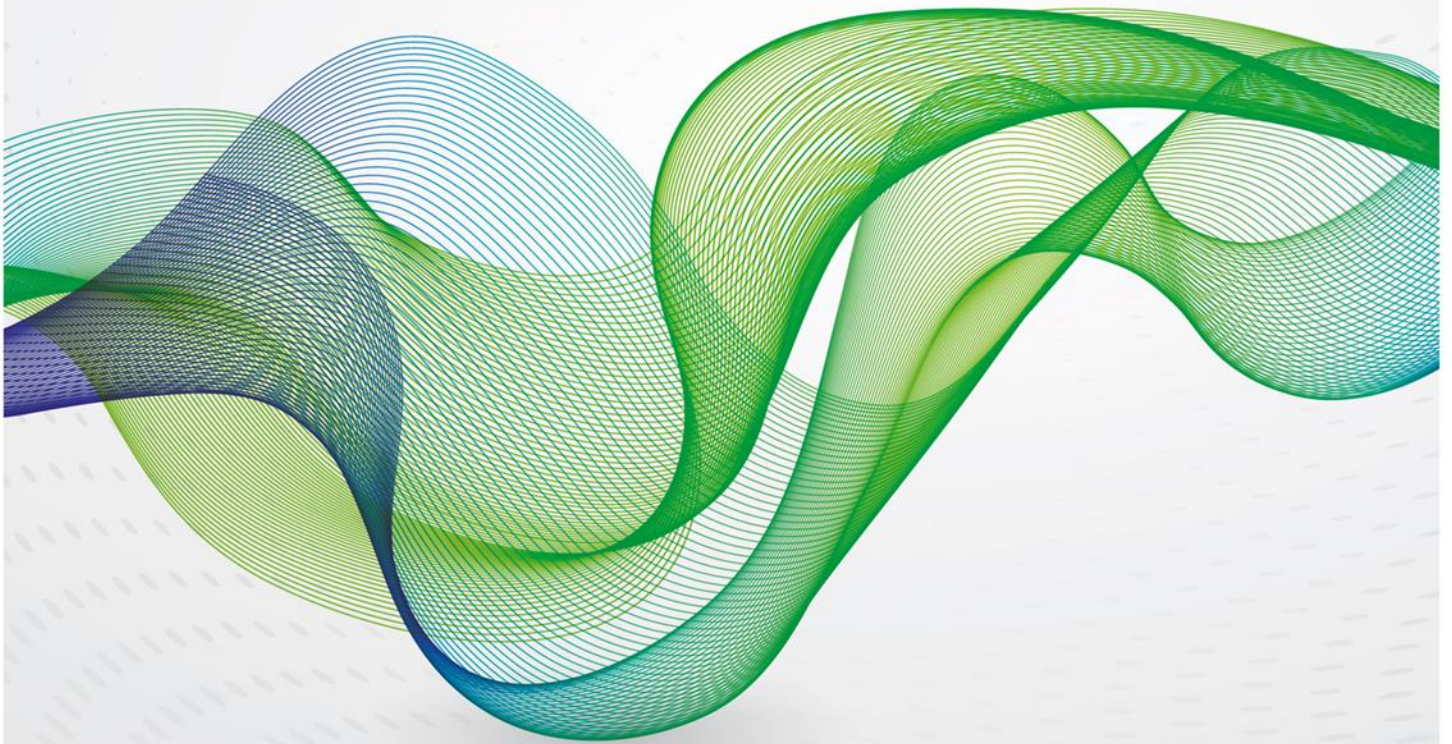


October 2020

Azerbaijan-Armenia conflict: energy implications of a potential escalation





Tensions between Azerbaijan and Armenia over Nagorno-Karabakh have simmered for many years but seldom resulted in more than a skirmish. The fighting which broke out in late September is much more severe, has already caused regional powers to consider their positions, and on Sept 29 the UN called for a halt in the fighting. The geopolitics of the situation are complex. Russia has a long-standing close relationship with Armenia, but also political and economic ties with Azerbaijan. Turkey is close to Azerbaijan and is a transit partner for Azeri oil and gas pipeline exports as well as having an upstream stake in both its main projects – ACG oil and Shah Deniz gas¹. Notwithstanding the UN's intervention, unsubstantiated rumours on Sept 30 claimed a Turkish F-16 operating from Azerbaijan had shot down an Armenian military plane.

