which allowed it to deliver crude oil to international markets via Turkey. Originally proposed by President Suleyman Demirel and Heydar Aliyev in 1998, it enjoyed support by both the Clinton and the Bush administrations in the U.S. as well as BP leading the consortium.<sup>3</sup> Parallel to BTC runs the Baku-Tbilisi-Erzurum (BTE) gas pipeline – a partnership between BP, TPAO (Turkey), and SOCAR (Azerbaijan).

With BTC and BTE operational in 2006, Caspian oil and gas came closer to Europe's borders. The two Ukraine gas crises of January 2006 and January 2008 resulting in a cut-off of supplies to several Eastern European countries focused the EU's attention on the would-be Southern Gas Corridor. Diversification of supplies became the buzzword, with the EU adopting a flurry of legislative, regulatory, and financial measures towards this end. The European Commission as well as the U.S. government championed the Nabucco Pipeline project to connect BTE to the Baumgarten terminal in Austria. In July 2009, Turkey, Bulgaria, Romania, Hungary, and Austria signed an intergovernmental agreement for Nabucco. But two years later, Turkey broke ranks with the group and struck a separate deal with Azerbaijan for the Transanatolian Pipeline (TANAP) running from Erzurum to the Greek border. TANAP – with a throughput capacity of 16 bcm and Azerbaijan's SOCAR holding 70% of the shares – came online in June 2018.<sup>4</sup>

Once Turkey opted for TANAP in 2011, the question for the Shah Deniz consortium<sup>5</sup> was which route to choose for a pipeline to the EU. Option 1 was a truncated Nabucco (Nabucco West: Bulgaria – Romania- Hungary-Austria). Option 2 was TAP. Ultimately,

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in the summer of 2013, the Shah Deniz consortium decided in favor of TAP. That was a boon for Greece, in the throes of a financial crisis at the time, as well as Italy. Though Nabucco West would have made a greater political impact by delivering gas to countries otherwise dependent on Russia, TAP had a stronger business case. Its length of 878 km compared favourably to Nabucco West's 1329 km. Nabucco's estimated cost was EUR 7.9 bn vs 4.5 bn for TAP. Investors were prepared to underwrite it too – with BP taking a 20% share, Snam another 20%, Fluxys 19%, Enagas 16% and Axpo 5%.<sup>6</sup> The only major position behind Nabucco was Austria's OMV.

The Shah Deniz consortium's decision brought onboard the European Commission as well. It selected TAP as a Project of Common Interest (PCI). This made the project eligible for EU financing on account of its contribution to energy security and integration between member states' gas markets. In February 2018, it received a loan worth a record EUR 1.5 bn by the European Investment Bank (EIB). Construction kicked off in May 2016, a major event for the government of Alexis Tsipras still smarting from the financial meltdown Greece went through a year prior.



*Fig 1: The Southern Gas Corridor consisting of Southern Caucasus pipeline (SCP), Trans-Anatolian gas pipeline (TANAP), Trans-Adriatic pipeline (TAP)<sup>7</sup>*

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### **TAP's Impact**

The volume of gas TAP brings to European consumers – 10 bcm a year – is not insignificant but falls short of being a gamechanger in the market, at least for the time being. To put things in perspective, the EU imported 398 bcm in 2019, with Russia accounting for 39% and liquefied natural gas (LNG) for another 28%.<sup>8</sup> Azerbaijan is a long way from carving out a substantial share in the EU market, as it has already done in Turkey thanks to TANAP/BTE.<sup>9</sup>

Italy alone consumes about 74 bcm annually and has pipeline connections to Algeria and Libya, in addition to the Russian gas which enters its grid from the north. TAP's 8 bcm a year is not a game changer in the Italian market by any measure.<sup>10</sup> In addition, ENI, Italy's leading oil and gas company, has long-standing partnerships with Gazprom and Rosneft including within third world countries which means that the Russian connection will persist. ENI is also focused on large-scale gas projects in the Eastern Mediterranean such as the Zohr offshore field in Egypt. It is safe to assume that Italian energy diplomacy will not be exclusively focused on the Southern Gas Corridor.

Greece is a different case: the 1 bcm contracted with Shah Deniz corresponds to about a quarter of annual demand and therefore makes a difference. TAP has turned the Hellenic Republic into a transit country rather than a consumer one with all the political benefits that come with it.

