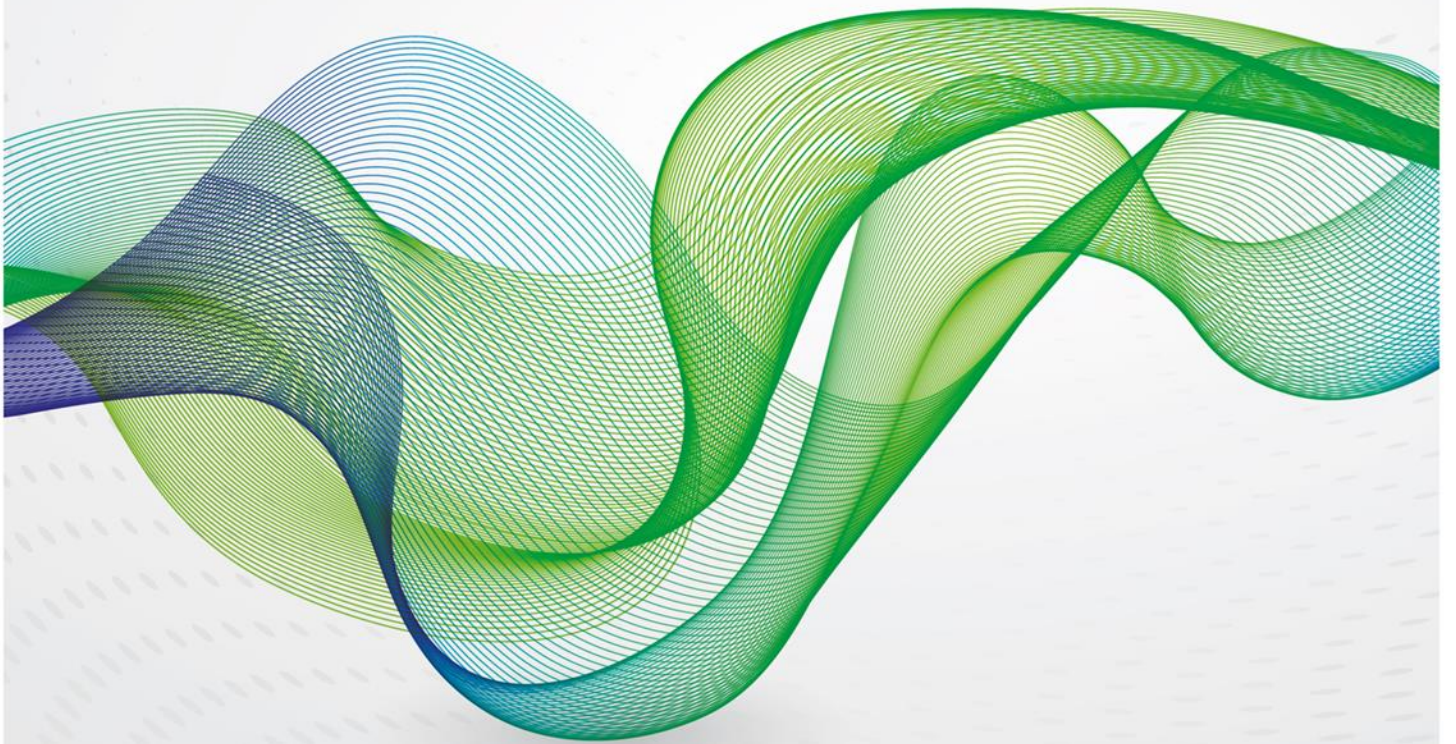


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The Curious Incident of the Nord Stream Gas Turbine



