

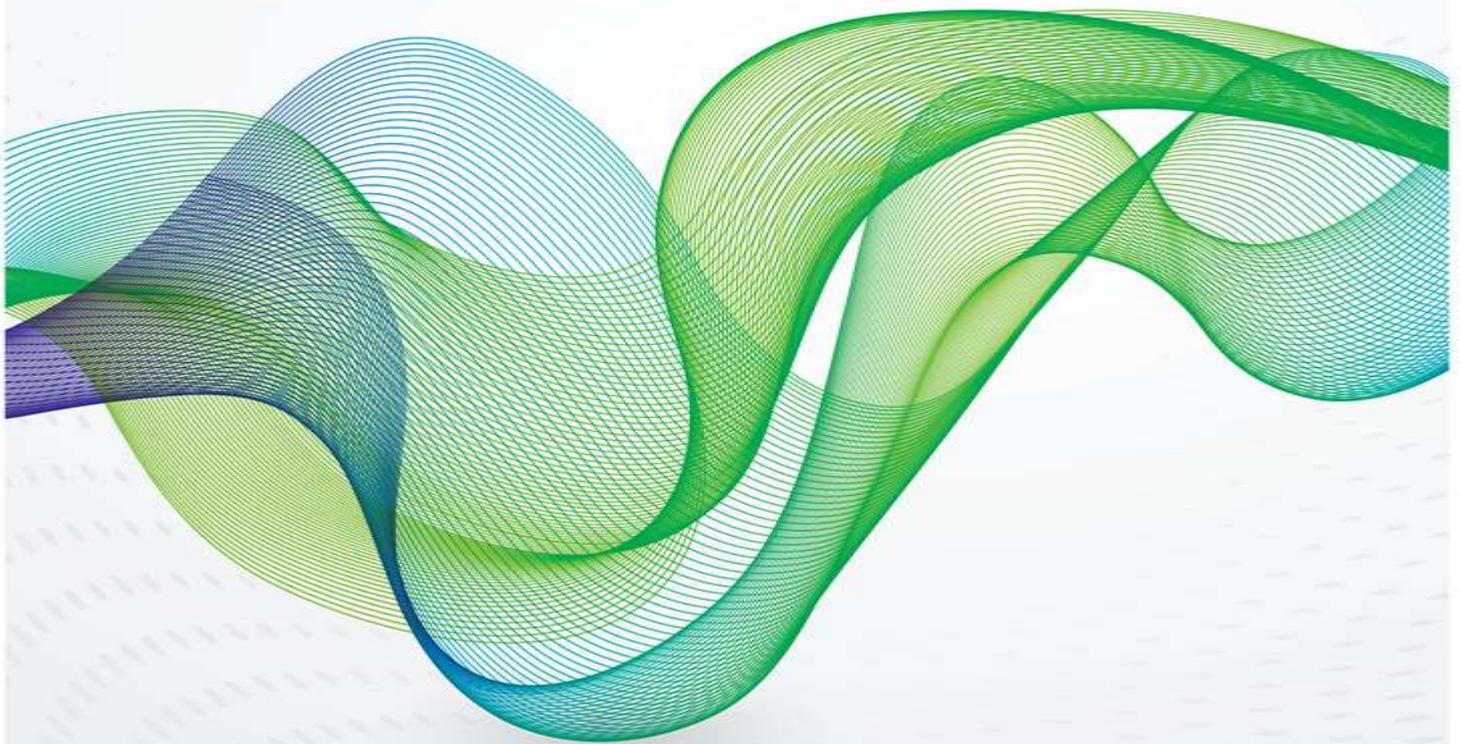


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STUDIES

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European gas storage:

backhaul helps open the Ukrainian safety valve



OXFORD ENERGY COMMENT

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As the gas storage injection season got underway last month, the level of gas stored in Europe was at a record high. If injections continue at the average rate, European storage will be completely full by early August – raising, in a worst-case scenario, the prospect of a storage “crunch” such as the one in the oil market in the southern USA in late April, which triggered negative prices for West Texas Intermediate contracts. With the market oversupplied, UkrTransGaz, which manages storage, and the new TSO, Gas Transmission System Operator of Ukraine (GTSOU), are encouraging European traders to place volumes in Ukrainian storage by offering discounted transportation tariffs and a “customs warehouse” arrangement to exempt stored gas from customs duties. To further enable the movement of gas from Europe to Ukraine, virtual interconnection points are being put in place on Ukraine’s western border to increase Ukraine’s import capacity. These changes make it more likely that substantial volumes of European gas will be injected into Ukrainian storage during the summer of 2020, over and above volumes usually held in Ukraine for seasonal balancing on the domestic market. This will not only help to ease the oversupply situation in Europe, but could also hasten the integration of the Ukrainian and European gas markets.

Rapidly filling storage in Europe

European gas storage was already at record levels late last year: it peaked at a record high of 101.4 bcm on 27 October 2019, and set a new end-of-year record of 91.5 bcm. This resulted from sluggish demand throughout 2019, and the widespread expectation of a supply interruption at the New Year, due to the unresolved dispute over Ukrainian transit. Despite the fact that this storage “overhang” led to higher year-on-year storage withdrawals in Q1 2020, European storage stocks at the end of March 2020 remained at a record high level of 56 bcm, leaving just 47.5 bcm of capacity to be filled over the summer injection season.

In Europe, the economic consequences of the COVID-19 pandemic began in March but were felt more strongly in April, as the market tipped into oversupply. To absorb some of the excess, storage injections increased by 11 per cent year-on-year. As a result, storage stocks at the end of April 2020 were 65 bcm – substantially higher than stocks at the end of April in 2019 (50 bcm), 2018 (26 bcm), and 2017 (31 bcm).¹ This left just 38.5 bcm of storage capacity to be filled from 1 May onwards.