Azerbaijan's oil and gas export pipelines run fairly close to the conflict area. While any pipeline disruptions are judged low risk at the moment, the purpose of this note is to put an energy dimension and context to the fighting: what might the potential impacts be on international energy markets and other issues if the flows through these pipelines are interrupted? The main focus is on Azerbaijan, as it is an oil and gas exporter, while Armenia is a small gas consumer, and all its oil and gas requirements are imported.

The conclusions of this report are:

A cessation of Azeri oil exports (around 650-700 kb/d) can be managed given the current over-supply in the market, and this will be easy if any disruption is short. As Azeri crude quality is light low sulphur, it is possible there might be a small impact on light-heavy pricing differentials in the Mediterranean area.

Gas exports can mostly be replaced. Turkey, Azerbaijan's main export market has demonstrated in the last couple of years its ability to exploit its wide supply portfolio options, and bring in more LNG. Turk Stream is also now operational. The main impact of any reduction in supplies would be on Georgia, which is 95 per cent supplied from Azerbaijan, and whose only alternative would be to resort again to Russian supplies.

Exports through the Southern Corridor via TAP are not relevant at present because TAP is only due to start-up sometime in 4Q2020. But assuming TAP is starting-up, in the near term these volumes could easily be found elsewhere in the sense that those markets supplied by TAP (Greece, Bulgaria, Italy) could continue with their current supply arrangements: Southern Corridor gas will not in the immediate future be meeting new demand but will be easing out existing supplies. Additionally, Greece has also been taking in more LNG at the expense of Russian volumes.

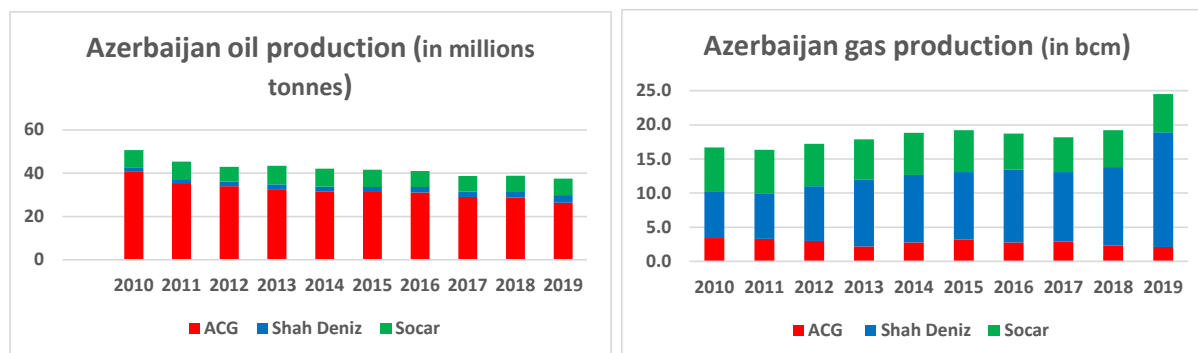
The main impact would be on Azerbaijan. The Azeri economy is highly dependent on its hydrocarbon sector and its oil and gas exports. With crude exports accounting for almost 75 per cent of export revenues, any pipeline disruption really becomes an oil story, rather than a gas one. Any disruption to the gas side, at present volumes, is more of a reputation issue around reliability and security of supply as the Southern Corridor begins gas flows beyond Turkey into TAP.

1. Azerbaijan oil and gas production and exports

Azerbaijan's energy production is extremely highly concentrated in just two off-shore fields, ACG and Shah Deniz, with the Azeri-Chirag-Guneshli ACG complex accounting for 70 per cent of the country's oil output. Output is coming off plateau now, but the decline is being moderated through continuous investment in the fields. ACG peak production was in 2009-10, at just over 40 million tonnes/800 thousand barrels/day; in 2019 its output was 26mt/530 kb/d. Oil is also produced at Shah Deniz, primarily condensate. As gas production ramps-up for Shah Deniz Stage 2, its condensate output will also rise, and condensate is included in the crude oil numbers. Adding its 3.5mt of output in 2019 to ACG, these two together accounted for 80 per cent of Azeri oil that year, the remaining 20 per cent coming from SOCAR.