OXFORD ENERGY COMMENT

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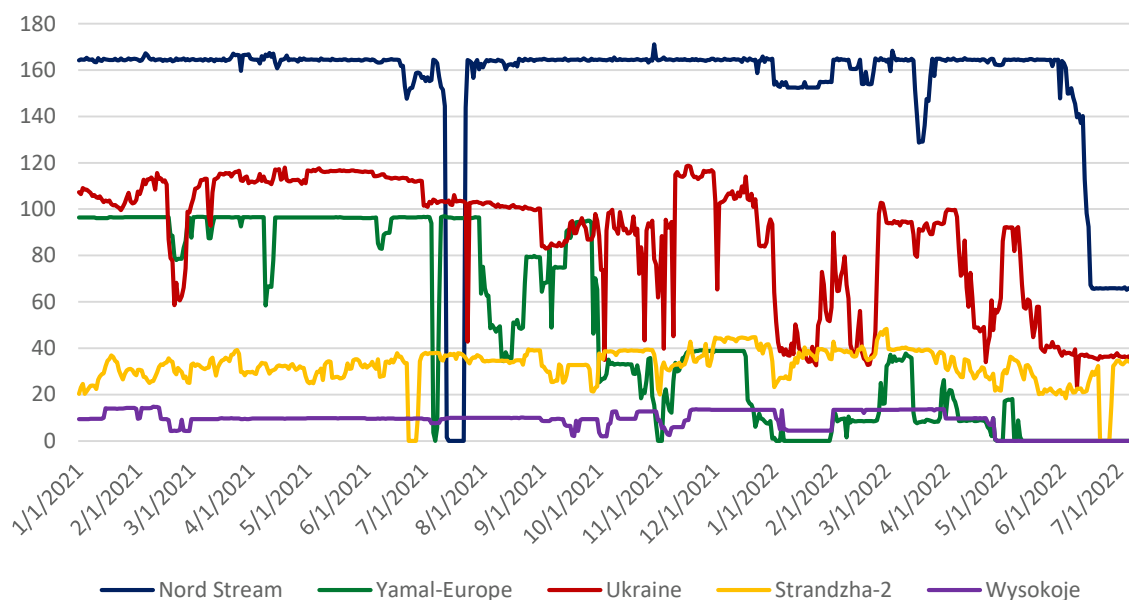
Introduction¹

While Russian gas flows to Europe via Ukraine and Belarus have been in (volatile) decline since September 2021, flows via both Nord Stream (and TurkStream) remained steady, with Nord Stream running at full capacity (167 mmcm/d). This changed on 14 June 2022 when Gazprom announced it was reducing the flow from 167 mmcm/d to 100 mmcm/d and on 16 June further down to 67 mmcm/d, justifying its actions by technical problems at Portovaya – a giant compressor station feeding Nord Stream with gas.

Gazprom's announcement, resulting in Nord Stream flows dropping by more than half in just a few days, sent shockwaves through the European gas market given that Nord Stream running at full capacity was expected to help the EU meet its gas storage filling targets and avert gas rationing in winter 2022/23. As Gazprom has not transferred displaced flows from Nord Stream to Ukraine (or any other) route – on which some capacity is available under 2019 transit agreement (although not the amount sufficient for full compensation) – and several European buyers have reported their flows being below nominations, it gave rise to renewed accusations of Russia using its 'gas weapon' against Europe. Were the technical problems at Portovaya sufficiently serious to justify such a significant reduction of flows? Nord Stream continued to flow gas at a reduced level of 67 mmcm/d until 11 July – the start date of its planned annual maintenance period – when the flows, as expected, stopped entirely.

In this Comment, we go through the timeline of the events resulting in the flow reduction, analyse the technical issues at Portovaya, as well as the legal issues and Gazprom's declaration of force majeure.

Figure 1: Daily gas flows from Russia to Europe by route (mmcm/d)



Data source: ENTSOG Transparency Platform²

¹ The authors are grateful to Dr Michal Meidan, director of the OIES Gas Research Programme, Dr James Henderson, chairman of the Programme, Dr Vitaly Yermakov, senior research fellow on the Programme, and Trefor Brayley of Saith Limited for their useful input and comments. Responsibility for all the views expressed and all the conclusions reached is solely that of the authors. The authors also thank John Elkins for editing and Kate Teasdale for administrative support.