One has to bear in mind that the Southern Gas Corridor has potential to expand. Officials and analysts expect TAP's capacity to double to 20 bcm by 2025.<sup>11</sup> The volume in question roughly covers the demand in all Southeast Europe which means that, in theory, Azerbaijan could become the area's principal supplier. The Southern Gas Corridor could bring even more natural gas online should Central Asian producer countries such as Turkmenistan and Kazakhstan start using the newly available infrastructure and even make headway with much talked-about plans for a Trans-Caspian Pipeline. It is still a long shot, but it is worth noting that Turkey has a contract from 1999 with Turkmenistan for 16 bcm a year, which was renewed in 2014.<sup>12</sup>

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### **North-South connections**

For TAP to realize its full promise, it should establish infrastructure links with countries in the Balkans. The Greek grid needs to be connected to those of its northern neighbours. Under such a scenario, Bulgaria, North Macedonia, Serbia, Kosovo, and others would obtain access to Caspian gas which in turn would bring both economic and environmental benefits.

#### *Bulgaria*

Most progress thus far has been made in Bulgaria since state-owned trader Bulgargaz has a contract for 1 bcm a year with the Shah Deniz consortium (just like Greece's DEPA). That is a significant volume as it corresponds to about a third of yearly demand by industries and households in the country. Work on the Greece-Bulgaria interconnector pipeline (ICBG) running between Komotini and Stara Zagora picked up speed in 2019 after long delays. The interconnector is projected to pipe gas from both TAP and the planned floating storage and regasification unit (FSRU) off the northern Greek port of Alexandroupoli which is designed to bring in LNG from a variety of global suppliers. Bulgartransgaz, the grid operator, has taken up a 20% stake in the unit.<sup>13</sup> Though the Bulgarian government is hopeful that ICBG will be up and running by mid-2021, chances are this deadline will be missed.<sup>14</sup> The date to keep in mind is the end of 2022. Bulgargaz's long-term supply contract with Gazprom holds a virtual monopoly on the Bulgarian market ends. ICBG and the deal with the Shah Deniz consortium provide the Bulgarian energy ministry and Bulgargaz with a bargaining chip vis-à-vis Moscow in the upcoming commercial talks. The same applies to Greece where DEPA's contract with Gazprom runs until 2026.<sup>15</sup>

#### *The Ionian-Adriatic Pipeline*

TAP's second phase may bring Caspian gas to the Western Balkans as well. In early 2020, DESFA and Snam Rete (Italy's system operator which owns a majority of shares in DESFA) explored commercial interest in future sales in Albania. Based on preliminary bookings, they submitted a proposal to the TAP project company for the second phase of the pipeline.<sup>16</sup> Should Albania start importing gas through TAP and build one or several exit points on its territory, it will open possibilities for an extension into the Western Balkans, as TAP doubles its capacity.<sup>17</sup>

Since 2007, Croatia, Albania, and Montenegro have been pushing forward plans for an Ionian-Adriatic Pipeline (IAP).<sup>18</sup> It is projected to have a throughput capacity of 5 bcm/year and is projected to run over 511 km from Fier in Albania, a likely exit point for TAP, to the Croatian port city of Split.<sup>19</sup> Bosnia and Herzegovina joined in 2008 and IAP won support by the Energy Community, an EU-promoted regional cooperation body. More recently, the pipeline has also come into the spotlight of the so-called Three Seas Initiative.<sup>20</sup> It was discussed at a forum in Dubrovnik in August 2019 for instance. IAP forms part of the so-called Western Balkan Gas Ring proposed by the Energy Community, a regional cooperation institution backed by the EU.<sup>21</sup>

Within IAP, Croatia is projected to take 2.5 bcm/year, Bosnia and Herzegovina and Albania 1 bcm each, and Montenegro 0.5 bcm or a total of 5 bcm/year. Croatia, which benefits from EU funds, is therefore expected to underwrite 50% of IAP's cost estimated at 600 million euros.