¹ Turkish Petroleum TPAO has a 19 per cent stake in Shah Deniz and 5.7 per cent in Azeri-Chirag-Guneshli ACG

With the start-up of Shah Deniz, Azeri gas output soared in 2019 by 28 per cent to 24.5 bcm. The oil percentages for ACG and Shah Deniz above are almost identical but reversed: Shah Deniz Stages 1 and 2 in 2019 accounted for 68 per cent of total Azeri gas output, and ACG's associated gas another 9 per cent, bringing their combined total to 77 per cent of the country total.



Sources: Energy of Azerbaijan, annual yearbook, Azerbaijan State Statistical Committee AzStat; ACG and Shah Deniz output from BP Azerbaijan, annual business updates at https://www.bp.com/en_az/caspian/press/businessupdates

Summary balances are shown in the table below. For oil, annual processing through the Baku refineries has been fairly stable over the last six years, averaging 6.4 million tonnes pa. All the remaining oil is exported. In 2019, 83 per cent of oil output was exported, or 32.1mt/660 kb/d.

Azerbaijan oil and gas balances

Crude oil (in millions tonnes & kb/d)						
	2014	2015	2016	2017	2018	2019
Oil production (millions tonnes)	42.1	42.8	42.2	39.8	39.9	38.6
Domestic refining (millions tonnes)	6.8	6.7	6.2	6.0	6.3	6.4
Crude oil exports (millions tonnes)	35.2	36.1	36.0	33.8	33.6	32.1
Oil production in thousand barrels/day (kb/d)	865	880	868	818	821	793
Crude oil exports (kb/d)	724	742	739	694	690	660
% crude production exported	84%	84%	85%	85%	84%	83%
Natural gas (in bcm)						
Gas production	18.8	19.2	18.7	18.2	19.2	24.5
Domestic gas demand	11.0	11.4	11.2	10.9	11.1	12.6
Gas imports	0.0	0.0	0.3	2.1	1.8	0.0
Gas exports	8.1	8.1	8.0	8.9	9.9	11.8

Source: Energy of Azerbaijan annual yearbook, Azerbaijan State Statistical Committee (Azstat)

There are two crude oil export pipelines starting from the major oil and gas processing terminal at Sangachal some 40 km south of Baku: the 1200 kb/d BTC line and the much smaller 100 kb/d Western Route Export Pipeline (WREP). Most crude goes through the Baku-Tbilisi-Ceyhan BTC pipeline to the Mediterranean port of Ceyhan in Turkey. In 2019 BTC handled 640 kb/d. Additionally, the WREP runs 830 km from Sangachal through to the Georgian Black Sea port of Supsa, and handled 77 kb/d in 2019.

The table below shows crude exports from the Sangachal terminal into these two pipelines. Note, most of this was Azeri oil, but additionally some third-party oil also entered these pipelines, with small volumes coming from Kazakhstan, Russia, and Turkmenistan.

Sangachal terminal oil exports

	2017	2018	2019
in millions barrels			
through BTC to Ceyhan	253	255	235
through Western Route Export Pipeline WREP	28	28	28
Total ex Sangachal	281	283	263
in thousands barrels per day kb/d			
through BTC	693	699	644
through Western Route Export Pipeline WREP	77	77	77
Total ex Sangachal	770	775	721

Source: BP Azerbaijan, annual business updates

Note: Crude exports include volumes from ACG, Shah Deniz and 3rd party volumes

The other line that has been used in the past, but recently only intermittently, is Baku-Novorossisk. This 1330 km crude oil pipeline, which can take 105 kb/d, has a 230 km Azeri section which is operated by SOCAR.²