² Note that the figure for Ukraine is the flow of gas from Ukraine to its western neighbours, which includes a small volume of gas re-exported from Ukrainian storage and excludes Gazprom's deliveries to Moldova that are also made via Ukraine

Nord Stream turbine(s): caught in the sanctions

The Nord Stream pipeline consists of two parallel lines, with a combined capacity of 165 mmcm/d. The length of the pipeline is 1,224 km. Transportation began through Line 1 in November 2011 and through Line 2 in October 2012.³ Gas is fed into the two lines from the Portovaya compressor station. Portovaya includes a gas metering station, a gas treatment unit, and two compressor buildings, each of which contains four compressors.⁴ Six of these eight compressors are 52 Megawatt (MW) units “using Siemens SGT-A65 turbines produced in Canada” and two are 27 MW units “using SGT-A35 turbines produced and overhauled by Siemens’ facility in Aberdeen”.⁵ The compressors used at Portovaya were manufactured by Rolls-Royce. Siemens Energy acquired the Rolls-Royce turbine business in 2014.⁷ (See **Technical Analysis**).

As Gazprom announced the reduction of flows through Nord Stream on 14 June, it justified its action by the technical inability of Portovaya to flow more gas, stating that only three turbines installed at the station could ‘be used at the moment’ due to ‘the failure’ by Germany’s Siemens to return one turbine ‘in due time after their repair’, ‘the expiration of time between overhauls’ set out for turbines and ‘the malfunctions detected in engines’.⁸ (See Box 1). On the same day, Siemens issued a statement confirming that a gas turbine was ‘currently unable’ to return from maintenance in Canada due to sanctions, adding that the Canadian and German governments have been ‘informed’ and were ‘working on a viable solution’.⁹ (Reportedly, another turbine was also due for maintenance in 2022 but could not be sent from Russia overseas.)¹⁰ The following day, Gazprom announced it was reducing the flow through Nord Stream further down to 67 mmcm/d, with one more turbine being taken offline, thus resulting in just two turbines being operational.¹¹

Box 1: Nord Stream flows and the ‘turbines crisis’: the timeline

14 June: Gazprom announced it was reducing the flow through Nord Stream from 167 to 100 mmcm/d with five out of eight turbines being taken offline. This led to three turbines remaining operational

15 June: Gazprom announced it was reducing the flow through Nord Stream to 67 mmcm/d as one more turbine was taken offline, leaving only two operational turbines

22 June: Canadian natural resources minister Wilkinson says the G7 will discuss the fate of the gas turbine¹²

27 June: German chancellor Scholz and Canadian prime minister Trudeau hold a bilateral meeting to discuss gas matters at the G7 meeting

³ Nord Stream. *The pipeline*. <https://www.nord-stream.com/the-project/pipeline/>

⁴ Nord Stream AG, 2011. *Landfall: the starting point of the pipelines*. https://www.nord-stream.com/download/file/documents/pdf/en/2018/12/landfall-the-starting-point-of-the-pipelines_196_20181201.pdf

⁵ Gazprom’s Exports to Europe Drop to Record Low. *Energy Intelligence*, 29 June 2022, <https://www.energyintel.com/00000181-ae4d-dfdc-ada3-aedd3a3c0000>

⁶ MESIT. *Compression Station Portovaya Gazprom*. <https://www.mesit.com/en/projects/2/compression-station-portovaya-gazprom.html>

⁷ Siemens Energy, ‘Siemens to acquire the Rolls-Royce Energy gas turbine and compressor business and enter into a long-term technology partnership’. *Press Release*, 6 May 2014. <https://press.siemens.com/global/en/pressrelease/siemens-acquire-rolls-royce-energy-gas-turbine-and-compressor-business-and-enter-long>

⁸ Gazprom, Telegram, 14 June 2022; <https://t.me/gazprom/763>; Gazprom, Twitter, 14 June 2022, <https://twitter.com/GazpromEN/status/1536680482842234887>

⁹ ‘Russian sanctions leave Nord Stream gas pipeline turbine stranded abroad’, *Bloomberg*, <https://www.bloomberg.com/news/articles/2022-06-14/russian-sanctions-leave-nord-stream-turbine-stranded-in-canada>

¹⁰ Ibid.

