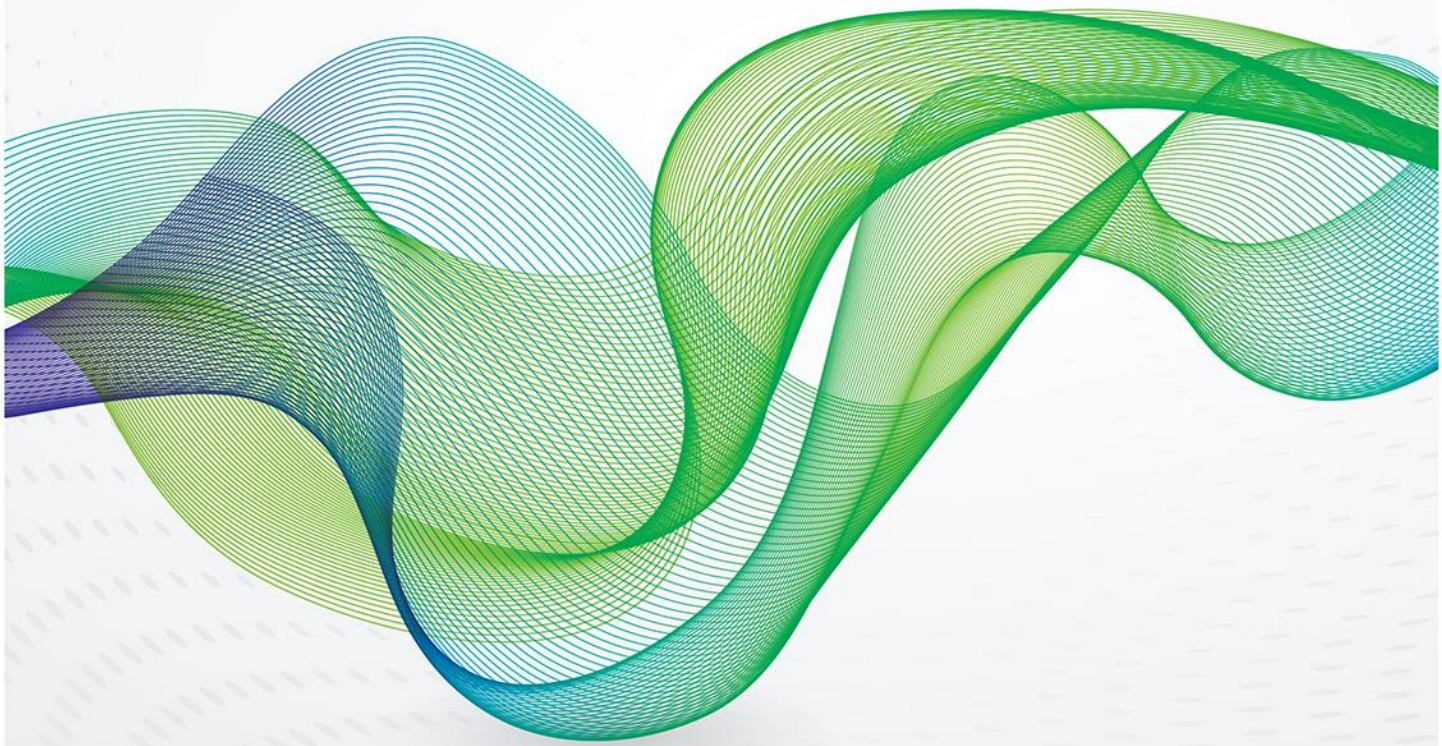
THE OXFORD INSTITUTE FOR ENERGY STUDIES

A RECOGNIZED INDEPENDENT CENTRE OF THE UNIVERSITY OF OXFORD

UNIVERSITY OF OXFORD

February 2016

Russian Gas Transit Across Ukraine Post-2019:
pipeline scenarios, gas flow consequences, and regulatory constraints



OIES PAPER: NG 105

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ISBN 978-1-78467-054-2

Preface

This paper is the latest in a long series of commentaries published by the OIES Gas Programme on the Russia-Ukraine gas relationship, dating back 10 years to the first serious crisis between the two countries to have impacted European gas supplies.