2. Gas markets

i) Turkey

Turkey, with virtually no domestic production, imported 45 bcm in 2019, of which 72 per cent was imported by pipeline and 28 per cent as LNG. Russia was the principal supplier with 15.2 bcm, or 34 per cent market share.³ In the past, Russia's market share has been substantially higher than this – it accounted for 52 per cent of all imports in 2017, for instance. A significant feature of recent years, with particular acceleration seen in 2019-1H 2020, has been the penetration of LNG. LNG climbed from 28 per cent in 2019 to 46 per cent of the market in 1H 2020. The main loser here has been Russia: in 1H 2020 it exported just 4.7 bcm to Turkey. Azeri volumes also have risen as Shah Deniz Stage 2 has ramped-up, and at present Azerbaijan is the largest single supplier into Turkey. There has been some surprise at the apparent lack of response by Russia to its sudden loss of market share, particularly since it has just completed a dedicated direct piece of infrastructure in Turk Stream Line 1. However, in July 2020 there were possible signs of a belated Russian response to its diminished position, as Russian deliveries recovered from 0.16 bcm in June to 0.8 bcm in July, suggesting perhaps some flexibility on price to compete with spot LNG.

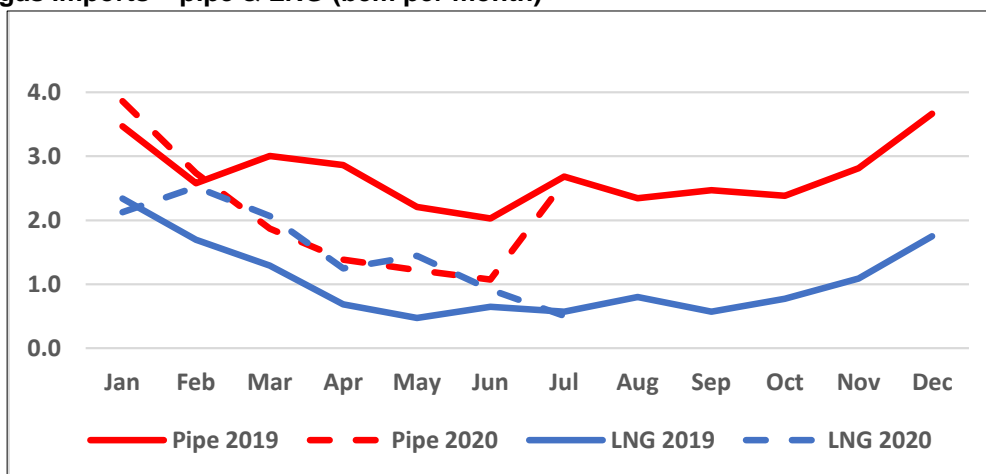
The point of this, however, is to emphasise that Turkey has an unusually varied and impressive supply portfolio, with a mix of pipeline supply from Russia, Iran and Azerbaijan, and LNG both from long-term contacts and an ability and willingness to buy spot LNG. For Turkey, the loss of Azeri volumes would be significant, but that volume - 9.6 bcm in 2019 and more in 2020 - could easily be replaced with Russian gas and LNG. Russian delivery infrastructure from Blue Stream and now Turk Stream (on stream since Jan 2020), gives Russia a direct delivery capability of just over 30 bcma into Turkey.⁴ In principle, Turkey could more than meet its current demand by using this Russian infrastructure at close to maximum (30 bcm) and LNG at its 1H 2020 level (10.3 bcm LNG imported in 1H 2020, or say 20 bcm in a full year).

² SOCAR's latest consolidated financial statements for end-2019 makes comments on its BTC and WREP commitments but does not mention Baku-Novorossisk - see Note 38 on oil shipment commitments on page 91 of the consolidated financial statements. See also <http://www.socar.az/socar/en/activities/transportation/baku-novorossiysk-oil-pipeline>

³ Import numbers from Turkey regulator EPDK's monthly gas sector report at <http://www.epdk.gov.tr/Detay/Icerik/3-0-95/dogal-gazaylik-sektor-raporu>

⁴ Comprising 16 bcma Blue Stream and 15.75 bcma Turk Stream Line 1. There is no technical reason why Turkey could not also take into its own system gas from TS Line 2, which is dedicated to Russian exports into SE and Central Europe.