¹¹ Gazprom, Twitter, 14 June 2022, <https://twitter.com/GazpromEN/status/1537069093798412289/photo/1>

¹² ‘Exclusive: G7 likely to discuss Russian turbine, but may not find solution – Canada minister’, *Reuters*, 22 June 2022, <https://www.reuters.com/business/energy/exclusive-g7-likely-discuss-russian-turbine-may-not-find-solution-canada-2022-06-22/>

7 July: German energy and economy minister Habeck calls on Canada to release the Nord Stream turbine

10 July: The Canadian government announces that it had issued a “time-limited and revocable permit” to exempt the return of turbines from its sanction regime

11 July: Politico reported that the permit applies to six turbines

12 July: Ukrainian diaspora in Canada started a legal action aimed at annulling the permit

12 July: Canadian media reports the permit allows Siemens to send turbines from Nord Stream to Siemens Canada's plant in Montreal for regular repair and maintenance

13 July: Siemens confirmed that only one turbine is currently in Montreal having undergone maintenance and that its goal is to transport it back to Russia ‘as quickly as possible’

13 July: Gazprom announced it does not have any confirmation of Siemens’s ability to get the gas turbine engine to Portovaya from Canada and is therefore unable to comment on future operation of Nord Stream

15 July: Gazprom announced it has requested Siemens to provide the documents necessary for transferring the turbine engine to Portovaya and to fulfill its obligations on repair and maintenance of gas turbine engines

18 July: Russian media reports the gas turbine has left Canada by plane for Germany, to be subsequently transported to Russia where it is expected to arrive around 24 July

18 July: Reuters reports of Gazprom retroactively declaring force majeure on supplies from 14 June, in a letter dated 14 July, addressed to several European buyers including German companies Uniper and RWE. Uniper has reportedly challenged the claim of force majeure.

The Canadian sanctions legislation, which entered into force on 17 March 2022,¹³ imposed “an asset freeze and dealings prohibition” on designated Russian persons, including Gazprom. The legislation specifies that it is prohibited for any person in Canada and any Canadian outside Canada to: “deal in any property, wherever situated, held by or on behalf” of such designated person; “enter into or facilitate, directly or indirectly, any transaction related to such a dealing”; “provide any financial or other related services in respect of such a dealing; make any goods, wherever situated”, available to such person; “provide any financial or related service to, or for the benefit of,” such person.¹⁴ This wording appears to suggest that bringing the turbines to Canada, repairing them in Canada, and taking them out of Canada would have been considered a violation of sanctions. The turbines’ maintenance schedule, to the extent that it requires repairs in Canada and cannot be conducted in Russia, was effectively put on hold by the sanctions regime. As a result, Gazprom was able to claim that sanctions have impeded its ability to flow gas through Nord Stream, when the other turbines stopped operating as Gazprom shut them down. This legislation was consistent with that of other sanctioning countries, based on the Russian invasion of Ukraine and, despite the fact that it has had unintended negative consequences on European gas security.

The German chancellor Scholz and the Canadian prime minister Trudeau had a bilateral meeting at G7 on 27 June and the German energy and economy minister Habeck publicly called on Canada to release the repaired turbine on 7 July¹⁵. After intense consultations, the EC, Ukraine and other players, the

¹³ Government of Canada, Canadian sanctions related to Russia, https://www.international.gc.ca/world-monde/international_relations-relations_internationales/sanctions/russia-russie.aspx?lang=eng

¹⁴ Government of Canada, Special Economic Measures Regulations (Russia), <https://laws.justice.gc.ca/eng/regulations/sor-2014-58/fulltext.html#h-810988>

¹⁵ 'Trudeau pokert mit Scholz: Kanada behält Nord-Stream-Turbine und bietet Deutschland Flüssiggas', *Berliner Zeitung*, 28 June 2022 (in German), <https://www.berliner-zeitung.de/wirtschaft-verantwortung/trudeaus-pokert-mit-scholz-kanada-behaelt->

Canadian minister of natural resources Wilkinson issued a statement on 10 July confirming Canada's consent to grant 'a time-limited and revokable permit' to allow the return of repaired Nord Stream turbines to Germany.¹⁶ Politico and the Canadian media subsequently reported that the permit would allow Siemens Energy to send up to six turbines to its facilities in Montreal for regular repair and maintenance for 2 years.¹⁷ By granting such a permit, Canada appears to have re-instated the turbines maintenance schedule and granted Gazprom temporary and limited access to Siemens repair and maintenance service. The Ukrainian government, although consulted on Canada's decision, has vehemently opposed it, whereas the Ukrainian World Congress, a Ukrainian diaspora group in Canada, filed a request for judicial review seeking to annul the permit.¹⁸ The U.S. has supported Canada's decision to grant a permit.¹⁹