Given these record high levels of storage, and expectations that lower year-on-year levels of gas demand and relative oversupply of pipeline gas and LNG will continue through the summer, it is highly likely that European storage facilities will reach full capacity by August, if not July. Ukraine’s plentiful storage capacity could ease Europe’s storage capacity shortage.

Ukrainian storage capacity and stocks

According to data from Gas Infrastructure Europe, Ukraine’s gas storage capacity is 30 bcm. As illustrated in the graph below, storage stocks held in Ukraine on 1 May 2020 (16.0 bcm) were already approaching levels seen at the end of October 2017 (16.7 bcm) and October 2018 (16.8 bcm) - that is, the peak volumes held at the start of winter in the “normal” years of 2017-18 and 2018-19. The year-on-year comparison with the end of October 2019 (21.3 bcm) is skewed, because stocks were unusually high in anticipation of a possible transit disruption in January 2020.

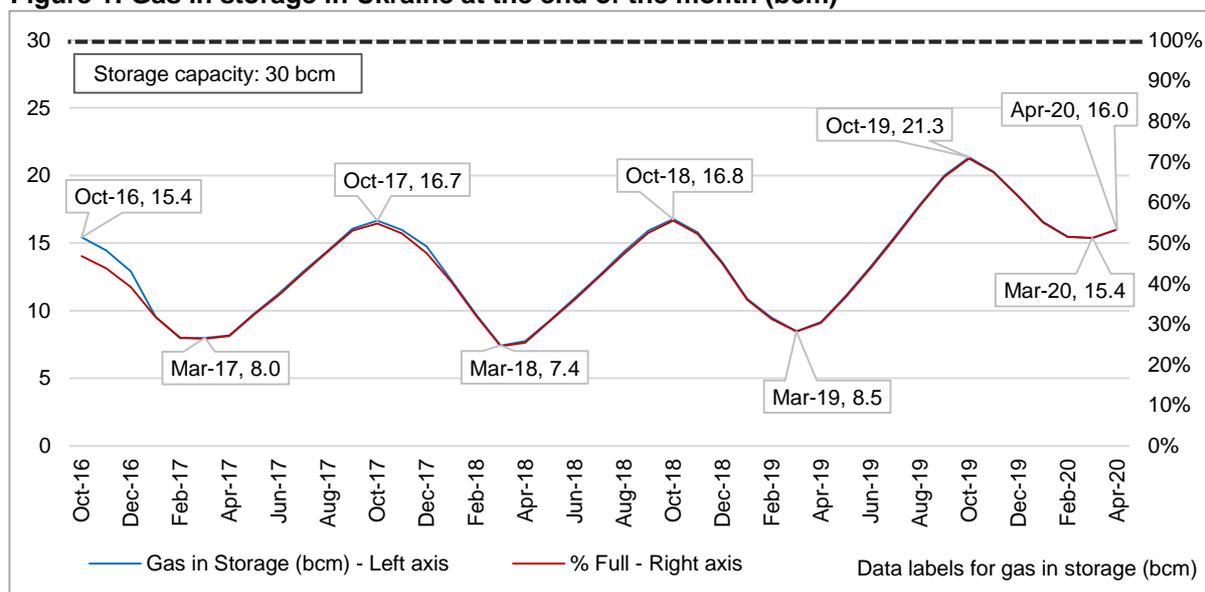
Little additional storage capacity, perhaps 2 bcm, is required this year to supply the domestic Ukrainian market; Naftogaz, the largest importer, has said that it will not be importing any gas over the summer.²

¹ Jack Sharples, 2020. ‘The impact of COVID 19 on global gas markets’. Section 2.2. *OIES Quarterly Gas Review* (May 2020), pp. 14-20; UkrTransGaz, 2020. ‘Wood Mackenzie: Ukraine may hold key to Europe’s gas storage crunch’. *News*, 22 April 2020. <http://utg.ua/en/utg/media/news/2020/ukraina-mozhe-zaproponuvaty-poriatunok-yevropi-u-iakoi-perepovneni-skhovyshcha-en.html>

² Reuters, 2020. ‘Ukraine only needs 2-3 bcm of gas to fill storage for 2020/21 heating season’. 7 April. <https://www.reuters.com/article/ukraine-gas-imports-idAFL8N2BV2H1>; Interfax-Ukraine, 2020. ‘Naftogaz has no plans to import gas – Kobolev’. 27 April. <https://en.interfax.com.ua/news/economic/658220.html>

This means that most of the storage capacity available on 1 May (14.0 bcm) may be offered to store gas from European countries. Indeed, of Ukraine’s 30 bcm storage capacity, 25.3 bcm is located in western Ukraine, including 17 bcm at the Bilche-Volytsko-Uhorske complex close to the border with Slovakia.³ Furthermore, we note that Ukrainian storage stocks have peaked in late October in recent years, which suggests that Ukrainian storage facilities will remain in injection mode until that time. This means that European traders are likely to be able to inject gas into Ukrainian storage for up to six months, from early May to late October.

Figure 1: Gas in storage in Ukraine at the end of the month (bcm)



Source: Gas Infrastructure Europe (GIE)⁴

Ukrainian incentives: The “customs warehouse” and discounted transport tariffs

Under these conditions, measures taken over the past three years by Ukrainian gas companies to attract gas into the country’s storage facilities have borne fruit. In April 2019, UkrTransGaz (the transport and storage division of Naftogaz) set up the “customs warehouse” facility, under which it stores imported volumes, for up to three years, net of taxes and customs duties. In April, regulations were amended to provide for transported volumes to be stored by UkrTransGaz, allowing traders in central and eastern European countries to store and move gas freely.⁵

On 1 January 2020, the new transmission system operator GTSOU (which was unbundled from Naftogaz on the same day) launched a short-distance gas transportation service, which effectively complements the “customs warehouse” by providing discounted tariffs for the transportation of gas between the Ukrainian border and Ukrainian gas storage facilities. The discounted entry tariffs (for transport to UGS) are EUR/MWh 0.25 at the Slovak, Polish, and Hungarian borders, compared to the regular entry tariff of EUR/MWh 0.71. The discounted exit tariffs range from 0.30 to 0.38 EUR/MWh at the three border points, compared to regular exit tariffs of 1.44-1.55 EUR/MWh.