Turkey gas imports – pipe & LNG (bcm per month)



Source: EPDK monthly gas sector report

Gazprom export to Turkey, volumes and delivery route

in bcma	2015	2016	2017	2018	2019
Total Russian exports to Ty	27.0	24.8	29.0	24.0	15.4
through Blue Stream	15.7	13.1	15.9	13.3	11.1
through Trans Balkan line	11.3	11.7	13.1	10.8	4.3

Source: Gazprom, Gazprom in Figures 2015–2019, factbook, pages 51, 82

ii) Georgia

Georgia is a 2.5 bcma market, and all its gas requirements are imported, as domestic production is negligible. Historically all imports were from Russia with a mix of direct purchase and transit fees for gas shipped on to Armenia, but with the development of Shah Deniz and Georgia's ability to buy Shah Deniz gas on favourable terms for its transit services, supply gradually switched to Azerbaijan. Today, a combination of Shah Deniz purchases and SOCAR's own direct sales into Georgia, means that around 95 per cent of its imports come from Azerbaijan. The market has a pronounced seasonal profile, which reflects the climate and the high share of hydro in the electricity mix. Demand rises in the winter months when the thermal power plants are turned on.

The other feature of the Georgian market is its transit function for Russian gas to Armenia. Transit flows average around 2 bcma (2.0 bcm in 2017, 2.2 bcm in 2019)⁵. The transit line runs north-south from Mozdok and has a rated capacity of just over 7 bcm. This line can handle both transit gas and Russian deliveries to Georgia. Georgia currently has no gas storage facilities, although it is building one at the depleted Samgori oil field close to Tbilisi and has a Eur150mn German KfW loan for this 0.3 bcm project, which has planned commissioning for 2022.⁶

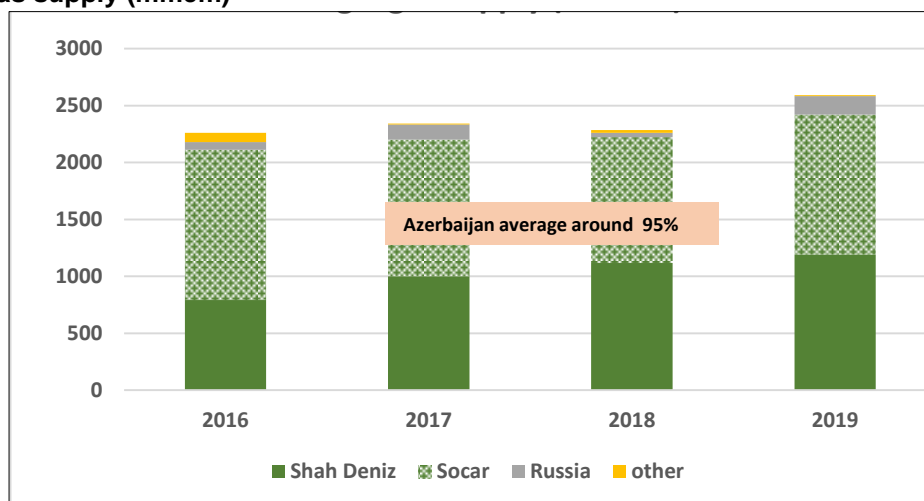
The chart below shows the mix of these Azeri volumes into Georgia. In 2019, its Azeri supply was split almost 50:50 Shah Deniz and Socar purchases. Through two Shah Deniz contracts (the supplements and option gas agreements) and some additional purchases, it took 1.2 bcm from Shah Deniz and 1.23

⁵ All Georgia market data is taken from the regulator's annual report: Georgia National Energy & Water Supply Regulatory Commission (GNERC), annual activity report - <https://gnerc.org/en/commission/commission-reports>

⁶ <https://bm.ge/en/article/at-what-stage-is-the-project-of-underground-gas-storage-facility--gogc-declares-that-tender-is-being-carried-out/46668>

bcm from Socar, a total of 2.4 bcm from Azerbaijan. It also imported a small 0.16 bcm from Russia. In the event of a failure in Azeri supplies, its only alternative would be to resume imports from Russia. When there were reported problems in procuring sufficient volumes from Azerbaijan in the winter of 2016-7, there were reports that Georgia was talking to Iran and Armenia about reverse flows along the transit line, but nothing apparently came of this.