On 13 July Siemens confirmed its goal 'to transport the turbine to its place of operation 'as quickly as possible', adding that the 'political export decision is a necessary and important first step for the delivery of the turbine,' and noting that its experts were 'working intensively on all further formal approvals and logistics', including 'legally required export and import control procedures.'²⁰ However, Gazprom appears to have adopted a 'trust but verify' approach as on the same day, 13 July, it announced it did not have any documented confirmation of Siemens's ability to get the gas turbine engine back to Portovaya and on 15 July requested Siemens to provide the documents necessary for transferring the turbine engine, reserving its judgment on Nord Stream's future operation until it received the documents. On 18 July, Russian media reported the turbine had left Canada by plane for Germany, to be subsequently transported to Russia by ferry and on land via Finland. It is expected to arrive at Portovaya around 24 July. It will then take another three to four days to install and prepare the turbine for operation. The turbine would therefore not be back in service until the end of July at the earliest, and more likely early August.²¹

According to Reuters, on the same day as the turbine had reportedly left Canada – 14 July – Gazprom declared force majeure on its supplies, backdated to 14 June – the date when Gazprom first reduced supplies via Nord Stream – to several European buyers, including Germany's Uniper.²² Uniper was one of the European companies reporting their flows below nominations in the aftermath of Nord Stream flow reduction.²³ It has reportedly challenged the claim of force majeure²⁴. Gazprom may have decided to declare FM to protect its legal position (see **Legal Analysis**) while at the same time putting pressure on the West to create a sanctions-proof repair and maintenance process and prevent the Canadian permit from being revoked.

nord-stream-turbine-und-bietet-deutschland-fluessiggas-li.241270; 'Germany's Habeck urges Canada to help thwart Putin on gas', *Bloomberg*, 7 July 2022,

<https://www.bloomberg.com/news/articles/2022-07-07/germany-s-habeck-urges-canada-to-help-thwart-putin-s-gas-excuses>

¹⁶ Minister of natural resources, Twitter, 10 July 2022, <https://twitter.com/JonathanWNV/status/1545933060129951747>

¹⁷ 'Nord Stream nightmare: has Putin stopped Europe's gas for good?', *Politico*, 11 July 2022,

<https://www.politico.eu/article/europe-russia-energy-gas-crunch-nord-stream-shutoff-ukraine-war/>; 'Ottawa's deal to allow

repair of Russian-owned turbines covers longer period than previously disclosed', *The Globe and Mail*, 12 July 2022,

<https://www.theglobeandmail.com/politics/article-canadas-deal-to-allow-repair-of-sanctioned-russian-turbines-covers/>

¹⁸ 'Ukrainian group to sue Canada for returning Nord Stream 1 turbine', *Reuters*, 13 July 2022,

<https://www.reuters.com/business/energy/ukrainian-group-sue-canada-returning-nord-stream-1-turbine-2022-07-13/>

¹⁹ U.S. Department of State, 'The United States supports Canada's decision to return turbine to Germany', press statement, 11

July 2022 <https://www.state.gov/the-united-states-supports-canadas-decision-to-return-turbine-to-germany/>

²⁰ 'Siemens aiming to return Nord Stream turbine 'as quickly as possible', *Platts European Gas Daily*, 13 July 2022.

²¹ 'Труба двинулась по назначению', *Kommersant*, 18 July 2022 (in Russian), <https://www.kommersant.ru/doc/5468944?>

²² 'Exclusive: Russia's Gazprom tells European buyers gas supply halt beyond its control', *Reuters*, 18 July 2022,

<https://www.reuters.com/business/energy/russias-gazprom-declares-force-majeure-gas-supplies-europe-2022-07-18/>

²³ 'Nord Stream 1 gas supply cut aimed at sowing uncertainty, Germany warns', *Reuters*, 15 June 2022,

<https://www.reuters.com/business/energy/german-minister-accuses-russia-finding-excuse-cut-nord-stream-1-gas-2022-06-15/>

²⁴ 'Russia nears gas shutdown in Europe as Germany rejects claims it can't fulfill contracts', *CNBC*, 19 July 2022,

<https://www.cnbc.com/2022/07/19/russia-nears-gas-shutdown-in-europe-as-germany-rejects-claims-it-cant-fulfill-contracts.html>

Technical Analysis²⁵

The Nord Stream pipeline is unusual in that during normal operation the flow rates are nearly 100% of capacity throughout the year, an ideal operating condition for any pipeline.

