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THE OXFORD INSTITUTE FOR ENERGY STUDIES

Quarterly Gas Review
Analysis of Prices and Recent Events

Analysis of Prices and Recent Events

Thanks to Argus Media, we updated our "LNG tightness" metric that measures the spread between the US Gulf Coast LNG FOB and the Henry Hub price. It is interesting to keep track of this 'LNG tightness' in a fast-changing energy world.

In Europe, the Brexit unknowns are increasing, and the gas markets have still not been properly addressed, leaving little time before March 2019 to find a commonly agreed solution not only for the short but also the long-term. We are now seeing industry lobby groups like Eurogas and Eurelectric interfering in those Brexit energy issues, making them less likely to be solved.

This is why more and more planning is going into the event of a no-deal Brexit scenario, like the introduction of a UK Carbon Emissions Tax (16 £/t) on top of the existing UK Carbon Price Support (18 £/t) and setting the total carbon price in the UK at 34 £/t to offset the impact of a UK withdrawal from the EU Emissions Trading System (EU ETS). This new Carbon Emission Tax is supposed to mirror the EU ETS situation as long as CO_2 prices stay around 18 €/t in Europe.

Quarterly Focus: A very special European gas year ahead

The industry is closely watching European storage levels to get a better picture of the supply-demand balance. We argue in this section, that recent trends are not useful for monitoring 2019/2020. With no-deal for post-2019 Ukrainian transit and Nord Stream 2 unlikely to be in operation by then, we believe that European storages will have to be filled to their maximum effective level ahead of the 2019/20 winter.

Storage levels next summer could provide an indication of the timing of a Ukrainian transit deal. If a deal can only be reached at the last minute (or even later in January 2020), EU-27 storage will need to reach 97% full by October 2019, much higher than the 87% and 89% recorded respectively in October 2018 and 2017. In the summer of 2018 extra storage need (69 TWh) was the main reason for European hub prices to move up when demand was going down. If Europe needs another 105 TWh for storage alone in the next 12 months, (i.e. to get up to 97%) it could further tighten the regional supply-demand balance, as this is not taken into account by the actual market consensus scenario.

In a perfect world, we could expect more foreign supply (from LNG and Gazprom restarting Turkmen gas re-exports) to balance the European system in 2019 and a competitive fixed price deal for transiting gas via Ukraine. But mixing policy and economics doesn't mean the best outcome will be achieved. Hence the market could face high level uncertainties about the Ukrainian transit contract renewal and the Nord Stream 2 start-up and ramp-up, making the 2019/2020 gas year very interesting.

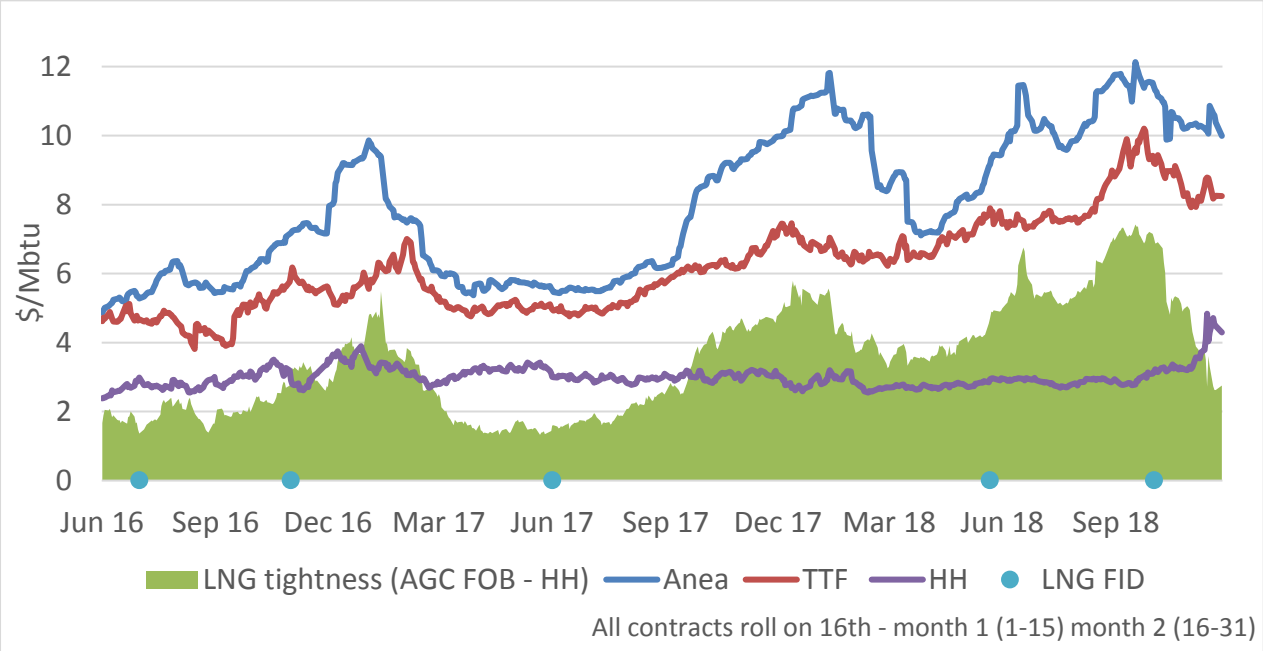
Our scenario suggests that even if Nord Stream 2 is not operational in early 2020, Gazprom could refrain from signing an uncompetitive long-term contract with Naftogaz transport because filling EU-27 storage to its maximum level could help mitigate the expected transit risk.

Analysis of Prices and Recent Events

Our 'LNG tightness' indicator[1] graph designed with the kind assistance of Argus Media shows:

- TTF Month Ahead (Netherlands) which reflects hub pricing in Europe for both pipeline gas and LNG
- HH Month Ahead (US) which reflects pipeline gas pricing in North America
- ANEA Month Ahead which reflects DES LNG spot pricing in Northeast Asia as assessed by Argus
- The AGC[2] LNG FOB – HH spread, labelled 'LNG tightness': a low spread would suggest a close alignment of worldwide prices (due to higher US prices or increased global competition) while a high spread would suggest that LNG needs to be attracted to demand centres in Asia, Europe, Latin America or the Middle East. A prolonged high spread could also be indicative of the need to invest in new liquefaction capacity. This spread shows the sensitivity of the LNG market: it normally slackens in the summer when Northern Hemisphere gas demand falls but gets tighter during the winter as demand increases
- To better monitor when Final Investment Decisions (FIDs) are taken for LNG projects we also add them.[3]

Figure 1: Worldwide gas prices and LNG tightness



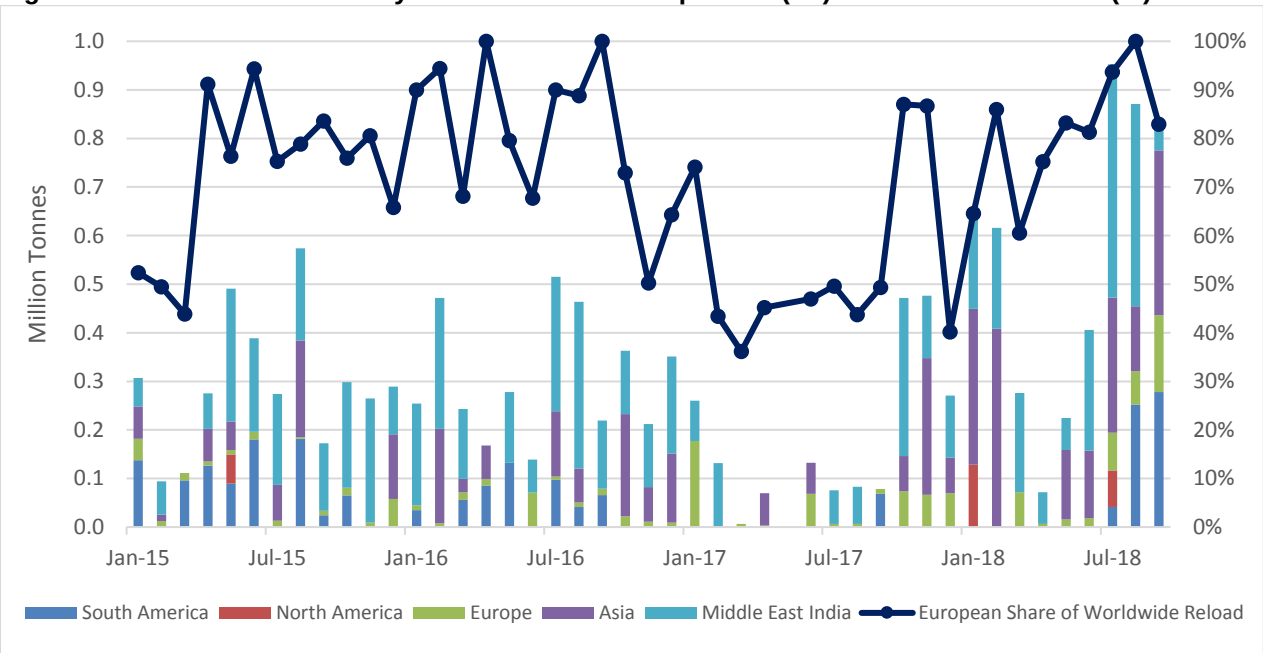
Source: Argus Media, thierrybros.com

[1] T. Bros, March 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-analysis-prices-recent-events/
[2] Since August 2018, Argus has renamed its US Gulf Coast LNG FOB to Argus Gulf Coast LNG FOB (AGC LNG FOB) to better distinguish the Argus physical price assessment from calculated values of Gulf Coast LNG.
[3] For detailed information please refer to Quarterly Gas Review – Issue 2 by T. Bros, June 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-analysis-prices-recent-events-issue-2/

Since October 2018, Anea and TTF prices went through a bearish phase like the oil, EU Emissions Trading System (EU ETS) and equity markets as the consensus revised down economic growth and hence oil and gas demand going forward. In the US, HH prices moved up close to 5$/Mbtu in November 2018, as concerns arose that low storage levels (15-year historic low levels) won't be enough to meet winter heating demand in case of a cold winter, even as production is at record high.