³ Naftogaz, 2018. *Annual Report 2017*, p. 113. http://www.naftogaz.com/files/Zvity/NAK_AnRep2017_EN.pdf; Gas Infrastructure Europe (GIE), 2020. *Aggregated Gas Storage Inventory – Ukraine*. <https://agsi.gie.eu/#/historical/UA>

⁴ Gas Infrastructure Europe (GIE), 2020. *Aggregated Gas Storage Inventory (AGSI) - Ukraine*. <https://agsi.gie.eu/#/historical/UA>

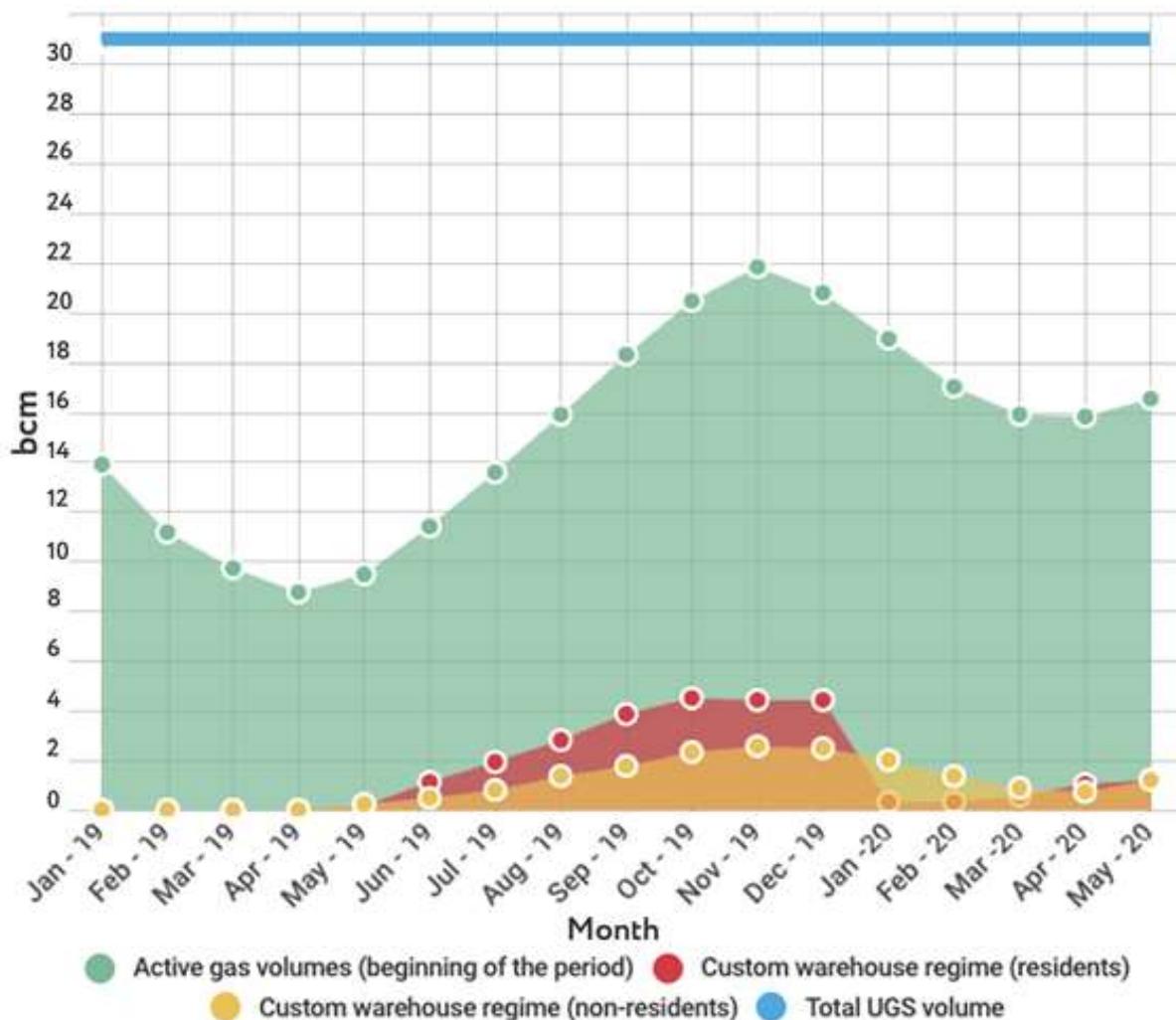
⁵ Interfax-Ukraine, 2020. ‘Ukrainian GTS, UGS operators to hold road show’, 9 January; UkrTransGaz, 2020. *Customs warehouse*. <http://utg.ua/en/utg/for-customers/customs-warehouse.html>

As a further incentive, in April the Slovak TSO, Eustream, announced unspecified discounts of up to 40 per cent on tariffs when exit and (re-)entry capacity is booked simultaneously on the Slovakia-Ukraine border, presumably for the purpose of transporting gas into Ukraine for injection into storage and later retrieval.

Uptake of “customs warehouse” services

The uptake of storage capacity under the “customs warehouse” regime is illustrated by the graph below, which shows volumes stored on the first day of the month. Both residents and non-residents of Ukraine may store gas under the “customs warehouse” regime, as shown by the yellow and red areas of the graph below. Stocks held by non-Ukrainian companies under the “customs warehouse” regime peaked at 2-2.5 bcm between 1 October and 1 December 2019, before falling to around 600 mmcmm by 1 April.