The design and construction of on-shore gas transmission pipelines are governed by a strict set of international engineering codes that ensure that the pipelines operate safely, and all potential risks are mitigated. In practice this means that the pipelines have a maximum operating pressure in the range of 70 to 80barg. As with all fluids and gases, natural gas pipelines experience pressure drops over distance caused by internal wall friction. The lower the pressure, the less volume of gas transported, so to counteract this, compressor stations are situated along the length of the pipeline. They normally have an inlet pressure around 30barg²⁶ and boost the gas pressure back to 80barg. For large throughput pipelines the compressors are powered by gas turbines, similar to jet engines but fed by natural gas.

For subsea pipelines the maximum pipeline pressure is governed more by the material properties of the pipeline than by potential safety issues arising from proximity to areas of population. For the Nord Stream pipeline, the maximum pressure is 220barg. The higher pressure means that the gas can travel considerably longer distances before the need for re-compression, in this case over 1,200km. The compressor stations are critical to the operation of the pipeline: if they fail for whatever reason, the pipeline ceases to function.

As noted above, the station for compressing the natural gas prior to the subsea section of the Nord Stream pipeline is situated at Portovaya in western Russia and has a capacity of 366-MW. From published information it is not possible to determine the configuration of the station, for instance, how many compressor turbines are required for normal operation. Nevertheless, a number of the compressor turbines will need to be available in the event of equipment failure. The compressor turbines will be operated sequentially such that all of them are used during any given period of time, and the spare equipment does not sit idle until it is required in an emergency. When five of the eight compressor turbines were taken offline, a possible explanation was that one or more of the turbines were not operating so that they could be used as back up to the operating turbines, i.e. the turbines are perfectly fit to operate but the safe operating configuration requires one or more back-up turbines to be available. While this may be seen by some as overly cautious, it could be justified on safety grounds.

The removal of gas turbines from the compressor station site to carry out routine maintenance is unusual; the systems are usually designed so that any necessary work can be carried out on site. However, the reason for sending the gas turbine to Canada, where it was reportedly manufactured, may have been that it needed major repairs and/or was due a major overhaul. It is unclear whether any of the other turbines will need to be sent to Canada for any repairs or major overhaul, but the fact that five of the turbines were taken offline suggest that Gazprom intends to send at least some of them to Canada.

Another possibility that has been discussed is that other gas turbines on the Gazprom system could be used to replace the Siemens turbines which are not operating. The Nord Stream 2 compressors are in place at the Slavanskaya CS and consist of 11 gas pumping units with a total capacity of 352 MW. These gas turbines are Russian made Ladoga 32 MW units. While theoretically it may be possible to install different gas turbines, this may require significant work to be undertaken and Gazprom may be unwilling to undertake such work.

²⁵ This section is based on a discussion with a pipeline engineer.

²⁶ Barg means gauge pressure and is the difference between absolute pressure and atmospheric pressure, whereas Bar is the measure of absolute pressure.

Legal Analysis

The legal structure surrounding the Portovaya CS and Nord Stream is quite complex. Portovaya CS is managed and operated by Gazprom.²⁷ Nord Stream - the transporter – is a separate entity; Gazprom Export is probably the shipper on Nord Stream and also the seller of gas to European buyers.

The legal processes for curtailing the flows on Nord Stream will be covered in the gas transportation agreement. The exact details are not publicly available, but typically the agreement would include provisions for maintenance. Scheduled Maintenance would be for a maximum number of days in a contract year and it would seem to be for the July 11 to 21 period on a regular basis. Under the agreement, Nord Stream would have given notice to the shippers on the length and timing of the Scheduled Maintenance. As well as the Scheduled Maintenance, there are probably provisions for Exceptional Maintenance, which may take place at any time during the year but only with notice being given and for a maximum number of days in any contract year. In addition, there might also be a provision for Extraordinary Maintenance that occurs if the Scheduled Maintenance period is expected to be extended for any reason. Again, notice would have to be given for such maintenance and it would also be time-limited.