Freight rates reached a record high above 170,000$/day in November (from lows of 50,000$/day in April) as there is no more shipping available from independent shipowners. At those rates, the cost of shipping represents c. 40% of the Anea price. Which explains why Northwest Europe has seen a boom in LNG imports as the arbitrage is closed for re-exports. If this continues there is a possibility that more Yamal cargoes will be left in Europe over the winter, boosting the load factor for European regas.

Figure 2: Destination of monthly EU reloads & transhipments (mt) and worldwide share (%)

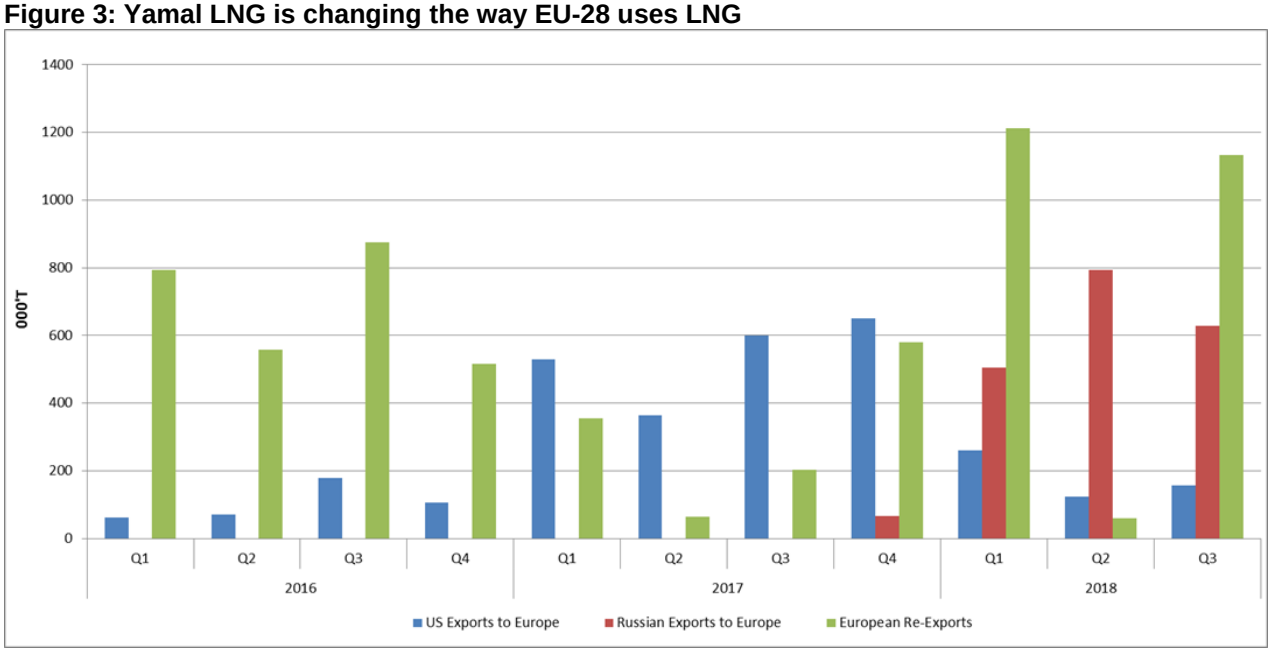


Source: Kpler

This graph is a perfect illustration of the uniqueness of the EU's ability to provide this service and an example of the profit that could be made if Europe becomes the worldwide energy storage provider.[4] Those reloads are not only profitable for regas terminals and LNG traders but also provide opportunity to avoid closure of any gas storage that, for now, provides the only worldwide buffer for any unexpected events that could be technical, political or the extreme weather patterns we are witnessing more and more. In September, Novatek shipped its first Yamal LNG cargo to Brazil.[5] In fact, the cargo was transhipped at Zeebrugge.

[4] More info in T. Bros, Quarterly Gas Review – Issue 3, September 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-issue-3/
[5] http://www.novatek.ru/en/press/releases/index.php?id_4=2682

Figure 3: Yamal LNG is changing the way EU-28 uses LNG

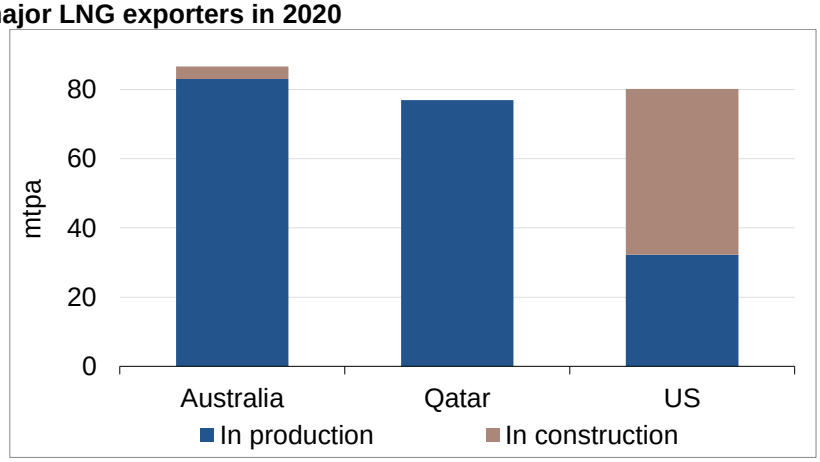


Source: Cedigaz Preliminary data (re-exports are from the terminal storage tanks not from transshipments)

Thanks to trading markets, the EU is able to take the cheapest LNG, from Yamal, which has pushed out US LNG in H1 2018. But with reloads from Europe to Asia well out of the money for the remainder of the Winter 2018-19 we expect record regas deliveries into Europe this winter. Markets are the best and most efficient way to improve security of supply while reducing overall prices.

With Australian Ichthys 8.9 mtpa project up and running[6] since October, Australia has now become the largest worldwide LNG producer on a capacity basis, ahead of Qatar, which has now a new 110 mtpa target for 2024.[7] But Australia will have to wait at least until 2019 to become the biggest LNG exporter on a FY basis. In the US, Cheniere Sabine Pass train 5 and Corpus Christi train 1 went on-line respectively in October[8] and November. And finally, in November, Novatek started production from Yamal LNG train 3.[9]

Figure 4: The 3 major LNG exporters in 2020



Source: GIIGNL, thierrybros.com

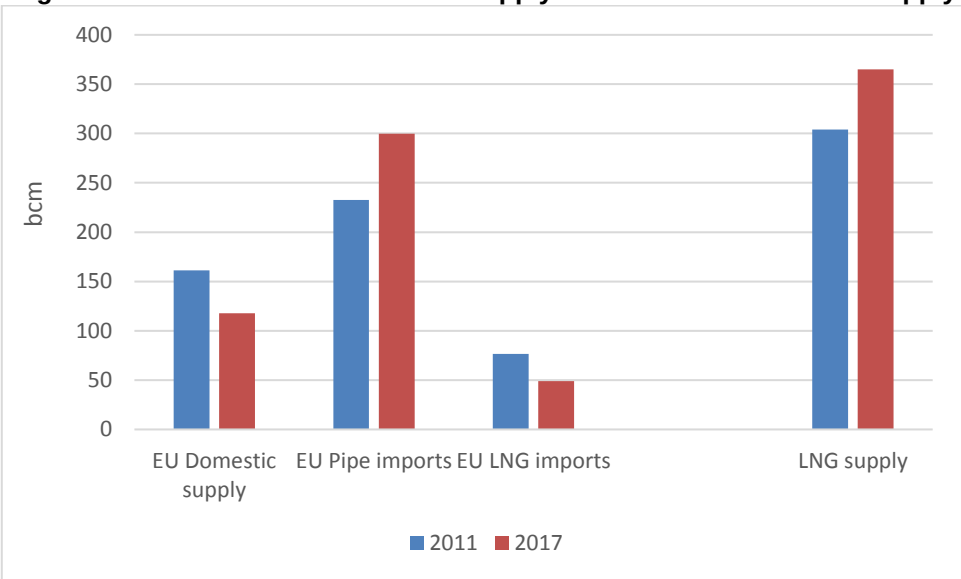
[6] http://www.inpex.com.au/news-media/news/inpex-confirms-first-lng-cargo-from-ichthys-lng-project/
[7] As none of the extra 33 mtpa are FID, they are not included in figure 4.
[8] http://phx.corporate-ir.net/phoenix.zhtml?c=101667&p=irol-newsArticle&ID=2376205
[9] http://www.novatek.ru/en/press/releases/index.php?id_4=2828

The remaining project still not operational in Australia is Prelude FLNG. With a May 2011 FID,[10] this project has now taken more than 7 years construction and is one year late.[11]

Kinder Morgan in its results[12] on 17 October 2018, pushed back again the expected in-service date for the Elba Liquefaction Project from Q4 18 to Q1 19 and updated on the total cost of "the nearly $2bn".