Figure 2: Gas stocks in Ukrainian storage (bcm on first day of month)



Source: UkrTransGaz⁶

⁶ UkrTransGaz, 2020. 'In January-April 2020 gas injection into UGS increased by 33%'. *Press release*, 13 May. <http://utg.ua/en/utg/media/news/2020/in-january-april-2020-gas-injection-into-ugs-increased-by-33-percent.html>

In April, oversupply on the European market led to increased storage injections, and the impact of this was felt in Ukraine. Total Ukrainian storage injections proceeded slightly more rapidly than usual with average daily net injections of 24 mmcm/d, compared to 22 mmcm/d in 2019. However, the significant difference in April 2020 was that non-Ukrainian companies conducted significantly higher storage injections compared to 2019. By 1 May 2020, non-Ukrainian companies held 1,173 mmcm in Ukraine's "customs warehouse" storage, up from 213 mmcm on 1 May 2019. In a similar vein, stocks held in "customs warehouse" storage by Ukrainian companies rose from 179 mmcm on 1 May 2019 to 1,197 mmcm on 1 May 2020. Therefore, on 1 May 2020, 14 per cent of Ukraine's total gas storage stocks (of 16.6 bcm) were being held under the "customs warehouse" regime.⁷ This suggests that the customs warehouse regime is making Ukrainian storage more commercially attractive.

The most recent daily data show that, in the period 1-10 May, storage injections rose substantially to an average 47 mmcm/d. Although this was lower than injections in the same period in 2019 (57 mmcm/d), it was similar to injections in the same period in 2018 (50 mmcm/d) and 2017 (48 mmcm/d). Again, 2019 is an outlier in the context of the expiry of the Russia-Ukraine gas transit contract at the end of 2019, while 2017 and 2018 are regarded as more representative of "normal" storage cycles. By 10 May 2020, stocks totalled 16.5 bcm. This is not only close to the peak stocks held in 2017 and 2018, but a level reached only in mid-August in 2019, which was itself a year in which storage stocks reached record levels.

The situation is clear: Ukrainian storage stocks are at exceptionally high levels for this time of year, and the probability of brisk injections during the summer means that Ukrainian storage utilisation in 2020 is likely to surpass even the unprecedented levels of 2019. The rate at which gas is injected into storage will depend to a great extent on Ukrainian gas imports, both in the form of physical imports from Europe and the implementation of backhaul (or virtual reverse flow⁸) imports from gas that is transited across Ukraine, as discussed below.

Physical capacities and gas flows from Europe to Ukraine

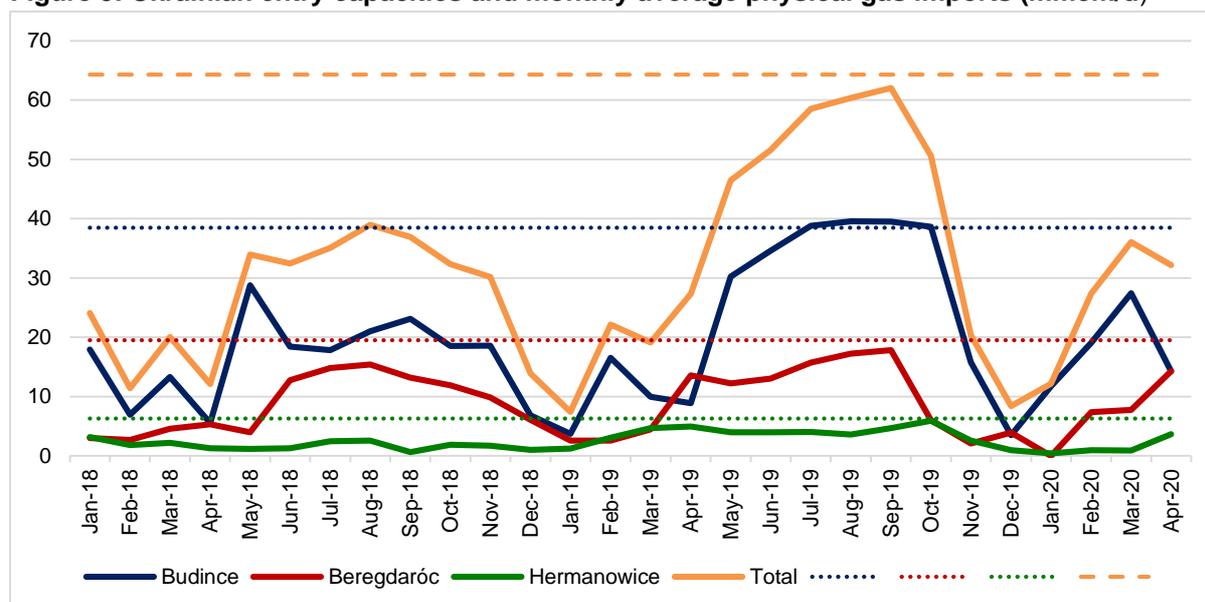
Although Ukraine's storage capacity is very large, its physical capacity for imports over its western borders is not. The capacity for west-to-east imports was developed after 2014, when Ukraine was seeking alternatives to pipeline imports from Russia, and virtual reverse flow was effectively prevented under the previous transit arrangements. Ukraine's physical imports are sourced from all three of its western neighbours: Slovakia, Poland, and Hungary. The regular pattern is for higher imports during the summer (1 May to 31 October) as Ukrainian storage facilities are filled, and lower imports during the winter as Ukrainian storage stocks are drawn down.

The capacity available to European traders who wish to physically transport gas to Ukraine to inject into storage is determined by (i) the capacity of the cross-border interconnections, and (ii) the demand for this capacity by Ukrainian market actors importing gas for the Ukrainian market.