Georgia gas supply (mmcm)



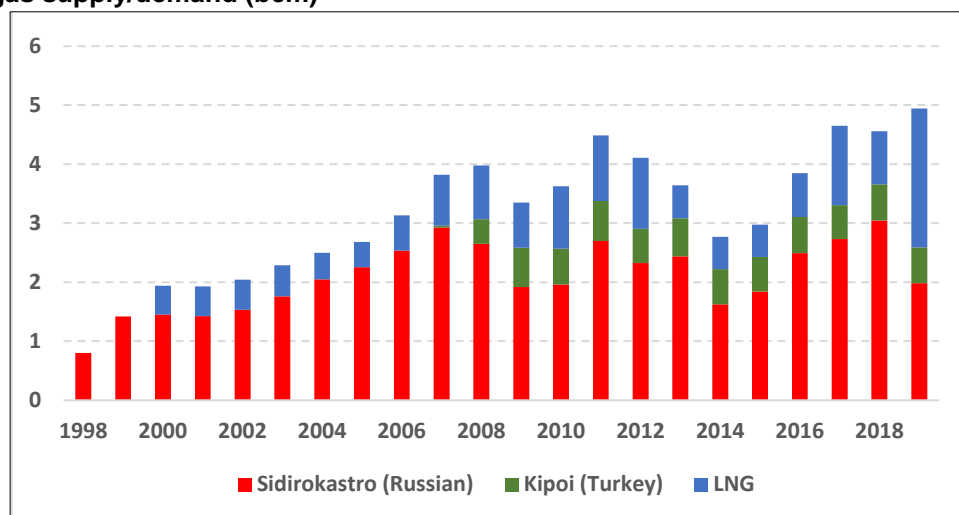
Source: Georgia National Energy & Water Supply Regulatory Commission (GNERC), annual Activity Report. <https://gnerc.org/en/commission/commission-reports>

iii) TAP markets – Greece, Bulgaria, and Italy

As the TAP is not commissioned yet - gas flow is due to start in 4Q 2020 - its present relevance in any discussion of how markets replace lost volumes is absent. These markets are by definition already supplied from other sources and are not vulnerable to any Azeri gas supply outage.

Nevertheless, if TAP were delivering the SD2 contracted volumes of around 8 bcm once build-up is complete (6 bcm to Italy, 1 bcm each to Greece and Bulgaria) then all these markets do have sufficient supply alternatives in the form of LNG, Russian gas, and Algerian gas into Italy. The chart below shows supplies into the 5 bcm Greece market, and the extent to which LNG has displaced Russian gas in 2019. Additionally, small volumes of around 0.6 bcm were moved into Bulgaria through reverse flow operations on the Bulgaria-Greece transit line.

Greece gas supply/demand (bcm)



Source: DESFA Development Study 2020-29, July 2019, page 6

3. Oil and gas in the Azeri economy

A constant refrain in any Azeri economic development discussion is the need to develop the non-oil economy in order to move away from oil dependency. One tangible indicator of the size of the oil sector is the share of hydrocarbons in its total exports. The table below summarises the country's trade balance over 2014-19 and shows the very high contribution of exports of crude oil, oil products, and gas to total export earnings. The second chart reinforces the point by categorising the transport methods used to convey these exports. Not surprisingly, as crude oil is the predominant export earner, pipeline transportation is the predominant transport methods.

The country has run a trade surplus every year since the big ramp-up of ACG oil production in the late 2000s. Peak years were 2010-2014, when due to rising export volumes and \$100 oil, Azerbaijan's annual trade surplus averaged \$22 bn. With the crash in oil prices, this surplus plummeted dramatically, although the country did manage to retain a surplus.

The share of crude oil in total exports has been enormous: it was 83 per cent in 2014, and even though export volumes have contracted since the oil production peak in 2010-11 and prices have fallen, it remained very high at 74 per cent in 2019. Azerbaijan is also an exporter of oil products. As noted above in Section 1, refinery crude throughputs have averaged around 6.4 mtpa over the last few years. In essence, it seems that refining policy is to meet domestic gasoline demand; this produces some surpluses, notably of diesel, and diesel is the main oil product export.