The "oversupplied" LNG has been mopped up by China and Europe still received 27.5 bcm less LNG in 2017 than during the 2011 peak (while having the same demand level c. 470 bcm but with imports requirements up from 309 to 349 bcm (+13%)). The LNG bubble has not materialized even in 2017 and should not materialize in the foreseeable future as spare production capacity is declining fast.[13]

Figure 5: Changes between 2011 and 2017 in EU supply mix and worldwide LNG supply



Source: BP Statistical Review – June 2018, GIIGNL, thierrybros.com

More important than demand forecasts is now the ability of the industry to grow supply post-2022.[14] The gas industry started to solve this investment problem with Cheniere[15] in May 2018 taking Final Investment Decision (FID) on Corpus Christi LNG expansion. On 2 October, a FID was taken by LNG Canada shareholders (Shell 40%, Petronas 25%, PetroChina 15%, Mitsubishi 15% and Kogas 5%) with first LNG

[10] https://www.shell.com/media/news-and-media-releases/2011/fid-flng.html
[11] https://www.theaustralian.com.au/news/bn-prelude-floating-plant-has-shell-fired-for-lng/news-story/ac91ce9c044be11681a5c6da79ddd057#&gid=null&pid=1 and http://www.inpex.com.au/media/2061/inpex_australia_brochure-spreads.pdf
[12] https://ir.kindermorgan.com/sites/kindermorgan.investorhq.businesswire.com/files/report/additional/KMI_Q3_2018_8-K_Exh_99.1_for_IR.pdf
[13] More info in T. Bros, Quarterly Gas review – Issue 3, September 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-issue-3/
[14] For more information please refer to the spare capacity calculations provided in T. Bros, Quarterly Gas review – Issue 3, September 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-issue-3/
[15] T. Bros, Quarterly Gas Review – Issue 2, June 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-analysis-prices-recent-events-issue-2/

expected before the middle of the next decade.[16] In its presentation,[17] Shell estimates the total cost of this LNG delivered into Asia at around 7.1$/Mbtu, or 0.6$/Mbtu cheaper than its estimate of a greenfield US Gulf Coast development, mostly because of lower shipping costs. This FID also allowed Shell to partially reverse a 2015 impairment related to the Groundbirch unconventional gas project in British Columbia, which could provide equity gas to this liquefaction plant.[18] It is worth underlining that this is the first ever LNG project where FID has been taken without any long-term contracts. This could be explained by a combination of:

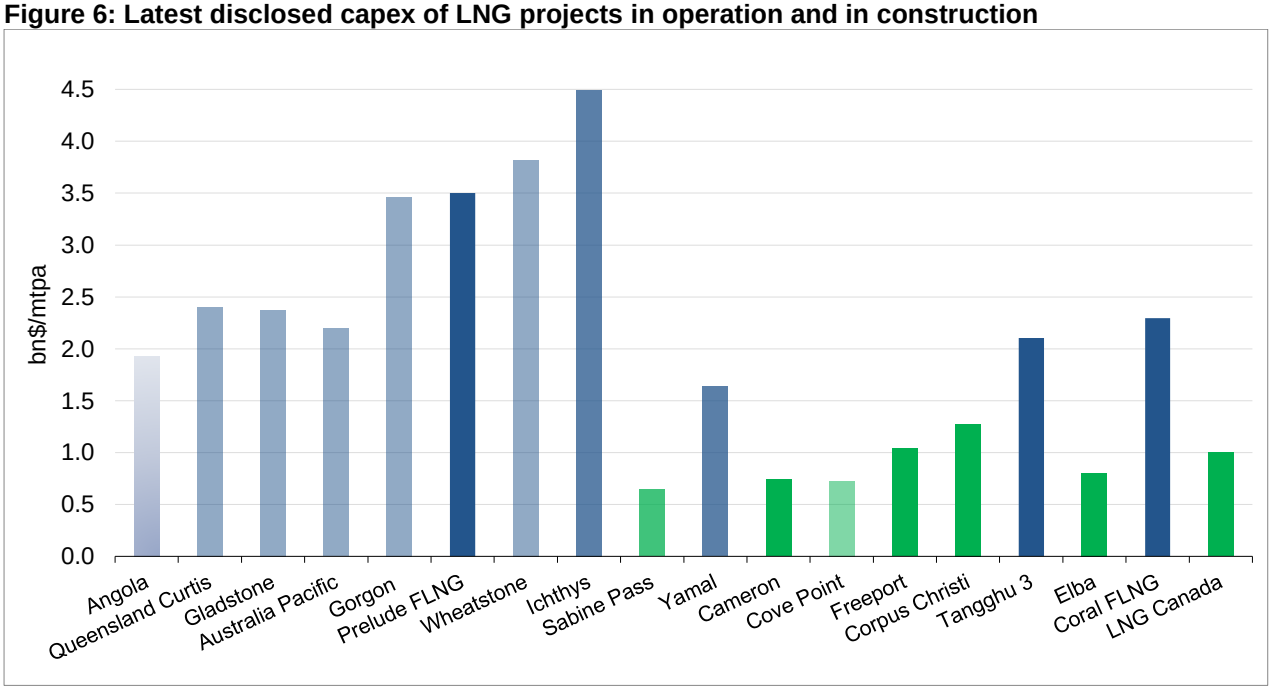
1. Shell already having enough long term contracts in its portfolio and

2. the emergence of an Asian index (this plant on the West coast of Canada will serve only Asian customers).

LNG is so versatile thanks to floating regas (or FSRU). Customers can plug in and out units to balance unexpected swings as we are seeing in Egypt that moved from an exporting to an importing and back to a re-export country…

If we only look at the total disclosed capex per unit of production we have to compare LNG Canada with the other US projects as in the North American model costs are for now unbundled (i.e. upstream and pipeline transport are not integrated in the LNG projects, in green below) contrary to the rest of the world (in blue below). Projects are listed according to the timing of the FID with shaded ones for those already in (full or partial) production.

Figure 6: Latest disclosed capex of LNG projects in operation and in construction



Source: thierrybros.com, company data

[16] In Shell press release https://www.shell.com/media/news-and-media-releases/2018/shell-gives-green-light-to-invest-in-lng-canada.html while "Our priority is to get the first train ready for startup by Q4 2023" according to Fluor senior vice president and project director on of the Procurement and Construction (EPC) contractor in https://www.northernsentinel.com/news/kitimat-gets-first-look-at-lng-canada-timeline/

[17] Slide 6 of https://www.shell.com/media/news-and-media-releases/2018/shell-gives-green-light-to-invest-in-lng-canada/_jcr_content/par/textimage_5acb.stream/1538482386925/4b283fac3474edd05add8a44c8c9e1d5063624a7ad68e71b18e09da6e5413fb6/lng-canada-fid-webcast-01102018.pdf

[18] Disclosed during Q3 18 results presentation

This recent FID shows that even if the LNG market is and should stay tight in the foreseeable future (as witnessed by our 'LNG tightness indicator'), investors are still worried about adequate returns and will carefully select the right projects. The excessively high capex witnessed in Australia is not acceptable any longer. But with our 'LNG tightness' that didn't show the usual summer dip, we are confident that many other greenfield FIDs are going to be taken in 2019e.

Finally, in September, China imposed a 10% tariff on US LNG exports as a retaliation against Trump trade barriers. This could slightly delay new FID in the US[19] but could push LNG to become soon a fully traded commodity as more reloads, more changes in destinations and swaps will be needed to accommodate this Chinese tariff proposal (FOB would become the preferred option to take delivery of LNG). This could also impact our 'LNG tightness' indicator, built on the assumption of free trade from the US Gulf of Mexico. If US cargoes were avoiding China, then we would need to reconsider our metric. But the other likely places to measure a worldwide LNG netback have major drawbacks: Australia or Qatar, the 2 other major producers, do not sell their LNG FOB and Europe, that provides reloads, does not produce LNG. The actual Northeast Asian index that is getting a lot of traction is the Platts Japan Korea Marker (JKM™) that has gone through exponential growth in the last year. For the last 12 months, 31 mt of LNG were cleared using this benchmark price assessment for spot physical cargoes delivered ex-ship into Japan, South Korea, China and Taiwan. Those 4 countries imported 178 mt[20] last year or 61% of the total worldwide LNG supply.

Brexit update

Finally, on 12 October, Her Majesty's Government (HMG) recognized, for the first time, that the UK was linked via gas interconnectors to the EU and issued a guidance[21] in case of no-deal Brexit. This leaves little time before March 2019 to find a commonly agreed solution not only for the short but also the long-term. "No deal" shouldn't have much of an impact as interconnection capacity is already booked for 2019-2020. But questions remain post-2020 as we stressed in our 2017 papers.[22] HMG recommends "interconnector operators should engage with the relevant EU national regulators (in Ireland, the Netherlands, or Belgium) in good time ahead of the UK's exit from the EU to confirm whether those countries intend to continue using the Capacity Allocation Mechanisms Code as the basis for their trading with the UK and understand any requirements for the reassessment of their access rules." And this at a time when the EU wants to revise the gas directive governing EU-non EU pipes in light of the Nord Stream 2 saga. In addition, one of the interconnectors (BBL) expects to make gas transportation possible in both directions as of summer 2019.[23]

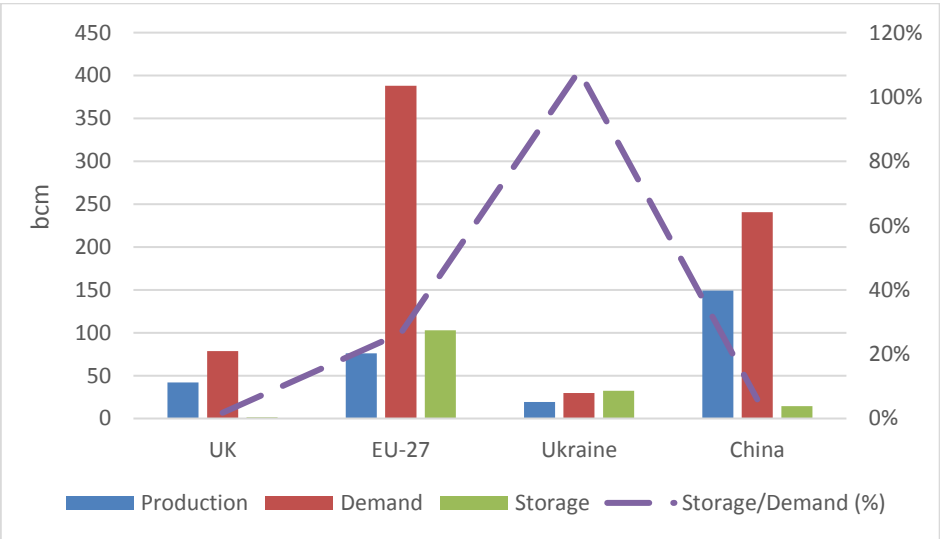
On 15 October, in a strange letter[24] in English to the European Union's chief negotiator on Brexit, Michel Barnier, Eurogas identified "areas of concern that will need to be addressed in a future relationship to minimise disruption to gas markets" once the UK leaves the EU. It is not absolutely certain that either the hardline pro-Brexit supporters or the rest of EU-27 citizens are likely to agree with the interference of a lobby organization suggesting "continued regulatory alignment" and "UK should remain involved in the Gas Coordination Group" in such difficult-to-solve Brexit energy[25] issues.