⁷ Data from Gas Infrastructure Europe and ENTSOG differ from data reported by UkrTransGaz and GTSOU, partly because of varied measurement standards. Because natural gas expands as it heats up, the temperature at which gas volumes are measured affects their size. GIE and ENTSOG data are expressed in standard cubic metres (measured at 15 degrees Celsius); UkrTransGaz and GTSOU data are expressed in volumes measured at 20 degrees, which are slightly larger. The difference between a volume of gas measured at 15 degrees and a volume measured at 20 degrees is approximately 2 per cent; the calorific value of the gas remains the same.

⁸ For definition, see box below, 'What is backhaul (virtual reverse flow)? An example'

Figure 3: Ukrainian entry capacities and monthly average physical gas imports (mmcm/d)



Data source: ENTSOG Transparency Platform. Note: Flows are represented by solid lines and capacities are represented by dotted lines

Slovakia is the largest source of Ukraine’s physical imports from Europe. At the (one-way, west-to-east) interconnection point, Budince, the Slovak TSO, Eustream, reports firm exit capacity of 26 mmcm/d plus interruptible capacity of 12.5 mmcm/d, giving a total of 38.5 mmcm/d. The Ukrainian TSO, GTSOU, reports firm entry capacity of 27 mmcm/d plus interruptible capacity of 15.5 mmcm/d, giving a total of 42.5 mmcm/d.⁹ According to Eustream, Ukrainian imports from Slovakia totalled 6.0 bcm in 2018 and 8.5 bcm in 2019; Naftogaz reported these imports as 6.5 bcm in 2018 and 9.2 bcm in 2019.¹⁰ As the graph above illustrates, between May and October 2019 flows at Budince ranged between 30 and 40 mmcm/d, peaking at the combined firm and interruptible capacity. In addition, it should be noted that the other interconnection on the Ukraine-Slovakia border, Uzhgorod / Velké Kapušany, only operates in a single direction, from Ukraine to Slovakia.

On the Ukraine-Hungary border, the Beregovo interconnection delivered gas from Ukraine to Hungary, and the Beregdaróc interconnection brought gas from Hungary to Ukraine. At Beregdaróc, the Hungarian TSO, FGSZ, reported zero firm capacity and 16.9 mmcm/d of interruptible capacity until 31 May 2019, and 19.3 mmcm/d of interruptible capacity until 1 May 2020. On 1 May 2020, the Beregovo and Beregdaróc border points were unified into a single Virtual Interconnection Point, “Bereg”. Flows in each direction are now netted out, and only the balance is transferred across the border.¹¹ Therefore, physical flow capacity from Hungary to Ukraine is estimated at 19.3 mmcm/d; any capacity above that is backhaul. Ukrainian imports from Hungary were reported by FGSZ as 3.2 bcm in 2018 and 3.4 bcm in 2019; they were reported by Naftogaz as 3.4 bcm in 2018 and 3.7 bcm in 2019.¹² As the graph above

⁹ ENTSOG, 2020. *Transparency Platform*. <https://transparency.entsog.eu/>; GTSOU, 2020. *Available capacities*. <https://tsoua.com/en/transparency/available-capacities/>

¹⁰ ENTSOG, 2020. *Transparency Platform*; Naftogaz, 2020. ‘Ukraine bought 14.3 bcm of gas from the European market’. *Press release*, 7 February. <http://www.naftogaz.com/www/3/nakweben.nsf/0/00BFD4A022FD2E99C22585070041ACA5?OpenDocument&year=2020&month=02&nt=News&>

¹¹ Therefore, any discussion of capacities and flows up to 30 April 2020 refers to the dual “Beregovo / Beregdaróc” interconnection, and any discussion of capacities and flows from 1 May 2020 refers to the single “Bereg” Virtual Interconnection Point.

¹² ENTSOG, 2020. *Transparency Platform*; Naftogaz, 2020. *Ukraine bought 14.3 bcm of gas from the European market*.

shows, Ukrainian imports from Hungary in summer 2019 ranged between 12 and 18 mmcm/d, peaking just below the physical import capacity.

On the Ukraine-Poland border, the Drozdovichi interconnection operates only to transport gas from Ukraine to Poland. In the opposite direction, the Hermanowice interconnection brings gas from Poland into Ukraine. At Hermanowice, the Polish TSO, Gaz-System, reports zero firm capacity and interruptible capacity that fluctuates between 4.2 and 6.3 mmcm/d; GTSOU reports interruptible entry capacity of 4.3-6.4 mmcm/d. Ukrainian imports at Hermanowice were reported by Gaz-System as 0.6 bcm in 2018 and 1.3 bcm in 2019; and by Naftogaz as 0.7 bcm in 2018 and 1.4 bcm in 2019.¹³ Flows at Hermanowice, like those at Budince and Beregovo, peaked just below capacity in summer 2019.

Firm capacity means gas transmission capacity contractually guaranteed as uninterruptible by the transmission system operator (TSO). **Interruptible capacity** means gas transmission capacity that may be interrupted by the TSO in accordance with the conditions stipulated in the transport contract.

When the nominations (requests for physical deliveries) by shippers exceed the physical capacity of the system, the TSO will reduce (proportionally or entirely) deliveries made in accordance with capacity booked by shippers under the “interruptible” regime. This may happen in the case of system maintenance, or a surge in demand. The size of the discount for the price of interruptible capacity relative to firm capacity depends on the likelihood of an interruption. For example, some network points are generally “busier” than others, making it more likely that nominations will exceed capacity.

See Regulation (EC) No 715/2009, Article 2, sub-sections 1(13) and 1(16). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02009R0715-20181224>.

Aggregate physical west-to-east capacity is therefore 62-64 mmcm/d. In 2019, under exceptional market conditions (risk of supply interruption at the year-end), physical imports at the three cross-border interconnection points peaked at just below the technical capacity in July, August, and September. In 2018, by contrast, the utilisation rate during the summer was lower: aggregate west-to-east flows of gas into the Ukrainian market were 32-39 mmcm/d. This suggests that, in a typical year, of the 62-64 mmcm/d physical capacity, about 25-35 mmcm/d could be available for European traders seeking to use the “customs warehouse”. Were gas physically imported at 30 mmcm/d in the 184-day period from 1 May and 31 October – an unlikely scenario, which assumes that import pipelines would be filled to capacity all summer – these traders could physically bring 5.5 bcm from Europe into the “customs warehouse”. That figure is far below the 12 bcm of currently-unused Ukrainian storage capacity likely to be available to European traders.