The reduction of capacity and flows on Nord Stream in June would not appear to be related to any sort of maintenance. The only other reason that capacity and flows might be curtailed is through an Emergency when there has been a significant event which disrupts flows. An Emergency, however, is generally for a limited time, and if it was a major disruption then the pipeline would likely call a Force Majeure (FM).

If Gazprom considered the non-availability of the gas turbines for the compressors a case of FM, then Gazprom PJSC, as the operator of Portovaya CS, would have to issue a notice of FM to Nord Stream. In turn, Nord Stream would issue a FM notice to Gazprom Export (based on the Portovaya FM notice) and Gazprom Export a FM notice to its European buyers (based on the FM notice from Nord Stream), stating that nominations are likely to be limited to a specific level – a percentage of the maximum daily contract quantity (DCQ). As noted earlier, it seems FM was declared by Gazprom on July 14, with retrospective effect from June 14. This seems a long time after the FM event but the notice period would be covered in the contracts.

The buyers, however, can challenge the FM notice, and it would then go through the dispute resolution process in the contract. The curtailment of flows would stand during this process. Notably, Uniper has already rejected the FM notice.²⁸

If an FM notice was not issued by Gazprom Export to the buyers, then the buyers would have a claim for non-performance and could submit a claim for damages from Gazprom Export. The extent of these damages would depend on the contractual terms - this could be direct loss or some form of liquidated damages, but there could be a cap on liability in the contract. Ultimately if there is continued non-performance then the buyers can terminate the contracts.

It is important to note that an FM event does not mean that there will be no flows on the pipeline, only that the flows are lower than the capacity booked by shippers. Effectively it means “we can’t meet your nomination but will deliver as much as is technically feasible”.

Conclusion

This Comment has discussed the technical issues at Portovaya, as well as the legal implications of Gazprom’s declaration of force majeure in order to understand whether Gazprom’s decision to reduce flows through Nord Stream was aimed at establishing a sanctions-proof regime for Nord Stream turbines repair and maintenance thus ultimately safeguarding rather than undermining its future gas

²⁷ Nord Stream AG, 2011. *Landfall: the starting point of the pipelines*.

²⁸ ‘Exclusive: Russia’s Gazprom tells European buyers gas supply halt beyond its control’, *Reuters*, 18 July 2022.

flows to Europe—or whether this was a pretext for reducing gas flows to Europe with a view to forcing it into geopolitical concessions over Ukraine. There are genuine technical complexities in the operation of the Portovaya CS and Nord Stream, related to the maintenance and sanctions regime, but these may have, nonetheless, allowed Russia to increase the pressure on the European gas market and the EU.

The decline in gas flows along Nord Stream, began on June 14, with one of the gas turbines being “stuck” in Canada as it could not be returned after its maintenance/repair because of sanctions imposed by Canada, consistent with other western sanctions initiatives, and other units also being taken offline. These other compressors were taken offline as they were also supposedly in need of a major overhaul, probably in Canada, together with the need to keep one or more fully operable turbines as back-up.

In consultation with the US and the EU, Canada subsequently lifted the sanctions on the turbine and any other turbines in need of major overhaul for a time-limited period of two years. The turbine that had been overhauled in Canada is now reportedly on its way back but may not be back in service until early August. There has been no word yet on what is happening to the remaining turbines which are offline and may need to be sent to Canada.

On July 14, Gazprom reportedly issued FM notices to at least some of the buyers, effective from June 14. The exact procedure for issuing FM notices under the contracts is not known. While delaying the issuance of a FM notice for 30 days after the event seems overly long, it could be covered by the contractual terms.

So, even though there are technical reasons that explain Gazprom’s actions, the pressure that reduced flows place on Europe was probably not lost on the company either. The ensuing spike in prices would more than offset any reduction of revenues from lower flows and could complicate European storage filling targets. But it is unclear if Gazprom is looking to cut flows this winter.