[19] But in the long term, huge amounts of LNG/gas for China can only be procured by additional supply coming from the US and Russia.
[20] GIIGNL data
[21] https://www.gov.uk/government/publications/trading-gas-with-the-eu-if-theres-no-brexit-deal/trading-gas-with-the-eu-if-theres-no-brexit-deal
[22] A summary has been used for the House of Lords Brexit Energy Security Enquiry and is available at https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/10/Submission-to-the-Inquiry-into-the-implications-of-Brexit-for-energy-security-in-the-UK.pdf
[23] BBL 1 Nov Press Release available at https://www.bblcompany.com/news/gas-transportation-in-both-directions-expected-to-be-ready-three
[24] https://eurogas.org/website/wp-content/uploads/2018/10/Letter-to-Mr-Barnier.pdf
[25] On the same day, Eurelectric wrote a similar letter https://cdn.eurelectric.org/media/3416/brexit_letter_-_15_october-2018-2650-0008-01-e-h-F868B7FF.pdf

On 17 October, a UK House of Commons Committee[26] was launched to examine issues around UK gas security and gas storage, the Government's approach to diversity of supply, and what action the Government is taking to ensure the supply system is robust and secure. As discussed in our September quarterly report, we believe governments should consider transforming the existing strategic obligations regarding crude and refined products into an energy storage obligation, allowing all fuels (oil, gas, water and electricity) to come up with the cheapest way to provide the required energy storage buffer. This could be achieved by changing the European Directive 2009/119/EC, imposing an obligation to maintain minimum stocks of crude oil and/or petroleum products, which was designed at a time when oil was more relevant than today, the energy transition hadn't really started, and energy markets were not fully functional. At a time of Brexit, HMG should therefore consider our idea of updating an old EU directive by a modern UK rule for the benefit of its citizens. Finally, in a fast-changing world, the existing pro-oil Directive is neither fuel- nor technology-neutral and is therefore hindering innovation and competition. We therefore argue that making all energy storage compete on a level playing field could allow the market to select greener and cheaper options, something that should please both policymakers and taxpayers, both in the EU and the UK.

On 19 October, the European Commission adopted a technical update to the Directive on minimum EU stocks of crude oil and/or petroleum products, to continue to guarantee the highest level of security of energy supply in Europe.[27] Even if this seems to have been done without prior global reflection, it shouldn't prevent the later return to this issue with more global solutions as we discussed in our latest quarterly[28] where we showed that EU-27 & Ukrainian storage could be used not only by the UK (pre- and post-Brexit via pipelines) but also by China (via LNG reloads). California, that is pushing fossil fuels out of the energy mix, plans to replace three natural gas-fired power plants with battery-storage systems.[29] This shows, as we explained in our last quarterly, that the missing link to achieving our energy transition is cheap storage, which would enable EU-27 (and Ukraine if it could better integrate with the EU) to benefit from its abundant gas storage capacity.

Figure 7: 2017 production and demand in gas markets long (UE-27 & Ukraine) and short (UK & China) of storage



Source: Cedigaz (with end 2016 storage data), BP Statistical Review June 2018, thierrybros.com

[26] https://www.parliament.uk/business/committees/committees-a-z/commons-select/business-energy-industrial-strategy/news-parliament-2017/gas-storage-evidence-17-19/
[27] https://ec.europa.eu/info/news/ensuring-security-energy-supply-eu-update-emergency-oil-stocks-directive-2018-oct-19_en
[28] T. Bros, Quarterly Gas Review – Issue 3, September 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-issue-3/
[29] https://www.bloomberg.com/news/articles/2018-11-08/california-moves-to-replace-gas-plants-with-batteries-from-tesla

In the event of a no-deal Brexit scenario, HMG will introduce a Carbon Emissions Tax at a rate of 16 £/t to all stationary installations currently participating in the EU ETS from 1 April to 31 December 2019. This would be in addition to the existing 18 £/t UK Carbon Price Support and would set the total carbon price in the UK to 34 £/t, offsetting the impact of a UK withdrawal from the EU ETS. This new Carbon Emission Tax is supposed to mirror the EU ETS situation as long as CO_2 prices stay around 18 €/t in Europe, which is unlikely for a traded product as it is volatile and bears a forex (£/€) risk. But as we mentioned in our June 2017 'EU ETS: fasten your seat belts' paper[30] there are still many burdensome patches to be implemented on both sides in any scenario, including "UK continues to participate in EU ETS until the end of 2020" or it "leaves the EU ETS under a no-deal Brexit on 29 March 2019".

[30] Available at https://www.oxfordenergy.org/publications/eu-ets-fasten-seat-belts/

A very special European gas year ahead

The industry is closely watching the European storage level to get a better picture of the supply-demand balance. We argue in this section, why the recent trends should not be used to monitor the 2019/2020 situation. With no-deal for a post-2019 Ukrainian transit and Nord Stream 2[31] unlikely to be in operation by then, we believe that European storages will have to be filled to their maximum effective level ahead of next winter, something not seen since October 2011. This alone could further tighten significantly the supply-demand balance.

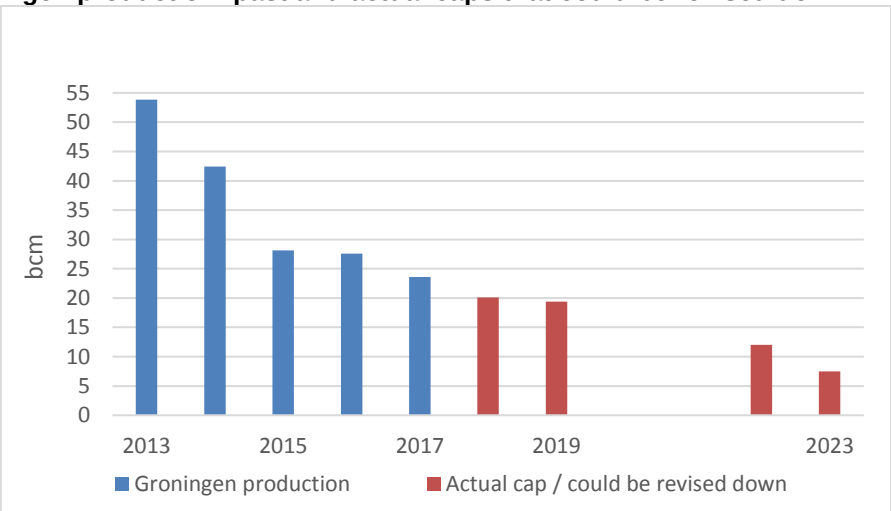
What can we expect for 2019?

EU to move from 28 to 27 Member states, domestic supply to continue to drop, hence rising imports

Between 2014 and 2017, EU-27 domestic supply dropped by 24 bcm (-24.3%). This very sharp drop is not mitigated by the UK production revival that we saw as the UK is now accounted outside the EU-27. In Jan-August 2018, EU-27 supply went down by more than 3% ytd yoy, confirming the 2014-2017 trend. We believe this drop should continue as Groningen production in the Netherlands is cut back further.

Gas production at the giant Groningen field in the Netherlands came in at 20.1 bcm for the 2017/2018 gas year (October-September). The original production cap for gas year 2017/2018 was 21.6 bcm, but the Loppersum area was permanently closed earlier this year after earthquakes were reported, reducing de facto total production capacity. The 2018/2019 production cap is set at 19.4 bcm, which means production from Groningen further falling at least 3% year on year.

Figure 8: Groningen production: past and actual caps that could be revised down

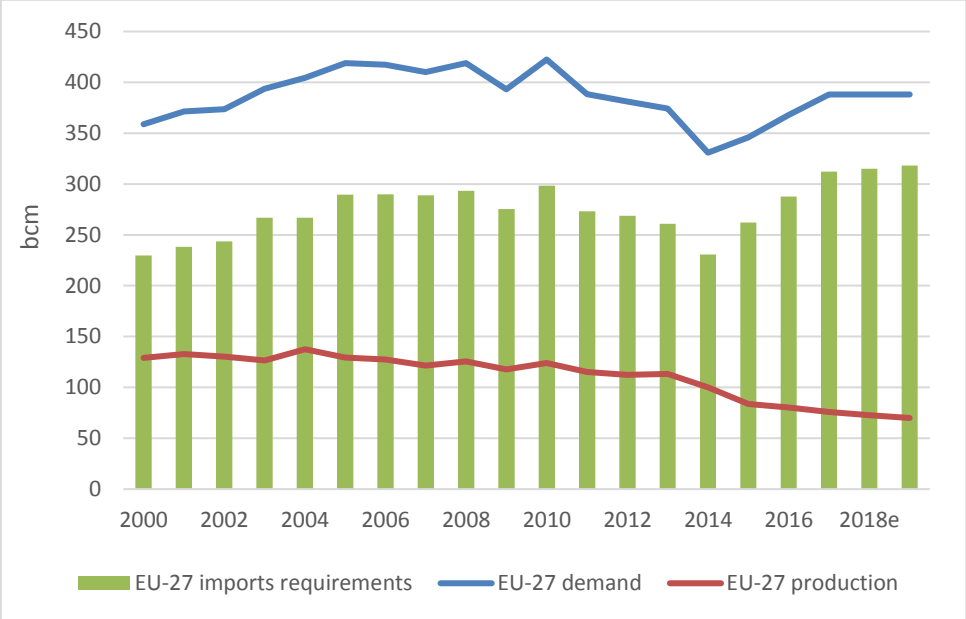


Source: NAM historical data, thierrybros.com

Between 2014 and 2017, annual gas demand at the EU-27 level grew by 57 bcm (+17.3%)[32] and this without considering the UK, which moved away from coal fire power generation in 2016. This coal-to-gas switching needs to continue if the EU wants to meet its climate targets. We could also see added gas demand if nuclear either retires or operates at lower load factor as in Belgium today. But in Jan-August 2018 gas demand[33] at the EU-27 level was down 2.8% vs same period last year. So even if demand has grown in the last 4 years, we have decided to assume a flat demand scenario for 2017 to 2019.