To utilise a greater share of Ukraine’s storage capacity – and compensate for physical interconnections not operating at full capacity until later in the summer, when European interest in Ukrainian storage intensifies – this physical import capacity must be augmented by backhaul, or virtual reverse, import capacity.

Physical pipeline capacity and backhaul (virtual reverse flow)

The potential of backhaul to augment the physical capacity was shown at the start of May. On 30 April, the total physical flow was 33.0 mmcm, including 14.4 mmcm/d from Slovakia at Budince, 14.8 mmcm/d from Hungary at Beregdaróc, and 3.9 mmcm/d from Poland at Hermanowice. During the first nine days of May 2020, physical flows at Budince and Hermanowice were virtually unchanged from their levels at the end of April, while the flows at Beregovo switched entirely to backhaul.

In the period 1-9 May, daily flows were at an average of 14.2 mmcm/d (physical imports) at Budince, 4.2 mmcm/d (physical imports) at Hermanowice, 3.8 mmcm/d (backhaul) at Drozdovichi, and 19.3

¹³ ENTSOG, 2020. *Transparency Platform*; Naftogaz, 2020. *Ukraine bought 14.3 bcm of gas from the European market*.

mmcm/d (backhaul) at Bereg: a total average of 41.5 mmcm/d of imports – a level higher than the 2018 monthly average peak of 39 mmcm/d.¹⁴ In April 2020, total imports had averaged 35 mmcm/d, including physical imports of 32 mmcm/d and backhaul of 3.1 mmcm/d at Drozdovichi.

While physical imports at Budince and Hermanowice remained stable between April and May, as did the backhaul imports at Drozdovichi, the major increase was at Bereg, where the shift to backhaul saw imports rise by 5 mmcm/d, accounting for most of the growth in Ukrainian imports between late April and early May. This illustrates the impact of the opening up of backhaul import capacity.

What is backhaul (virtual reverse flow)? An example:

On a given day, the Ukrainian TSO is obliged to deliver 10 mmcm across the border to Hungary, while the Hungarian TSO is obliged to deliver 3 mmcm across the border to Ukraine. Instead of using two parallel pipelines in opposite directions, the two volumes are netted out. Instead of delivering 10 mmcm across the border to Hungary, the Ukrainian TSO only delivers 7 mmcm, while the Hungarian TSO delivers 0 mmcm across the border to Ukraine.

The term “virtual reverse” implies that, in the example above, 3mmcm has “virtually” crossed the border from Ukraine to Hungary and then “reversed” back across the border to Ukraine. Likewise, the term “backhaul” suggests that the 3 mmcm has crossed the border and subsequently been “hailed back”. Two key points to note:

First, backhaul / virtual reverse is made possible by agreements between two neighbouring TSOs as they fulfil their obligations to shippers. This makes it different from traders performing swaps.

Second, the amount of gas that can be backhauled, or virtually reversed, is limited by the larger of the two cross-border flows. In the example above, if the Ukrainian TSO is obliged to transport 10 mmcm across the border to Hungary, the most it can request as a backhaul is 10 mmcm, which would result in zero gas actually crossing the border. If the Ukrainian TSO requires more than the “forward flow” of 10 mmcm, for example, 15 mmcm, it can backhaul 10 mmcm but must also request 5 mmcm of physical flow from Hungary. Therefore, backhaul cannot be unlimited.

Although Ukrainian imports grew in May compared to April, the full import capacity is far from being fully utilised. This is because, while European storage is likely to reach full capacity this summer, it will not do so until July at the earliest, perhaps August. Therefore, European demand for Ukrainian storage and, by extension, Ukrainian imports (physical and backhaul) from Slovakia, Poland, and Hungary, will probably not intensify until June. If it does, the amount of capacity added by backhaul, over and above the physical west-to-east physical import capacity, will be a key determinant of how much Ukrainian storage capacity will be utilised by European traders, particularly in Q3 2020.

How much capacity will be added by backhaul?

On the Slovak border, GTSOU signed a new interconnection agreement with Eustream on 31 December 2019, which came into effect on 1 January 2020.¹⁵ Then, on 28 February, GTSOU and Eustream signed an agreement establishing backhaul from 1 March 2020 at the Uzhgorod/Velké Kapušany cross-border interconnection point. This new backhaul has added 10 mmcm/d of virtual reverse capacity from Slovakia to Ukraine, in addition to the existing physical capacity at Budince.¹⁶ However, this backhaul capacity has yet to be used.