What is still missing is investment. Croatia failed to win a grant from the Connecting Europe Facility (CEF). Bringing in Azerbaijan would be another route. Plinacro (Croatia), BH-Gas (Bosnia and Herzegovina) and Geoplin (Slovenia) have all signed cooperation agreements with SOCAR. Azerbaijan has funded feasibility studies for developing infrastructure and the gas market in Albania and Montenegro. But neither SOCAR nor the rest of the companies involved in TAP have shown serious interest in developing IAP.

The main problem in the Western Balkans is the small size of the market which limits demand.

Croatia, consuming 3.3 bcm a year, may struggle to absorb sufficient volumes from IAP to make it investment worthy. Furthermore, it has been focused on another strategic project, an LNG terminal at the island of Krk. The FSRU with an initial annual capacity of 2.1 bcm is scheduled to come online on 1 January 2021 and is fully booked until October 2023.<sup>22</sup> Part of the shipments are bound for neighboring Hungary and Slovenia. The European Commission has thrown its weight behind interconnectivity. CEF has allocated up to 4.83 million euros for upgrading the Lucko-Zabok-Rogatec link with Slovenia with three compressor stations and another 2.25 million for a feasibility study for a pipeline from Zlobin to Slobodnica in Eastern Croatia. All these ventures form part of the planned north-south corridor running from Swinoujscie LNG terminal on Poland's Baltic coast to Krk. Another beneficiary might be Bosnia and Herzegovina which is working on an interconnector with



Croatia (Zagvozd– Novi Travnik with a branch to Mostar).<sup>23</sup> Unlike other countries, Croatia is not under geopolitical pressure. It stopped importing Russian gas in 2011. However, the interconnector at the Croatian–Hungarian border, which pipes gas from Central and Western Europe, remains massively underused. Northbound shipments from Krk and TAP/IAP are therefore feasible.

Albania and Bosnia and Herzegovina, both at 0.2 bcm, do not make a difference either. An EU-funded Gas Master Plan from 2015 established that the likely demand in Albania could expand to 0.5–1.5 bcm but the country has practically no distribution grid. Symptomatically, no gas shipped from Shah Deniz through TAP is being taken by the Albanians. Montenegro, further north, consumes no natural gas.

### **North Macedonia**

Another spur from TAP is planned to run from Greece to North Macedonia. The interconnector pipeline is currently at a preliminary stage, with a feasibility study in the works. North Macedonia's limited demand – 0.6 bcm a year – is an obstacle for attracting private-sector investment so the venture is reliant on public funds, possible assistance from the EU, and the international financial institutions (IFIs). The European Investment Bank has committed 52 million euros to the interconnector.<sup>24</sup> Kosovo, which like Montenegro consumes no natural gas at present, is interested in the interconnector too.

### **Future prospects**

Demand for natural gas from the Caspian will rise in Southeast Europe if gas is in competition with other energy sources, notably hydropower and lignite, used extensively for electricity generation. However, this is a tough proposition given market conditions, the infrastructure deficit, and rudimentary sector regulation. On the positive side, a gradual switch to gas may help overcome seasonal fluctuations in hydro-power, leading to electricity shortfalls, and contribute to energy efficiency.<sup>25</sup>

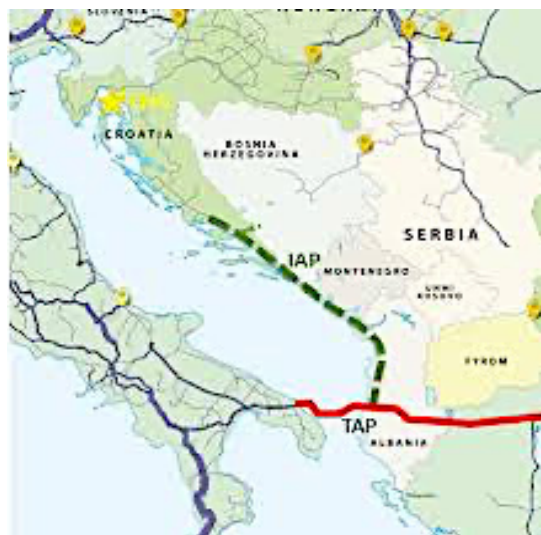
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There are clear environmental gains to be made from introducing more gas into the energy mix. Across Southeast Europe, natural gas could provide a partial fix to endemic air pollution due to reliance on low-calory lignite coal for heating.<sup>26</sup> Greece has already committed to phase out coal from power generation.<sup>27</sup> Bulgaria, Croatia, and Romania meanwhile are dragging their feet and asking for further EU financial support. The Western Balkans are even further behind. This will be an issue which will play out in the 2020s.