The fact that a turbine was delayed in its return from Canada does not appear to be, on its own, a reason to reduce flows, but once taken with the decision to stop the operation of more turbines, because they were due an overhaul and/or service, then the reduction in flows was inevitable. This did not mean that the turbine compressors could not operate but, if they continued to run, Gazprom argued that any continued operation would breach the operational warranty. In addition, ceasing the operations of all but two compressors on the grounds that at least one operational turbine was needed to back up two operating turbines may be justified on operational safety grounds.

The issuance of FM notices by Gazprom should not have been too much of a surprise. Standard FM clauses would include as a reason “unavailability of facilities or materials”. The surprise is that it took 30 days to issue the FM notice, effectively backdating it to June 14, when the flow reduction began. The contract terms will specify the procedures for issuing FM notices and the maximum time period they can be issued after the FM event in question, but 30 days does seem a long period of time to elapse before issuing the FM notice.

Issuing a FM does not necessarily mean it is a valid FM event. That will depend on the terms of the contracts and at least one European buyer has challenged the FM. If this becomes the subject of litigation, it could take years to resolve. In the meantime, the impact of the alleged FM on flows could continue. An additional question, however, is whether Gazprom could have taken more steps to mitigate the reduction in flows. By invoking FM, Gazprom will have to demonstrate its actions were (and continue to be) consistent with taking “as soon as reasonably practicable, all reasonable and necessary steps to rectify the Event of Force Majeure”²⁹. Indeed, the FM may not be valid if it could be shown that Gazprom should have had any relevant spare parts and equipment on site, acting as a “reasonable and prudent operator”.

²⁹ Example of standard language from FM clause

One possible step could be to bring in any spare turbines that Gazprom may have elsewhere on its pipeline system. The compressor station for Nord Stream 2 at Slavyanskaya is clearly not being used; Could the turbines from that CS be moved to Portovaya to replace, even temporarily, the non-operational turbines at Portovaya? The turbines appear to be of similar size and it may have been possible for Gazprom to transfer them to Portovaya and undertake any required engineering work. This might be considered as a “reasonable and necessary step to rectify the FM”. However, Gazprom is more likely to offer to transport displaced gas through Nord Stream 2, but the chances of this being politically acceptable for Germany and the EU would seem to be zero.

As this Comment goes to print, it is not known whether and at what level Nord Stream will re-start flows once its annual maintenance is concluded on 21 July. It is reasonable to assume that flows might come back on at their levels before maintenance on 11 July, assuming the two compressor units are still operational, but possibly no more immediately. It is possible that Gazprom may decide to wait until the repaired turbine arrives from Canada and is installed, with no flows until that is operational at some stage over the next two weeks. Gazprom’s FM notices should not be seen as a sign that there will be no flows on Nord Stream once maintenance has ended — as FM can be issued for flow reductions and not just for complete interruption. While it cannot be ruled out that there will be no flows on Nord Stream after 21 July, this scenario does seem unlikely.

In comments to reporters on 20 July, Russian President Putin stated that while currently two Nord Stream turbines are operational, one of them would have to be taken away for repairs before the end of July.³⁰ Therefore he expects that if the turbine from Canada is not received in time for the restart of Nord Stream, then flows will drop to 30mmcm/d. He also stated that it is not sufficient for the turbine to be returned from Canada, it is also necessary for the legal documentation to be received stating that the turbine – and other turbines which may be received from Canada – are definitively not under sanctions. Putin’s comments did not suggest any possibility of substituting turbines from any other source.

With regards to the other two large turbines that were offline, (after the two operational and one as backup, plus the one in Canada), if they are only due minor maintenance which can be carried out in Russia, then they could be brought back into operation on July 21, potentially increasing the flows above the rates prior to the maintenance shutdown, but not back to full capacity. However, given the recent comments by President Putin above, if the remaining larger offline turbines need to be returned to Canada (plus the one operational one), Nord Stream flows could not exceed 30mmcm/d. Once the turbine from Canada (and all the attendant documentation) is received and fitted, Nord Stream would once again be running on two turbines. This could bring flows up to its pre-maintenance level of 67mmcm/d (40% of capacity). Preserving Nord Stream flow at 67mmcm/d and increasing it further, potentially to full capacity, would only be possible if more turbines are sent to Canada, serviced and returned – a process that could take months.

³⁰ Vladimir Putin answered media questions, 20 July 2022 (in Russian), <http://kremlin.ru/events/president/news/69036>