The Russia-Ukraine gas relationship and its impacts on Europe have become substantially more controversial since the Ukraine crisis of 2014 and the annexation of Crimea by the Russian Federation. European policy discussion tends to focus on the pros but mostly the cons of various pipelines, urging that substantial volumes of Russian gas must continue to transit through Ukraine as a mark of European `solidarity' with that country. Most of this commentary is focused on the politics of the EU, Russia, Ukraine situation with natural gas analysis as a relatively minor factor.

This paper reverses the emphasis of the existing commentary. Its rationale is based on the belief there is a need for forensic analysis of different scenarios of Russian gas flows to Europe post-2019, following the expiry of the current Russia-Ukraine transit (and supply) contract. This requires detailed consideration of two broad groups of issues: a comparison of Gazprom's long term contractual commitments with possible gas flows post-2019 through a variety of existing and possible future pipeline networks. And an appreciation of the regulatory issues and obstacles to building new large scale infrastructure of the kind being proposed by Gazprom.

There are major problems in conducting such an analysis: the confidentiality of contracts makes it very difficult to be specific about which countries are being – and must continue to be – served and by which routes. And the evolution of European gas regulation and the network codes makes it difficult to be specific about the rules which may govern the construction of new pipelines, and capacity allocation in existing pipelines, by 2020. However, these are issues of paramount importance to the European gas market which needs to have clarity about the options for all parties in respect of the transit of Russian gas to Europe post-2019.

This has been an extremely complex paper to write and both Simon Pirani and Katja Yafimava are to be congratulated for bringing it to a successful conclusion.

Professor Jonathan Stern

Oxford, February 2016

Acknowledgements

We would like to acknowledge in the first place Professor Jonathan Stern, who has been generous with his time and invaluable comments on the entire paper, as well as Howard Rogers and Alex Barnes. We are also grateful to John Elkins for editing the paper, Dave Sansom for designing the maps, and Kate Teasdale for administrative support. Responsibility for all the views expressed and the conclusions reached in the paper is solely that of its authors.