[31] OIES will soon publish a paper on the outlook for transit of Russian gas to Europe, and in particular transit across Ukraine, in 2020 and in the period up to 2025 by S. Pirani – "Russian gas transit through Ukraine after 2019: the options"
[32] BP Statistical Review – June 2018
[33] From JODI gas database available at https://www.jodidata.org/gas/

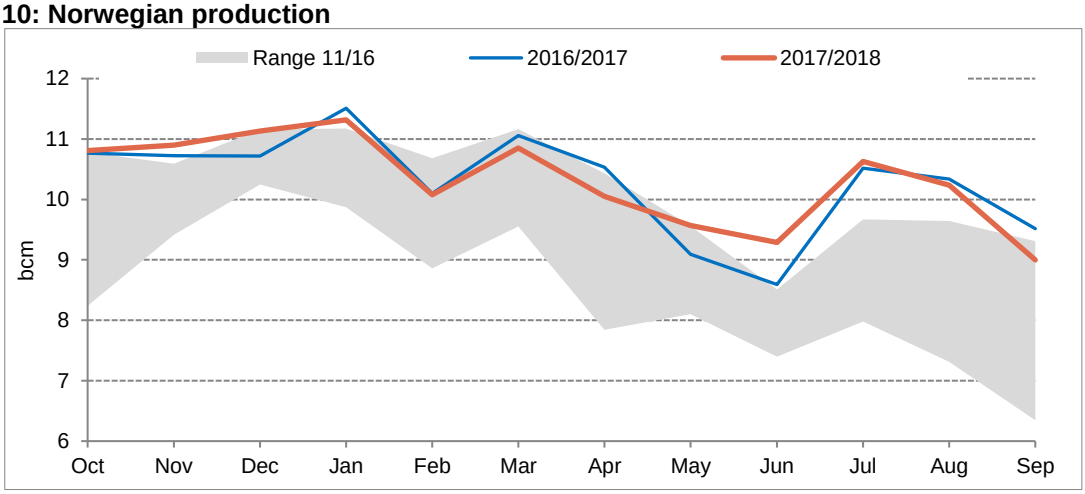
Figure 9: EU-27 gas import requirements



Source: BP Statistical Review – June 2018 for historical data, thierrybros.com

In short, EU-27 will need to import at least 3 bcm more in 2019 than in 2018. With Norwegian supply at maximum level since 2010, constrained Algerian and Libyan pipe gas and virtually no new gas from Azerbaijan entering EU via the Southern Gas Corridor, this leaves only Russian pipe gas and LNG to meet this requirement. Imports could actually be skewed to the upside in case of lower domestic production or a colder winter.

Figure 10: Norwegian production



Source: NPD, thierrybros.com

And with Groningen producing on a baseload basis and therefore providing little swing any longer, winter demand would need to be meet by high imports and storage withdrawals.

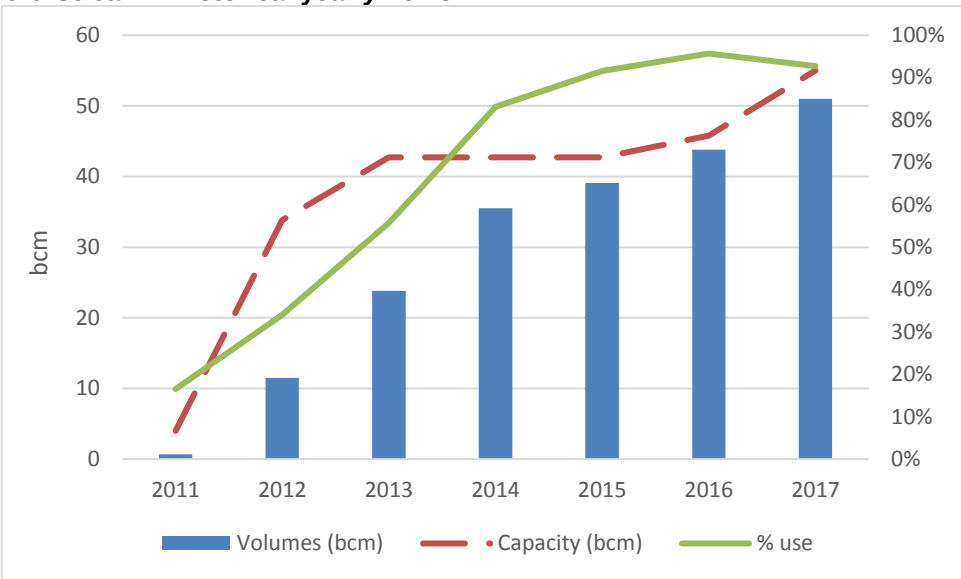
Nord Stream 2 unlikely to be fully operational on 1 January 2020

Nord Stream 2 is now being laid with an official completion date of "by end 2019" if construction sails smoothly. It is worth underlining not only the very constrained timetable but also the outstanding environmental permit from Denmark and the EU Commission opposition to this project and its willingness to

revise the actual Gas Directive to make sure that all pipes entering the EU are in line with core principles of the EU energy law. Opposition to Nord Stream 2 is also coming from EU Eastern Member States and from Members of the European Parliament.[34] Finally, the Swiss court injunction[35] barring operators of Nord Stream & Nord Stream 2 from making payments to Gazprom as part of a legal dispute between Gazprom and Ukraine's Naftogaz could further derail the whole project. This is why we have to be ready for no pipeline in operation in early 2020 even if the Nord Stream 2 target is to be operational by then.

A ramp-up period must also be assessed for Nord Stream 2 between commissioning and full use. Looking at Nord Stream 1, we found that the ramp-up lasted 4 years,[36] taking into account the regulatory limit on OPAL's use (until July 2017, only 55 mcm/d were allowed to be used out of the 97 mcm/d capacity). And during the starting months, the pipe must be filled up, hence why a 17% load factor for the first 2 months.

Figure 11: Nord Stream 1 historical yearly flows

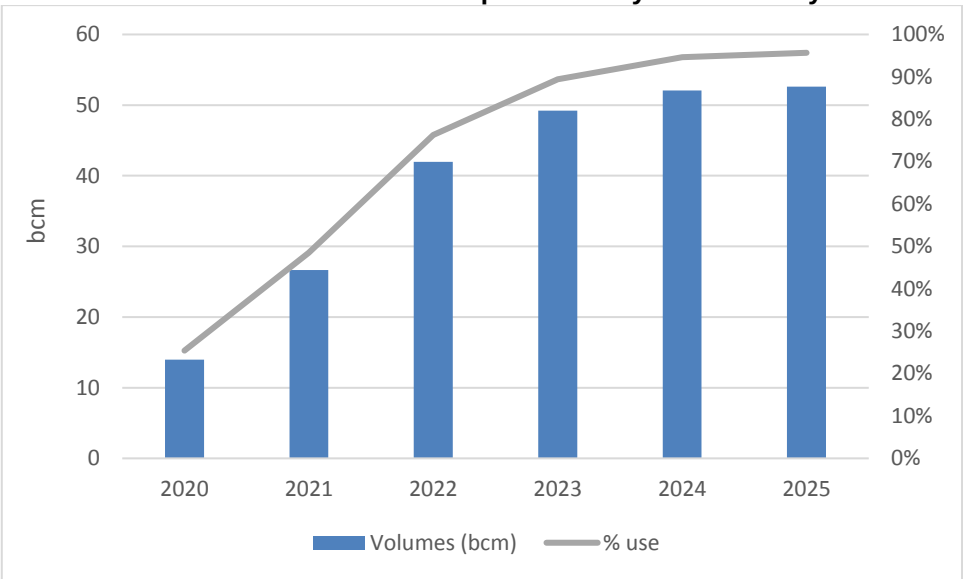


Source: Nord Stream 1, thierrybros.com

In November 2018, Paul Corcoran, Nord Stream 2 CFO publicly stated "Nord Stream 1 gradually ramped up to virtually full capacity last year. I would expect that Nord Stream 2 would have a similar profile, but at the end it's up to the shipper and up to the market".[37] This shows that as Nord Stream 2 will need a few years to ramp up to full capacity, it won't even be fully operational by end 2020 if constructed on time. In an extreme scenario where Nord Stream 2 is finished at the end of February 2020, these could be the expected flows.

[34] On 6 November a joint open letter regarding Nord Stream 2 to German Chancellor Angela Merkel was signed by 90 MEP available at https://rebecca-harms.de/post/joint-open-letter-regarding-nord-stream-2-to-german-chancellor-angela-merkel-57995
[35] https://www.reuters.com/article/us-gazprom-nordstream/gazprom-says-swiss-court-blocks-nord-stream-payments-idUSKCN1NH1YM
[36] https://www.nord-stream.com/press-info/press-releases/nord-stream-reaches-average-utilisation-of-93-in-2017-51-bcm-delivered-to-the-european-union-500/
[37] European Gas Daily, Platts, 9 November 2018

Figure 12: Extreme scenario with Nord Stream 2 operational by end February 2020 and fast ramp-up



Source: thierrybros.com

At the other extreme, we could have no Nord Stream 2 for the period until 2025. So, transit by Ukraine will be needed. But how much and for how long?