¹⁴ Data supplied by GTSOU

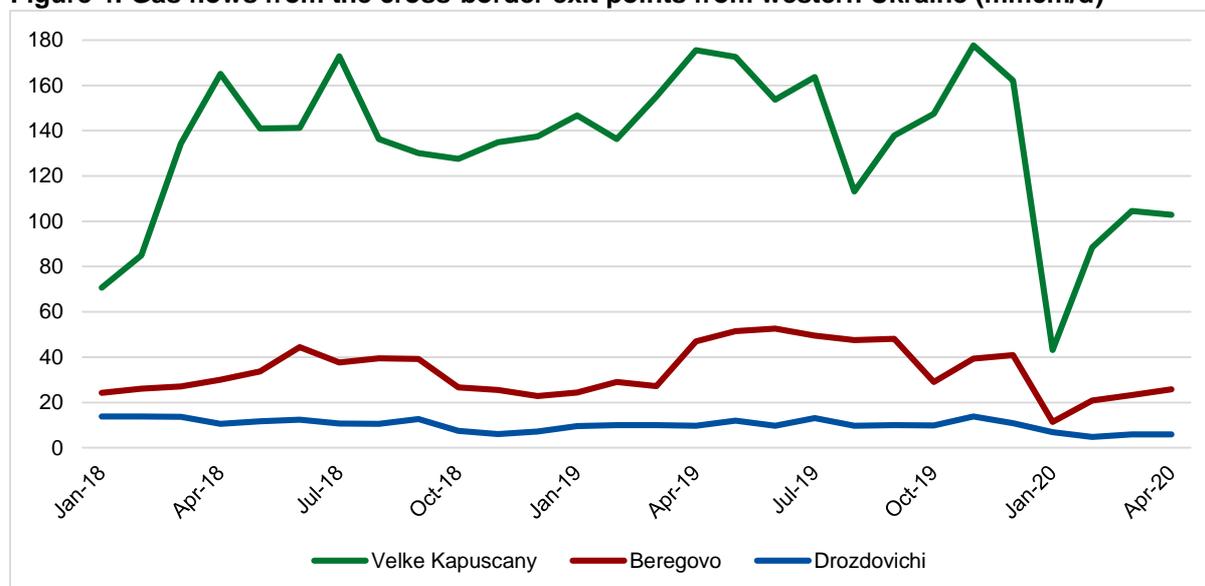
¹⁵ GTSOU, 2019. ‘Gas transmission system operator of Ukraine signed the interconnection agreements with Gazprom and EUSTREAM’. *Press release*, 31 December. <https://tsoua.com/en/news/gas-transmission-system-operator-of-ukraine-signed-the-interconnection-agreements-with-gazprom-and-eustream/>

¹⁶ GTSO, 2020. ‘Ukrainian and Slovak TSOs are launching virtual reverse flow’. *Press release*, 28 February. <https://tsoua.com/en/news/ukrainian-and-slovak-tsos-are-launching-virtual-reverse-flow/>

On the Hungarian border, GTSOU signed a new interconnection agreement with FGSZ on 20 December 2019, to come into effect on 1 January 2020.¹⁷ Then, as noted above, from 1 May, the Beregovo and Beregdaróc border points were unified into the single “Bereg” Virtual Interconnection Point. Under the new regime, 47.98 mmcm/d of firm capacity and a further 47.98 mmcm/d of interruptible capacity will be available from Ukraine to Hungary, coupled with 95.95 mmcm/d of interruptible capacity from Hungary to Ukraine.¹⁸ FGSZ reports these figures as 48.0 mmcm/d of firm and 42.7 mmcm/d of interruptible capacity from Ukraine to Hungary, and 90.7 mmcm/d of interruptible capacity from Hungary to Ukraine.¹⁹ As noted above, this backhaul capacity has now entered full operation.

On the Polish border, a new interconnection agreement was announced by GTSOU on 29 November 2019, which implemented backhaul from Ukraine to Poland at the Hermanowice cross-border interconnection point from 1 January 2020, in addition to the previously-existing physical capacity to bring gas from Poland to Ukraine at Hermanowice.²⁰ Backhaul from Poland to Ukraine at Drozdovichi began in late January, according to the chief executive of GTSOU, Sergei Makogon.²¹ GTSOU intends to combine the Hermanowice and Drozdovichi border points into a single Virtual Interconnection Point, as it did at Bereg on the Hungarian border, from 1 June 2020. According to GTSOU, at Drozdovichi, 16.75 mmcm/d of firm capacity is available from Ukraine to Poland, of which 9.02 mmcm/d is now available as interruptible virtual reverse capacity from Poland to Ukraine. As stated earlier, that backhaul capacity is already being used, providing 380 mmcm of imports in the first four months of 2020, at an average of 3.1 mmcm/d.

Figure 4: Gas flows from the cross-border exit points from western Ukraine (mmcm/d)



Data source: ENTSOG Transparency Platform

¹⁷ GTSOU, 2019. ‘New gas transmission system operator of Ukraine signed an interconnection agreement with Hungarian TSO’. *Press release*, 20 December. <https://tsoua.com/en/news/new-gas-transmission-system-operator-of-ukraine-signed-an-interconnection-agreement-with-hungarian-tso/>

¹⁸ GTSOU, 2020. ‘Ukrainian and Hungarian TSOs establish single virtual interconnection point “Bereg”’. *Press release*, 29 April. <https://tsoua.com/en/news/ukrainian-and-hungarian-tsos-establish-single-virtual-interconnection-point-bereg/>

¹⁹ FGSZ, 2020. ‘Establishment of virtual interconnection point VIP Bereg’. *Press release*, 29 April. <https://fgsz.hu/en/about-fgsz/news/establishment-of-virtual-interconnection-point-vip-bereg.html>

²⁰ GTSOU, 2019. ‘Transmission system operators of Poland and Ukraine are introducing new cooperation rules’. *Press release*, 29 November. <https://tsoua.com/en/news/transmission-system-operators-of-poland-and-ukraine-are-introducing-new-cooperation-rules/>

²¹ Interfax-Ukraine, 2020. ‘Ukraine has launched a “virtual reverse” of gas from Poland, expects to launch from Hungary and Slovakia – Makogon’. 24 January. <https://ua.interfax.com.ua/news/economic/637277.html>

The addition of backhaul agreements with Eustream, FGSZ, and Gaz-System have added a total of 90-96 mmcm/d of interruptible virtual reverse capacity for imports into Ukraine, including an increase of 71-77 mmcm/d at Bereg (Hungary) and new capacity of 10 mmcm/d at Velké Kapušany (Slovakia) and 9 mmcm/d at Drozdovichi (Poland).