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List of Abbreviations

ACER - Agency for the Cooperation of Energy Regulators

ACQ – annual contract quantity

Bcm – billion cubic metres

Bcma – billion cubic metres/year

CAM – capacity allocation mechanisms

CEO – chief executive officer

CMP – congestion management procedures

EBRD – European Bank for Reconstruction and Development

EC – European Commission

ECT – Energy Charter Treaty

EnCT – Energy Community Treaty

ECJ – European Court of Justice

EEA – European Economic Area

EEZ – exclusive economic zone

EIA – environmental impact assessment

EIB – European Investment Bank

ENTSOG – European Network of Transmission System Operators for Gas

ERI RAS – Energy Research Institute of the Russian Academy of Science

EU – European Union

FYROM – Former Yugoslav Republic of Macedonia

GGPOS – Guidelines of Good Practice on Open Season

GTM – Gas Target Model

IEA – International Energy Agency

IFI - international financial institution

IGA - intergovernmental agreement

IMF – International Monetary Fund

ISO – independent system operator

ITGI – Interconnector Turkey – Greece – Italy

ITO – independent transmission operator

LNG – liquefied natural gas

LTSCs – long term supply contracts

MoU - memorandum of understanding

NATO – North Atlantic Treaty Organisation

NC – network code

OECD – Organisation for Economic Co-operation and Development

OIES – Oxford Institute for Energy Studies

OPAL – Ostsee-Pipeline-Anbindungsleitung

OU – ownership unbundling

PCI – project of common interest

SCI – supply concentration index

SEP – Second Energy Package

TAP – Trans-Adriatic Pipeline

TEP – Third Energy Package

TOP – take-or-pay

TPA – third party access

TSO – transmission system operator

TYNDP – ten year network development plan

UIOLI – use-it-or-lose-it

US – United States

WB – World Bank

UN – United Nations

1. Introduction

The paper discusses the ways in which Russian gas is likely to be transported to Europe, and in particular the role of Ukraine in transit, after 2019. The current transit contract between Gazprom, Russia's monopoly exporter of pipeline gas, and Naftogaz Ukrainy, Ukraine's national oil and gas company, expires on 31 December that year. Gazprom has already substantially reduced the volumes of gas it transits across Ukraine, and expressed its intention of reducing the level further. The paper assesses Gazprom's transit diversification strategy, and attitudes to it in the EU and in Ukraine. Participation in transit diversification pipeline projects by Gazprom's largest European customers suggests that some are broadly supportive of this strategy, others lukewarm. The European political authorities have taken a different attitude. Prior to the Ukrainian political and military crisis that started in February 2014, the European authorities avoided opposing Russian transit diversification projects outright,[1] and focused on (i) increasing interconnectivity to reduce the European system's vulnerability to short-term supply interruptions, and (ii) responding to Ukrainian initiatives designed to integrate its gas market more closely with Europe's. After the crisis began, Brussels made clear its political opposition to the transit diversification projects, adding this obstruction to the regulatory problems that had plagued the projects for several years beforehand.

The paper surveys these political, regulatory, and contractual factors, and then assesses the degree to which Gazprom could reduce transit across Ukraine by 2020, and possibly eliminate it during the 2020s, depending on:

- the availability of new export capacity built before and after 2020;
- the availability of capacity in, and configuration of, existing European networks (assuming that there is enough matching capacity between export and domestic networks);
- EU regulatory rules in respect of the share of pipeline capacity, located on the EU territory, which Gazprom can utilise and
- the specifics of market requirements in different European countries.

The paper is arranged as follows. In this section we provide an overview of relevant economic, commercial, regulatory and political factors. These are followed by sections describing recent developments in the Russia-Ukraine gas relationship (section 2), changes in European attitudes to gas transit (section 3), and the regulatory issues that remain unresolved in respect of the transit diversification projects (section 4). Sections 5, 6 and 7 focus on current and expected transit volumes and pipeline capacities, dealing first with Gazprom's contractual commitments to deliver gas under its sales contracts (section 5); then presenting scenarios for transit in 2020, depending on which transit diversification projects are completed, if any (section 6) and related scenarios for deliveries of Gazprom gas in Europe (section 7). One conclusion from the scenarios is that it is likely that Russian gas will continue to be transported across Ukraine after 2019, albeit at reduced volumes, and we consider what contractual arrangements might be made for that (section 8), and how changes in the Ukrainian gas market may influence the bigger picture (section 9). Finally we draw conclusions (section 10).[2]

[1] Although Poland and the Baltic countries mounted significant opposition to Nord Stream 1.

[2] While this paper is a joint effort its authors' contributions towards various sections are as follows: section 1 (Introduction) by Pirani, section 2 – Pirani and Yafimava, section 3 – Yafimava and Pirani, sections 4, 5, 6 and 7 – Yafimava, sections 8 and 9 – Pirani, section 10 (Conclusions) - Pirani and Yafimava.

Background: commercial and economic factors

The problem addressed by the paper is of interest mainly because Russia is the leading supplier of external gas to Europe. But expectations of European gas requirements are changing. In 2005-06, it was widely assumed that demand and imports would continue to grow steadily, and that new Russian export pipeline capacity would be needed to accommodate that growth. Then came the outbreak of "gas wars" between Russia and Ukraine (from 2006), resulting in supply and transit interruptions and Russia's acceleration of its transit diversification policy; the financial and economic crisis of 2008-09 and a resulting slump in European (energy and) gas demand; and the increase in renewable energy resulting from carbon reduction commitments. By 2010, the outlook for Russian gas exports to Europe, and assumptions about how much transportation capacity would be required, were far less certain.

The only significant expansion of Europe's Russian gas import infrastructure, Nord Stream 1[3], was approved at the height of the economic crisis, and commissioned in 2010, not because the total pipeline capacity was expected to be insufficient, but because of the importance to Gazprom and its European customers of diversifying away from transit across Ukraine. Since the completion of Nord Stream 1, there has been no question that the total pipeline capacity for Russian imports to Europe is far greater than required. Since the turn of the century Russian exports to Europe have ranged between 150 bcma and 180 bcma, while total pipeline capacity is around 240 bcma, of which 120 bcma is through Ukraine (see Maps 1, 2, and 3).[4] Rather, the issues have been:

- Is partial diversification away from Ukrainian transit sufficient to ensure security of supply (and how, and by whom, is that security of supply defined)?
- What level of additional pipeline capacity would be required to diversify away from Ukrainian transit altogether (as Gazprom hopes to do)?
- Is investment in such capacity justified from a commercial (rather than a political) point of view?