What are the unknowns for 2019/2020?

What will happen after the Ukrainian transit contract expires on 31 December 2019?

Because of lack of trust, each party (Russia, Ukraine) is pushing for the fast and full implementation of its own strategy, making it difficult to strike a balanced deal:

- Gazprom claims that the amortised soviet grid needs now a full upgrade at a time when its production is moving North, which is why it is redesigning a shorter, more efficient route via Nord Stream, leaving Ukraine on the sideline. If Nord Stream 2 is built, Ukrainian transit for the EU would be severely reduced from 77 bcm/y in 2017 to less than 25 bcm/y and neither President Putin's promises nor the EC's infrastructure exemption decision used last time[38] to cap flows would be able to change this. Every time an additional pipe is used on a baseload basis, the flexibility requirements for Ukraine transit increase. While Ukraine retains its role in transiting Russian gas to Europe, but mostly acts as a source of flexibility in winter, reducing transit to 25 bcm/y could be very challenging in terms of operating a 146 bcm/y exit[39] capacity network in summer…
- If Nord Stream 2 is not built, Ukrainian transit would stay at c.80 bcm/y,[40] allowing Ukraine to keep more than $2bn/year of transit fees but the capex already spent on Nord Stream 2 would need to be impaired.

[38] The WTO panel upheld Russia's claim, finding that the challenged conditions imposed in conjunction with the infrastructure exemption granted to the OPAL pipeline limit competitive opportunities for the importation of Russian gas into the EU. This means that the EU cannot use those discriminative measures again against NS 2.
[39] Naftogaz 2017 Annual Report, page 100
[40] But would have lost the 16 bcm/y that used to transit to Turkey rerouted via TurkStream.

To complicate things even further, Ukraine wants to have a new contract with a formula in line with EU transport regulations while the Ukraine TSO is still not unbundled[41] after so many years of unsuccessful attempts.[42] Meanwhile the EU wants to reduce its transportation cost by implementing the Quo Vadis[43] idea. Gazprom could easily refrain from signing a (long-term) contract with a not yet fully established[44] TSO in 2019 as the unbundling is not planned before early 2020. Finally, all the parties (EU-Ukraine-Russia) are only interested in the financial outcome of the transportation negotiation (how much will Ukraine effectively get for this service) not the formula itself.

The author believes Ukraine will rightly not settle with a long term 25 bcm/y transit agreement as this would be the basic outcome of Nord Stream 2 being built and fully operational. Ukraine will fight for a minimum long term 40 bcm/y capacity transit guarantee (and with this a minimum yearly fee). Hence why a political deal will be needed with the assistance of the EU Commission.

European and Ukrainian elections to complicate further the trilateral Ministerial meetings process

Presidential elections are expected to be held in Ukraine on 31 March 2019 followed by parliamentary ones on 27 October 2019. The next elections to the European Parliament are expected to be held in 23–26 May 2019, with a new Parliament starting in July 2019 and having to appoint the new President of the European Commission and to approve the appointment of the new Commissioners after their hearings by the competent Committees of the Parliament. As a result, the new European Commission is not expected to be installed until November 2019. The present Juncker Commission[45] is to end its term at that time. This means that any deal between EU-Russia-Ukraine can hardly be achieved on any subject before a new Ukrainian president and parliament are elected and before the new EU Commission is up and running. However, there remains a slight possibility for a deal between a new Ukrainian President and the outgoing Commission between April and September 2019, but the results of the European elections in May could have some impact on the strength of the present Commission. This policy timetable leaves de facto only the last 2 months of 2019 to reach a deal.

[41] http://naftogaz.com/www/3/nakweben.nsf/0/8FA691BEB1824AEAC225830D005581E9?OpenDocument&year=2018&month=09&nt=News&

[42] Even the actual attempt is facing setbacks as recently mentioned in 31 October Naftogaz Press Release available at http://naftogaz.com/www/3/nakweben.nsf/0/29B3560EA80E3F88C2258337004234B1?OpenDocument&year=2018&month=10&nt=News&

[43] The study "Quo Vadis EU gas regulatory framework" was carried out to analyse whether the current regulatory framework in the EU gas sector is efficient in order to maximise overall EU welfare or whether changes may be necessary, and if so provide recommendations. More info on https://ec.europa.eu/energy/en/studies/study-quo-vadis-gas-market-regulatory-framework

[44] For timing of this unbundling please refer to the “Roadmap of the unbundling” available at http://www.naftogaz.com/files/Information/Unbundling-plan-presentation.pdf

[45] The Juncker Commission took office on 1 November 2014, after the 22-25 May European elections.

Figure 13: Timing of a post2020-transit deal in 2019

2019	Ukraine	EU	Trilateral deal
Jan			Unlikely with an out-going Ukrainian President
Feb			
Mar	President election		
Apr			Unlikely
May		Parliament election	
Jun			Possible depending on the strength of the out-going EU Commission after elections
Jul		New parliament	
Aug			
Sep			
Oct	Parliament election		Unlikely
Nov		New Commission	Possible
Dec			

Source: thierrybros.com

It is not unconceivable that, if the Greens get strong backings at the EU elections, they could push for an EU Climate Action & Energy Commissioner coming from their side. In this case, it is possible that she/he will not be interested to deal, first thing in office, with a gas transit issue, leading to a crisis on 1 January 2020, allowing him/her to push for a greener agenda.

At the time of writing, goodwill between Russia and Ukraine is non-existent and we have therefore to consider the significant possibility of no-deal for a post-2019 Ukrainian transit and Nord Stream 2 unlikely to be operation by 1 January 2020. So even if, as we too often have seen, a Ukrainian-Russian transit deal is agreed on the early morning of the 1 January 2020, the European gas industry will need to enter winter 2019/2020 set for some transit uncertainties.

The offshore section of TurkStream having been completed[46] in November 2018, it is highly likely that the first line will be operational by end-2019. Here again during the ramp-up, Turkey will still need to cope with the Ukrainian transit risk. When line 1 is fully operational, Gazprom will nearly be able to avoid using Ukraine as a transit route to Turkey. The final destination of line 2 is not finalised but it could provide extra supply to the growing Turkish market (+4.3%pa) and hence is unlikely to bring substantial Russian gas to the EU. But as Turkey is neither part of the EU nor properly connected to the EU hubs, we excluded this country from our analysis.

The ideal solution: a long term competitive transit contract to be signed as soon as possible

More foreign supply needed all year long

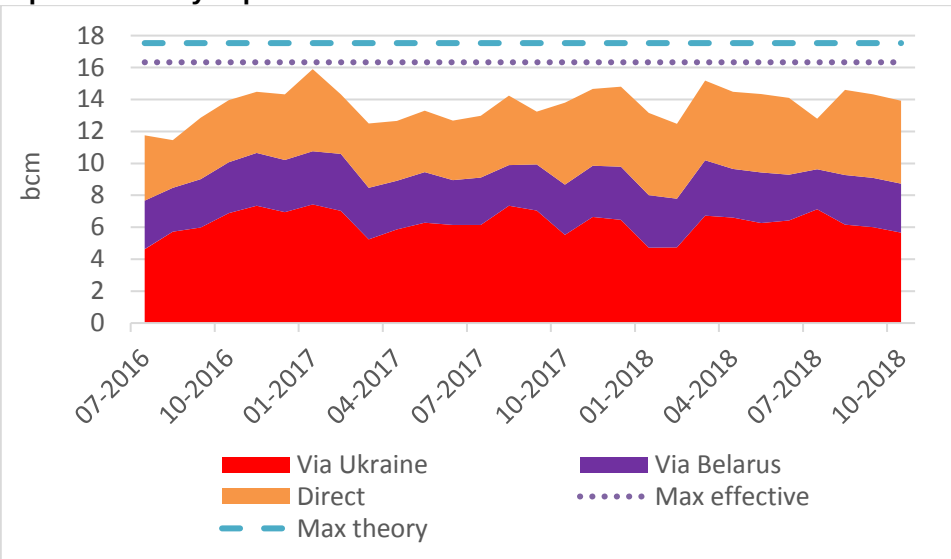
Gazprom is the only company supplying pipeline gas to Europe holding some spare production capacity.[47] From 83 bcm/y in 2017[48] we estimate that there will only be 48 bcm/y available at the end of 2018 because Gazprom's production is increasing (by 30 bcm between 2017 and 2018e) and the investment is right now concentrated in the Far East for Chinese consumers. Hence the decline rate (7% estimate or 5 bcm/y) for historical giant fields supplying Europe has not been mitigated in 2018. As Gazprom recently stated that it is

[46] http://www.gazprom.com/press/news/2018/november/article467765/
[47] For an explanation of the spare capacity concept and calculation please refer to T. Bros, March 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-analysis-prices-recent-events/
[48] For details on spare capacity, please refer to T. Bros, Quarterly Gas Review – Issue 1, March 2018 available at https://www.oxfordenergy.org/publications/quarterly-gas-review-analysis-prices-recent-events/

planning "to bring onstream the third gas production facility of the Bovanenkovskoye field"[49] we have added 23 bcm/y[50] of new capacity for 2019.

Using Alexey Miller's October briefs to Russian Prime Minister Dmitry Medvedev on Gazprom's readiness for autumn/winter period,[51] we find out that the maximum contractual obligation to supply gas to Europe (incl. Turkey) is 205 bcm/y. This means that any increased sales in 2019 should be covered by a spot/auction to be competitive vs extra LNG.