Turning to geopolitics, the diversification of supplies in Greece and Bulgaria is a setback for Russia, the dominant player in the local market. Gazprom is set to lose market share over the coming years to Azerbaijan and LNG suppliers. However, Moscow has been able to score points too. The completion of the TurkStream 2 (Balkan Stream) pipeline in Bulgaria and Serbia has cemented its leading position, especially on the Serbian market.<sup>28</sup> The extension of the Southern Gas Corridor into the Western Balkans will therefore be one of the priorities of US-EU cooperation.

The Southern Gas Corridor has considerable transformative potential for energy politics in Europe and Eurasia. Its impact will be felt in the 2020s and beyond with a range of actors – including the EU, Turkey, and Russia along with the countries in Southeast Europe and the Southern Caucasus – affected.



*Fig 2: Ionian-Adriatic Pipeline (IAP)* <sup>29</sup>

## Endnotes

- 1- TAP starts commercial operations. *TAP-AG.com*, 15 November 2020. <https://www.tap-ag.com/news/news-stories/tap-starts-commercial-operations?fbclid=IwAR3SVVDbjzejYSKt1kKuTUJYXVXlgYfgXcomLoU-Bu3TgWvolxvyPUshQzB>
- 2- Silvia Favasuli and Gary Hornby, Turning on the TAP: A Shift on the European Gas Market. Special Report, *S&P Global/Platts*, September 2020. [https://www.spglobal.com/platts/plattscontent/\\_assets/\\_files/en/specialreports/naturalgas/turning-on-tap-a-shift-in-the-european-gas-landscape.pdf](https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/naturalgas/turning-on-tap-a-shift-in-the-european-gas-landscape.pdf)
- 3- Svante E. Cornell, Mamuka Tsereteli and Vladimir Socor; "Geostrategic Implications of the Baku-Tbilisi-Ceyhan Pipeline" *Oil, Gas and Energy Law* 4 (2006), [www.ogel.org](http://www.ogel.org)  
URL: [www.ogel.org/article.asp?key=2307](http://www.ogel.org/article.asp?key=2307)
- 4- Turkey and Azerbaijan mark the completion of TANAP pipeline to take gas to Europe, *Reuters*, 30 November 2019. <https://www.reuters.com/article/us-turkey-energy-tanap-idUSKBN1Y4oCP>
- 5- The consortium is led by BP which holds 28.8% in the Shah Deniz offshore field TPAO (Turkey) has 19%, Petronas (Malaysia) 15.5%, SOCAR (Azerbaijan) 16.7% - through its subsidiaries AzSD and SGC Upstream, Lukoil, 10%; and NICO (Iran) 10%.
- 6- The Shah Deniz consortium concluded long-term supply contracts for a combined volume of 8 bcm with Shell, Engie, Uniper, Naturgy, Hera Trading, Enel and Axpo. Bulgargaz (Bulgaria) and DEPA (Greece) have contracts for 1 bcm each.
- 7- CuriousGolden, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons
- 8- European Commission, DG Energy, *Quarterly Report on European Gas Markets*, December 2019. [https://ec.europa.eu/energy/sites/ener/files/quarterly\\_report\\_on\\_european\\_gas\\_markets\\_q4\\_2019\\_final.pdf](https://ec.europa.eu/energy/sites/ener/files/quarterly_report_on_european_gas_markets_q4_2019_final.pdf)
- 9- In 2018, Turkey imported 7.5 bcm from Azerbaijan corresponding to 23.7% of consumption. For 2019, the figure is 9.5 bcm or 21.4% of consumption. Data by the Turkish Energy Market Regulatory Council (EPDK) <https://www.epdk.gov.tr/Detay/Icerik/3-o-16>
- 10- Konstantinos Pantazopoulos and Valentina Bonetti in: Turning on the TAP, op.cit. pp. 6-10.
- 11- See for instance remarks by Kjetil Tunland, managing director at TAP, delivered at the Atlantic Council's Energy and Economic Summit in Istanbul, 5 November 2012. Transcript available at: <https://www.atlanticcouncil.org/commentary/transcript/istanbul-energy-and-economic-summit-2012-realizing-shah-deniz-and-southern-gas-corridor-11-15-12-transcript/>
- 12- Marat Gurt, Turkey inks deal with Turkey to supply gas to the TANAP pipeline, *Reuters*, 7 November 2014, <https://www.reuters.com/article/turkmenistan-turkey-tanap-idUSL6NoSX2QK20141107>
- 13- Bulgaria's Bulgartransgaz acquires 20% interest in Greek LNG terminal, *BNE Intellinews*, 24 August 2020. <https://www.intellinews.com/bulgaria-s-bulgartransgaz-acquires-20-interest-in-greek-lng-terminal-190324/>
- 14- Mario Tanev, Completion of Greece-Bulgaria gas link could be delayed to H2 2021 - report, *SEE News*, September 2020. <https://seenews.com/news/completion-of-greece-bulgaria-gas-link-could-be-delayed-to-h221-report-714918>
- 15- Azeri gas and LNG give leverage to Turkey, the largest gas market in the area by a long stretch, in dealings with Gazprom. Renegotiation of supply contracts for the so-called Western route, currently served by TurkStream, are due at the end of 2021. Another contract, for the volumes shipped through the Blue Stream pipeline, expires in 2025.