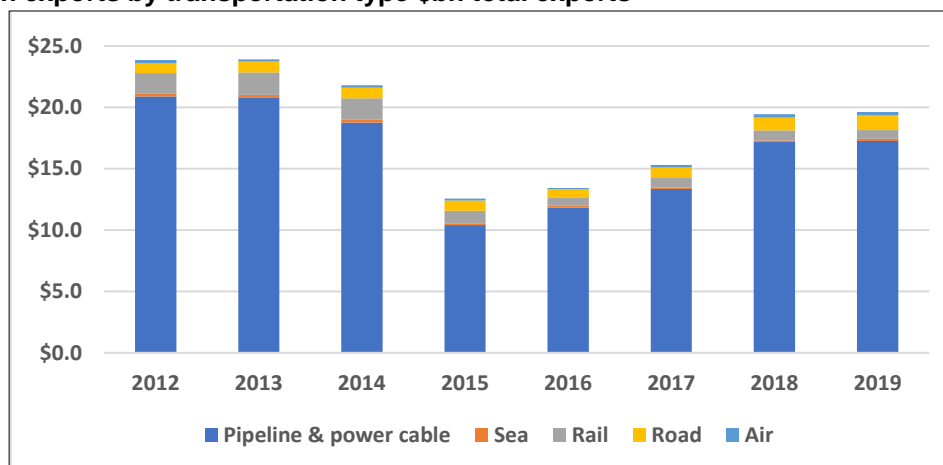
Gas, in comparison with crude oil, is a very small contributor to total exports. Even in 2019 as volumes increased, gas accounted for only 13 per cent of total exports. Combining crude, oil products and gas, these three accounted for 90 per cent of total exports.

Azerbaijan oil & gas exports – volumes & value

	2014	2015	2016	2017	2018	2019
Total commodity exports in \$ billion	\$30.2	\$16.6	\$13.1	\$15.5	\$20.3	\$19.5
Total commodity imports in \$ billion	\$9.2	\$9.2	\$8.5	\$8.8	\$11.5	\$13.7
Trade balance	\$21.0	\$7.4	\$4.6	\$6.7	\$8.9	\$5.8
Crude oil exports (in \$ bn)	\$24.9	\$12.4	\$10.3	\$12.3	\$16.3	\$14.4
Oil product exports (in \$ bn)	\$1.5	\$0.8	\$0.4	\$0.3	\$0.5	\$0.5
Gas exports (in \$ bn)	\$0.3	\$1.5	\$1.0	\$1.3	\$1.7	\$2.6
Total oil and gas (in \$ bn)	\$26.7	\$14.7	\$11.7	\$13.9	\$18.6	\$17.5
Total oil & gas as % of total exports	88%	88%	89%	90%	91%	90%
Crude oil as % of total exports	83%	75%	79%	79%	80%	74%
Gas as % of total exports	1%	9%	7%	8%	8%	13%

Source: Foreign Trade of Azerbaijan, statistical yearbook, AzStat, various years

Azerbaijan exports by transportation type \$bn total exports



Source: Foreign Trade of Azerbaijan, annual yearbook, AzStat, table 6.2 (total export \$ numbers used by AzStat here is slightly different to the one used in the table above. AzStat produces two values, one it calls 'customs basis' and the other 'statistical basis'. The difference appears to be due to the way PSA oil and gas exports are treated).

Conclusions

International oil and gas markets are over-supplied and flexible. The oil market is depressed, and major suppliers have reigned in output. In this situation, replacing Azeri volumes either entirely or in part for what would probably be a short period should be easily manageable. Not all BTC volume can be re-directed into the 75 per cent utilised WREP or the Baku-Novorossisk pipelines or rail, but some could, which would provide some mitigation for both the market and Azerbaijan. In other words, probably not all Azeri export volumes would be lost to the market. The European gas market is substantially more flexible than even 2-3 years ago. The way in which Turkey sharply increased its LNG imports over the last 18 months is an example. To a lesser extent, Greece has done the same, and improvements in pipeline operations have enabled some LNG to be reverse flowed into Bulgaria. The main supply problem would likely be seen in Georgia, which would have to take a geopolitically hard decision to return to Russia. The biggest problem would probably be for Azerbaijan itself because of its huge economic dependency on oil in particular. In reality, Azeri hydrocarbon exports are all about crude oil: it is crude oil that remains the paymaster of the economy.