Figure 14: Gazprom monthly exports to the EU-27

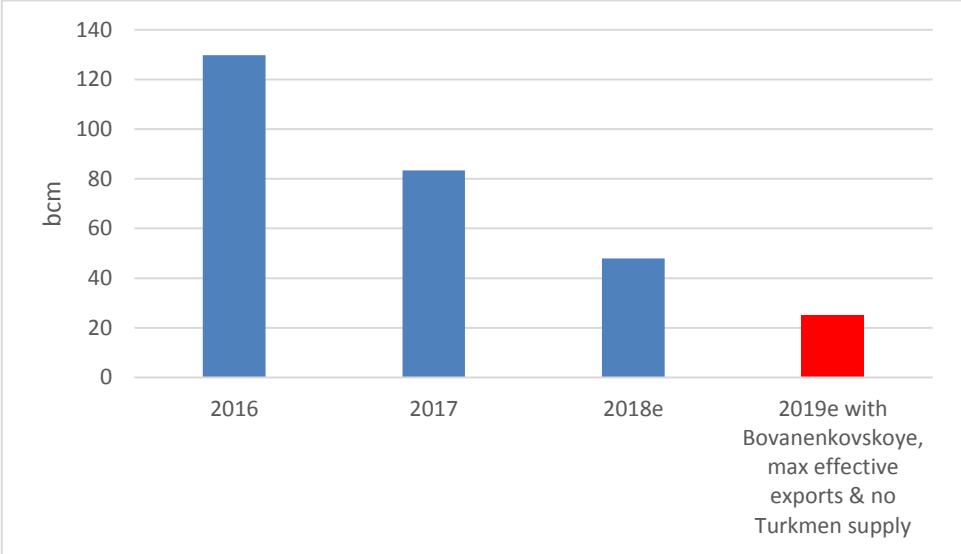


Source: Gazprom, thierrybros.com

On top of spare production capacity, Gazprom holds flexibility in the transit system. It has achieved a maximum effective transit of 16.3 bcm/month and could easily export 27 bcm more in 2019 than in 2018 by maximizing use of all year-long export routes to effective maximum level. If Gazprom manages to use all routes at their maximum theoretical levels, then exports to the EU could grow by 41 bcm, leaving too little spare capacity.

[49] http://www.gazprom.com/press/news/2018/november/article468431/
[50] Gas production is planned at 115 bcm/y with three upstream facilities. Two of them have been already brought online: the first one, in 2012 (60 bcm/y), the second one, in 2014 (30 bcm/y). This leaves 25 bcm/y (Russian standards) or 23 bcm/y under EU standards for the third.
[51] http://www.gazprom.com/press/news/2018/october/article464466/

Figure 15: Gazprom spare capacity 2016-2019e



Source: thierrybros.com

This explains perhaps why Gazprom is willing to resume, in 2019, Turkmen imports[52] stopped in 2009.[53] In a high price environment, it could even become more profitable for Gazprom to re-export Turkmen gas to Europe than to try to overproduce its own fields, because the 30% export duty does not apply to non-Russian gas. Once Turkmen gas becomes cheaper than the sum of Gazprom cost of production inclusive of the Mineral Extraction Tax (MET) plus the export duty, then Gazprom will be incentivized to call on Turkmen gas instead of producing more. This is a very sound portfolio strategy and allows Gazprom to be in a situation to saturate all export capacity at any time in 2019.

A fixed competitive Ukrainian transit fee?

According to the Naftogaz 2017 Annual Report,[54] revenues from Gazprom for transit in 2017 and 2016 accounted respectively for UAH73.9bn (or $2.6bn) for 93.5 bcm/y transited (EU and Turkey) and for UAH60bn (or $2.2bn) for 82.2 bcm/y transited. With TurkStream on-line from 2020, Naftogaz will then lose 16 bcm/y (or c. $0.4bn/y). To maintain something like a fixed $2.4bn annual revenue[55] on a long term basis, Naftogaz could be tempted to come up with a capacity tariff increasing if less volumes are transited, which we believe defies the purpose as it would make this route very expensive and could even pose some technical issues. Gazprom will never consider such a deal on a long-term basis and could only be forced to accept it as a short-term solution, before finishing the construction of Nord Stream 2! The author believes the EU Commission should encourage Naftogaz to offer Gazprom a long-term deal competitive to the cost of the alternative, Nord Stream 2.[56] As the EU gas industry refused the EU Commission Quo Vadis idea of a single entry fee for transport inside the EU and as the German border is c. 700 km closer to the main demand centre than the Ukrainian one, the cost of transport in the Eastern part of the EU has to be added to Ukrainian fees. So, if we take a cost of €1.3bn for the total transit of 55 bcm/y for Nord Stream 2, Ukraine

[52] https://www.naturalgasworld.com/russia-to-resume-turkmen-gas-imports-65042?#signin
[53] In a low demand and low prices world, Gazprom was better off using its own huge spare capacity than calling Turkmen gas for exports to the EU
[54] Pages 101, 226 and 255
[55] With a back-of-the-envelope calculation, the fee could be as high as 5$/1,000cm/100km for the minimum 40 bcm/y capacity on offer.
[56] In a 29 May 2018 presentation, Paul Corcoran, Nord Stream 2 CFO mentions a cost of less than 2€/1,000cm/100km for the 1,230 km Nord Stream (slide 15) available at https://www.europeangashub.com/wp-content/uploads/2018/09/RS2481_Paul-Corcoran.pdf

could then offer a fixed €1bn/year[57] deal to transit any quantities up to 100 bcm/y, allowing the only economically sensible situation to be achieved:

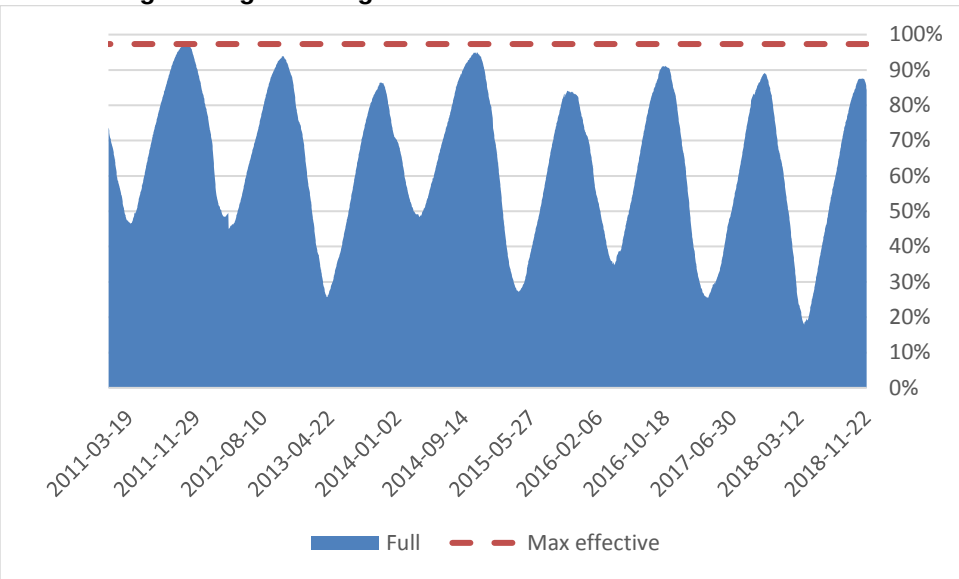
- Ukraine keeps a decent fee with a long-term contract
- Gazprom can use the Ukrainian transit as a seasonal transit swing
- EU secures its gas supply in a competitive way

But mixing policy and economy doesn't mean the best outcome will be achieved…

Higher storage level in October 2019

For this paper we looked only at the working storage capacity of underground gas storages.[58] According to the Gas Infrastructure Europe (GIE) transparency platform,[59] EU-27 storage capacity is now 1,060 TWh.

Figure 16: EU-27 underground gas storage use



Source: GIE, thierrybros.com

The maximum filling rate of storage was reached in October 2011 with 97.3%. In 2018, the maximum was reached with 926 TWh (87.5%) on 27 October. Last year, the overall storage level reached 940 TWh (89.2% full) on 29 October 2017.[60] With a low of 189 TWh (18% full) reached on 30 March 2018, this means that this year, 737 TWh was injected in EU-27 storage vs 668 TWh injected between 28 March and 29 October 2017. This 10.4% growth was one of the main reasons why hub prices in Europe moved up from 7 to 9 $/MBtu last summer, when demand in Europe dropped by a massive 7% in March-August 2018 vs the same period last year.[61]

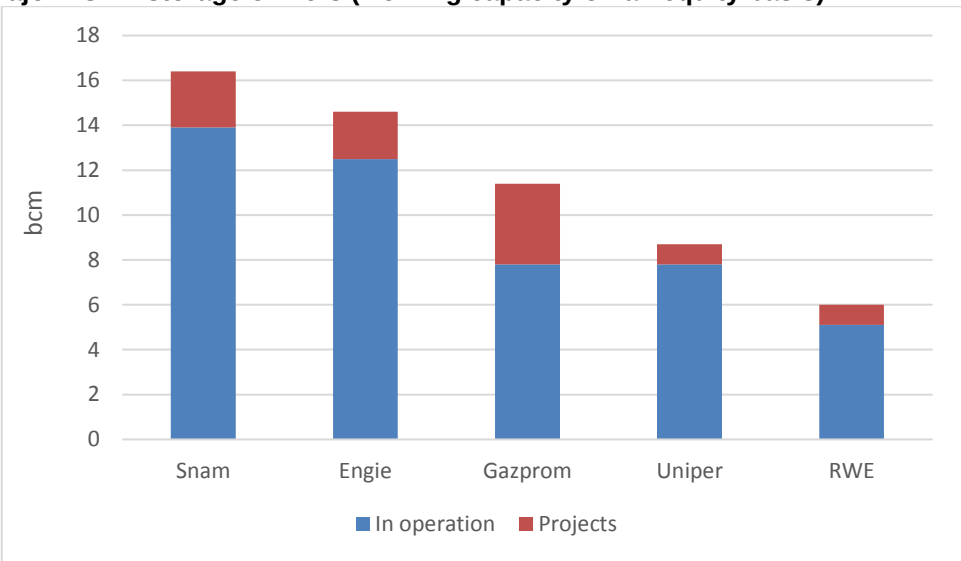
If the gas industry re-iterates this maximum 2011 storage level in October 2019, to mitigate any transit risk, this means that 1,032 TWh would be needed in storage or an extra 105 TWh (or 10 bcm). This extra storage requirement would be met by higher imports. It is worth underlining that the extra imports (10 bcm) are more than 3 times higher than our conservative EU-27 additional imports requirements for 2019 calculated at 3