In reality, not all of that interruptible backhaul capacity will be available. The maximum available will be equal to the “forward” flow of Russian gas from Ukraine to its western neighbours. At Velké Kapušany, it is clear that the 10 mmcm/d agreed with Eustream will be attainable, given the size of “forward” flows illustrated in the graph below. At Drozdovichi, flows above 9 mmcm/d were seen throughout summer 2018 and 2019, making the virtual reverse flow of 9 mmcm/d realistic, although flows in Q1 2020 were down to 5-7 mmcm/d. However, at Bereg, 91-96 mmcm/d will certainly not be achievable, given that the backhaul capacity will be limited to the size of the physical “forward” flows. Such physical flows from Ukraine to Hungary peaked at 44 mmcm/d in summer 2018 and 53 mmcm/d in summer 2019. Flows from Ukraine to Hungary in April 2020 (26 mmcm/d) were similar to those in April 2018 (30 mmcm/d) but far below flows in April 2019 (47 mmcm/d). Here, the level of 40 mmcm/d seen across much of summer 2018 might be a more realistic aim.

Therefore, a total of around 60 mmcm/d of virtual reverse flow capacity – equivalent to slightly more than 11 bcm over a six-month period from 1 May to 31 October – appears to be a realistic figure. The actual backhaul flows will be determined by European importers’ and traders’ willingness to use that capacity in order to gain access to Ukraine’s gas storage facilities.

How much gas will European traders be able to place into Ukrainian storage in summer 2020?

We suggest that, in total, 62-64 mmcm/d of physical import capacity, plus 60 mmcm/d of backhaul capacity – equivalent to 22-4-22.8 bcm over a six-month period from 1 May to 31 October – is available to bring gas into Ukraine for injection into storage, mostly in the “customs warehouse”. However, this capacity is unlikely to be fully utilised, and in any case, the maximum (currently unused) storage capacity that is likely to be available to European traders in summer 2020 is around 12 bcm. Even this 12 bcm capacity is unlikely to be fully used, given that Ukrainian imports and storage injections are unlikely to ramp up until later in the summer.

In this context, it seems entirely reasonable for the chief executive of GTSOU, Sergei Makogon, to say that he expects 5-6 bcm of gas owned by foreign traders to be brought to Ukraine over the summer, and that a maximum of 10 bcm could be brought in.²² Looking forward, we expect that demand for Ukrainian storage will grow throughout the summer, as European storage levels move toward full capacity. Three markers will illustrate this: i) Growth in daily physical imports from Europe to Ukraine; ii) Growth in daily backhaul imports from Europe to Ukraine, and iii) Growth in daily storage injections in Ukraine. The sooner this ramp-up takes place, the greater the extent to which Ukrainian storage will be able to absorb excess volumes from the oversupplied European market in summer 2020.

To sum up: i) Ukrainian storage stocks on 1 May were 16 bcm; ii) Ukrainian companies are likely to import a further 2 bcm to inject into storage for seasonal balancing; iii) European traders are likely to bring in 5-6 bcm for injection into Ukrainian storage by the end of summer, although this could rise to 10 bcm. Therefore, the total amount of gas likely to be stored in Ukraine by the end of summer is approximately 23-24 bcm, but possibly up to 28 bcm. This is still below Ukraine’s storage capacity of 30 bcm. So even if storage facilities hit “tank tops” in the rest of Europe by August, storage facilities in Ukraine are unlikely to follow suit.

²² RBK Biznes, 2020. ‘Глава «Оператора ГТС Украины» — РБК: «Мы готовы к «нулевому транзиту»’, 29 April. <https://www.rbc.ru/interview/business/29/04/2020/5ea7f3ea9a79470cffbcb550>

Conclusion: Ukrainian integration with European market

When the Ukrainian “customs warehouse” scheme was first mooted in 2017, it seemed that it would be constrained by limited demand. Among Ukraine’s western neighbours, while Poland, Romania and Moldova were indeed short of storage capacity, Slovakia, Hungary and larger markets to the west were adequately supplied. It seemed likely that Ukraine storage services would be treated as a supply of last resort. Two factors have combined to change the situation.

First, Ukraine’s market reforms have moved forward significantly. Regulation is, in its essentials, aligned with rules in EU countries. Ukraine’s industrial market, in which prices are unregulated, is supplied almost entirely by Ukrainian and foreign-based trading companies, although prices for households, the public sector and district heating companies are still regulated. Those traders also account for around half of Ukraine’s imports via its western neighbours and, although exchange trading accounts only for a small proportion of the market, prices are transparent and linked closely to the European hubs. In parallel with the tripartite talks between Ukraine, Russia, and the EU on the new transit arrangements put in place this year, Naftogaz’s transportation assets have been unbundled into GTSOU. The “customs warehouse” was launched last year against the background of these changes.

Second, of course, is the demand shock caused by the COVID-19 pandemic, and the resulting oversupply of the European gas market. Storage in central and eastern Europe was already at exceptionally high levels at the end of winter because gas had been stored in readiness for the supply interruption that never came. The COVID-19 crisis came on top of this. The Ukrainian companies and regulatory bodies, and their Slovakian, Polish and Hungarian counterparts, have reacted effectively, building the operational and regulatory infrastructure discussed above.

As the European gas market looks toward a summer when storage capacity could be completely filled, Ukraine is offering plentiful storage capacity in the “customs warehouse”, and physical interconnections with discounted short-haul tariffs supplemented by backhaul. The pieces are laid out on the board; market participants, who reacted favourably to these offers in April and early May, are likely to do so on a greater scale over the summer. Initial volumes reported for physical imports and backhaul flows have been limited, considering Ukraine’s large storage capacity. But these volumes could rise substantially as European storage facilities reach full capacity in Q3.

While injections into Ukrainian storage by European traders will, to a certain extent, act as a “safety valve” and relieve pressure on an oversupplied European market, the short-term result will also be much-needed revenues for GTSOU and UkrTransGaz in the context of lower year-on-year Russian gas transit via Ukraine. The longer-term result is likely to be the further integration of the large Ukrainian gas market with the markets of its western neighbours.