- 16- Silvia Favasuli, in Turning on the TAP, *op. cit.*, p. 13.
- 17- Daniel D. Stein. Trans-Adriatic Pipeline Expansion, Energy Source, *Atlantic Council*, 14 November 2019. <https://www.atlanticcouncil.org/blogs/energysource/trans-adriatic-pipeline-expansion/>
- 18- Alexander Kovacevic, Towards a Balkan Gas Hub, The Interplay between Pipeline Gas, LNG and Renewable Energy in South East Europe. *Oxford Institute for Energy Studies*, OIES Paper 115, February 2017. pp. 31 ff. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/02/Towards-a-Balkan-gas-hub-NG-115.pdf>
- 19- Gas\_16 / Ionian Adriatic Pipeline (Fier, AL - Split, HR), *Energy Community*, <https://www.energy-community.org/regionalinitiatives/infrastructure/PLIMA/Gas16.html>
- 20- See John Roberts, Three Pipelines and Three Seas: BRUA, TAP and IAP, Report, *Atlantic Council*, 17 September 2018. <https://www.atlanticcouncil.org/in-depth-research-reports/report/three-pipelines-and-three-seas-brua-tap-the-iap-and-gasification-in-southeast-europe/>
- 21- Kovacevic, *op. cit.* p. 2. Energy Community, Study on Recommendation for Funding Investments in the Energy Community Gas Ring, Final Report, *Energy Market Insights*, December 2011
- 22- Gas from LNG terminal off Krk island soon in Croatia's system, *Croatia Week*, 29 November 2020. <https://www.croatiaweek.com/gas-from-lng-terminal-off-krk-island-soon-in-croatias-system/>
- 23- Details on the Energy Community website: <https://www.energy-community.org/regionalinitiatives/infrastructure/PLIMA/Gas03.html>
- 24- See project files available through the European Investment Bank (EIB) website: <https://www.eib.org/en/projects/pipelines/all/20190190> <https://www.eib.org/en/projects/pipelines/all/20180836>
- 25- Jakov Milatovic and Damin Chung, How can the Western Balkan electricity mix be made more sustainable? *European Bank for Reconstruction and Development*, 3 December 2018. <https://www.ebrd.com/news/2018/kicking-the-coal-habit-in-the-western-balkans.html>
- 26- Kovacevic, *op. cit.*
- 27- Greece to spend 5 billion euro to phase coal by 2028, *Reuters*, 9 September 2020. <https://in.reuters.com/article/us-greece-coal/greece-to-spend-five-billion-euros-to-phase-out-coal-by-2028-idUSKBN-2602PR>
- 28- Dimitar Bechev, TurkStream: Geopolitical Impact and Future Prospects, *Al Sharq Forum*, 5 May 2020. <https://research.sharqforum.org/2020/05/28/turkstream-geopolitical-impact-and-future-prospects/>
- 29- source *www.energy-community.org*

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