[57] It would make also much more sense to avoid using $ in such a deal. The €0.3bn difference is to cover the cost of the extra transport from the Ukrainian border to the main demand centres in the EU
[58] We took no account of LNG tank capacity.
[59] https://agsi.gie.eu/#/
[60] From gie.eu transparency platform
[61] From JODI gas database.

bcm (see figure 9), but still much lower than Gazprom's spare production and export capacity (41 bcm). But if we further assume no deal in November-December 2019, this translates into a minimum storage withdrawal to mitigate the increased risk, hence higher imports/apparent demand as all operators will try to keep as much gas as possible in storage until a deal is achieved. So, we could have in 2019, even with no real demand growth, a higher apparent demand (10 bcm) just to maintain a high storage level. The sum of this extra storage requirement and the domestic production drop translates into 13 bcm more imports in 2019 than 2018.

Those extra volumes should be taken by the industry as a whole, which would start to price the transit risk when refilling storages from April 2019. But Gazprom, a major storage owner in Europe, could be willing to stock as much gas as possible to limit disruption and to be in a better position during the final months of negotiations. The whole European gas industry should purchase more gas for storage next year, but Gazprom may want to do it for negotiating purposes as well.

Figure 17: Major EU-27 storage owners (working capacity on an equity basis)



Source: thierrybros.com, 2016 company data

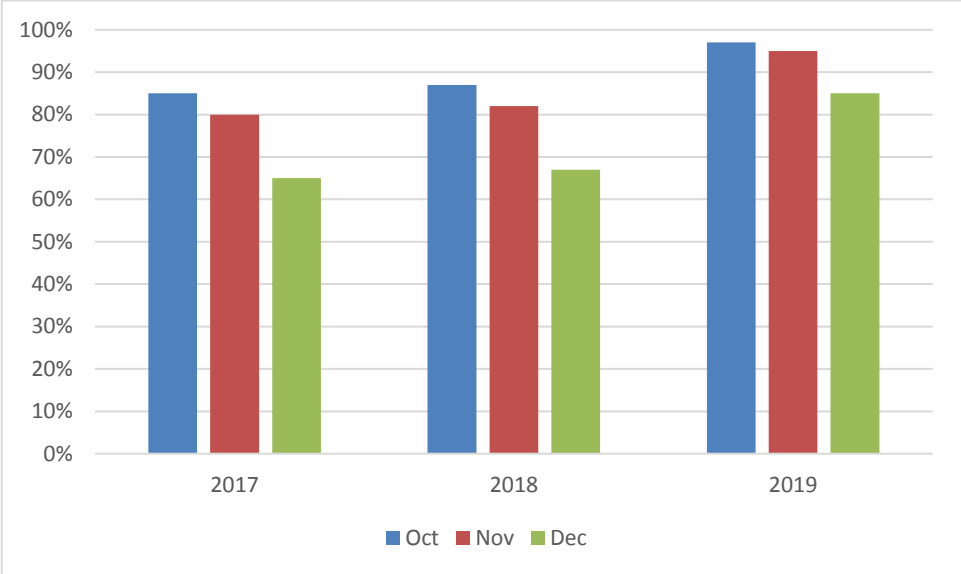
So, without any demand growth, domestic supply decline and storage filling could boost imports for EU-27 by an extra 13 bcm in 2019 vs 2018. This massive growth will require Gazprom to boost its exports and/or hub prices in Europe to attract and keep LNG (or high shipping rates as seen today deterring longer voyage to Asia).

The likely outcome

Storage levels next summer could provide an indication of the timing of a Ukrainian transit deal. If a deal can only be reached at the last minute on 31 December 2019 (or even later in 2020), EU-27 storage will need to reach 97% full, much higher than the 87% and 89% recorded respectively in October 2018 and 2017. This will further boost import needs and apparent demand for 2019 - like the need to refill low storage level last summer. 2019/2020 could be a bumpy gas year. Stay tuned during next Summer season!

If no-deal is reached before the beginning of 2020, storage withdrawals will be reduced in November-December 2019 to mitigate this transit risk. This could result in c.20 bcm more gas in stock at end December 2019 vs 2017.

Figure 18: EU-27 storage % fill in Q4 at end of month in case of no-deal



Source: GIE for historical data, thierrybros.com

Filling storage by an extra c. 20 bcm would mitigate the consequences of the full closure of the Ukrainian route in the winter of 2020, allowing Nord Stream 2 to be finalised and operational.

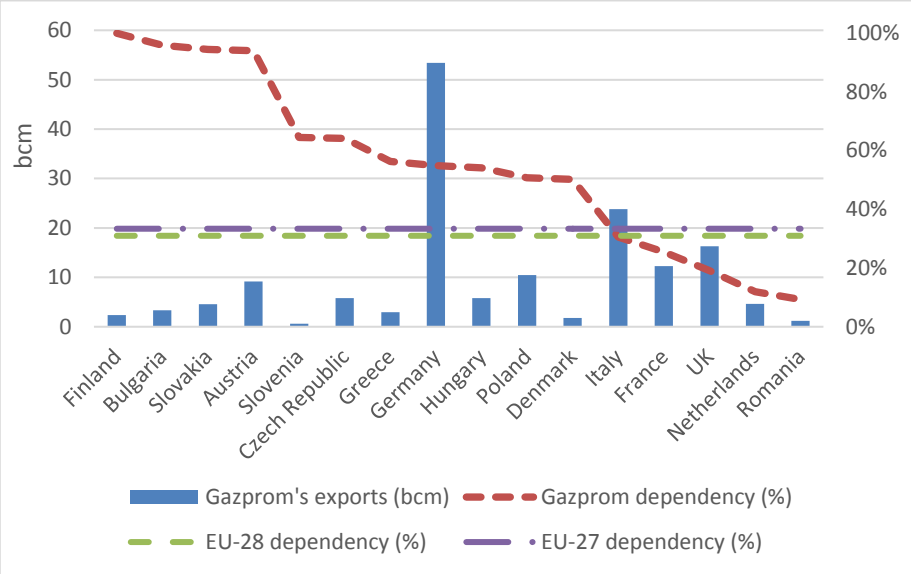
But as soon as 1 January 2020, Gazprom could try to use the EU network code to nominate gas to be transported on a day-ahead basis and Ukraine will have to deal with it (willingly or forced by the EU Commission after a few days of interruption). And if we have no transit early in 2020 and no Nord Stream 2 operational, Gazprom could then be in a position to prioritize its European customers, with some receiving their contractual volumes (from gas in storage, from Nord Stream 1 and via Belorussia) and some affected by partial default. An interesting exercise could be to guess who will be provided with less contracted gas for political reasons plus which heavily oil-indexed contracts would be put in partial default for economic[62] reasons! Stay tuned during next Winter season!

Thanks to an improved infrastructure (reverse flows and more storage), a supply interruption in gas flowing through Ukraine in 2020 would have much less severe supply consequences for EU countries than in 2009. Italy, which is 32% dependent on Gazprom and the furthest away from the possible disruption, could be where hub prices spike the most. Other NWE markets could be less affected thanks to Nord Stream 1 still operating as we've already seen in December 2017.[63]

[62] If in January 2020 Nord Stream 2 is not operational with no Ukrainian transit, spot prices should be much higher than oil-indexed ones.

[63] Please refer to T. Bros - Reflection on the Baumgarten Gas Explosion: Markets are Working, January 2018 available at https://www.oxfordenergy.org/publications/reflection-baumgarten-gas-explosion/

Figure 19: 2017 countries and EU dependency on Gazprom



Source: Gazprom Export, BP Statistical Review, thierrybros.com

If we assume for Nord Stream 2 a load factor increasing from 0% in January 2020 to 35% in December 2020 (as detailed in figure 12), the situation will still not be solved for winter 2020/2021 but time would work for Gazprom. Ukraine transit will continue to be needed but the same questions will still need to be addressed: How much? For how long? For what price?[64] But then, the Trans Adriatic Pipe (TAP) should hopefully be in operation, allowing the 10 bcm/y Shah Deniz 2[65] gas from Azerbaijan to reach Italy via the Southern Gas Corridor, reducing further the need for Ukrainian transit.

Thanks to added gas in stock at the end of 2019, even if Nord Stream 2 is not operational, this scenario pushes back the need for a contract to be signed between Gazprom and Naftogaz transport to April 2020 as storage could make up any shortfall until then. This analysis shows that, on top of the difficult on-going arbitration case, Gazprom and the Ukrainians are engaged in a run up to get the upper hand for the transit negotiations in late 2019/early 2020. This will boost storage requirements from next summer. And with the industry having a price incentive to store more gas, Gazprom could use high storage level as leverage in the negotiations.

[64] For more information, please refer to S. Pirani – "Russian gas transit through Ukraine after 2019: the options" to be published
[65] 10 bcm/y for customers in Italy, Greece and Bulgaria as mentioned in https://www.bp.com/en/global/corporate/media/press-releases/shah-deniz-final-investment-decision-paves-way.html