The unexpected cancellation in December 2014 of the South Stream project, the glacial progress of talks on its successor, Turkish Stream in 2015, and the emergence of proposals for Nord Stream 2, show that the answers to these questions are both unclear and sharply contested.

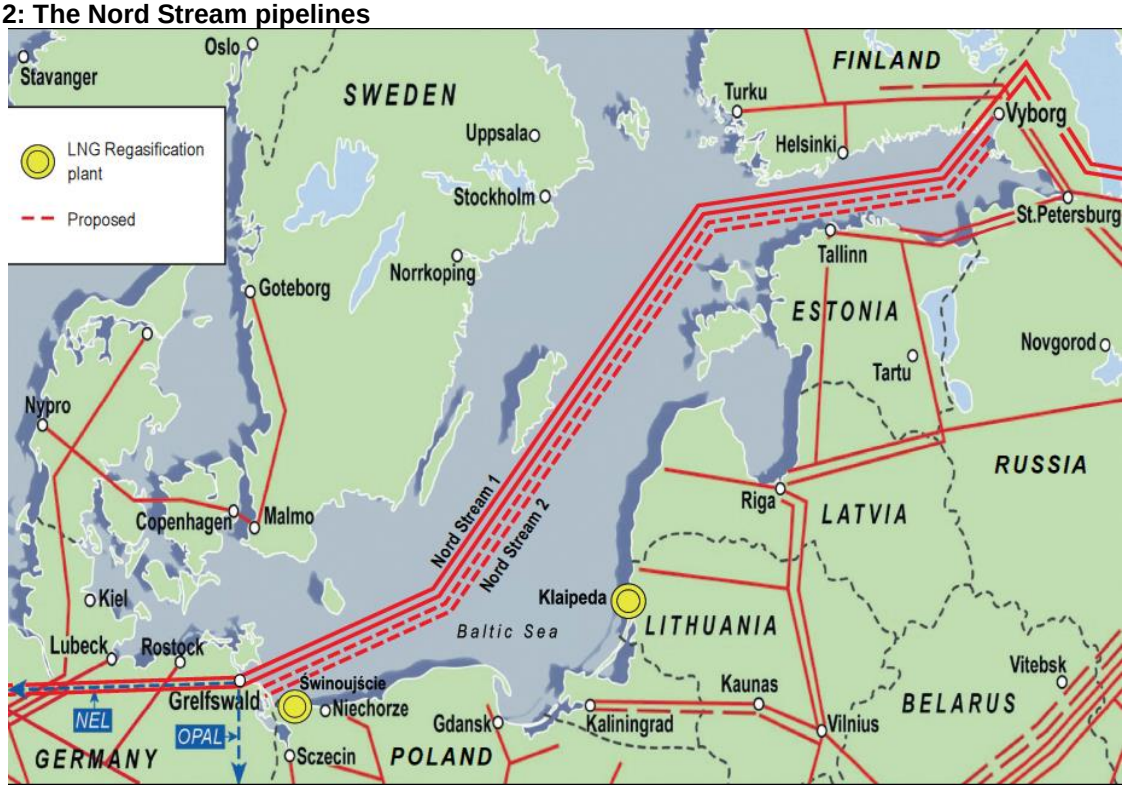
[3] Nord Stream 1 consists of two lines (existing) and Nord Stream 2 consists of two lines (planned).

[4] The annual exit capacity of the Ukrainian network to Europe is stated by Naftogaz Ukrainy as 151 bcma (see Naftogaz (2014), p. 78). Our estimate of 120 bcma assumes some deterioration due to lack of investment. Actual volumes transited were 125-140 bcma in the mid 2000s, falling to 115-120 bcma in 2007-08, around 100 bcma in 2009-11, around 85 bcma in 2012-13 and below 70 bcma thereafter. On Russian exports, note that these figures include 10-15 bcma of gas marketed by Gazprom Marketing & Trading in Europe, much of which is non-Russian gas that should be deducted from pipeline transport requirements.

Map 1: The Ukrainian and Yamal-Europe pipelines

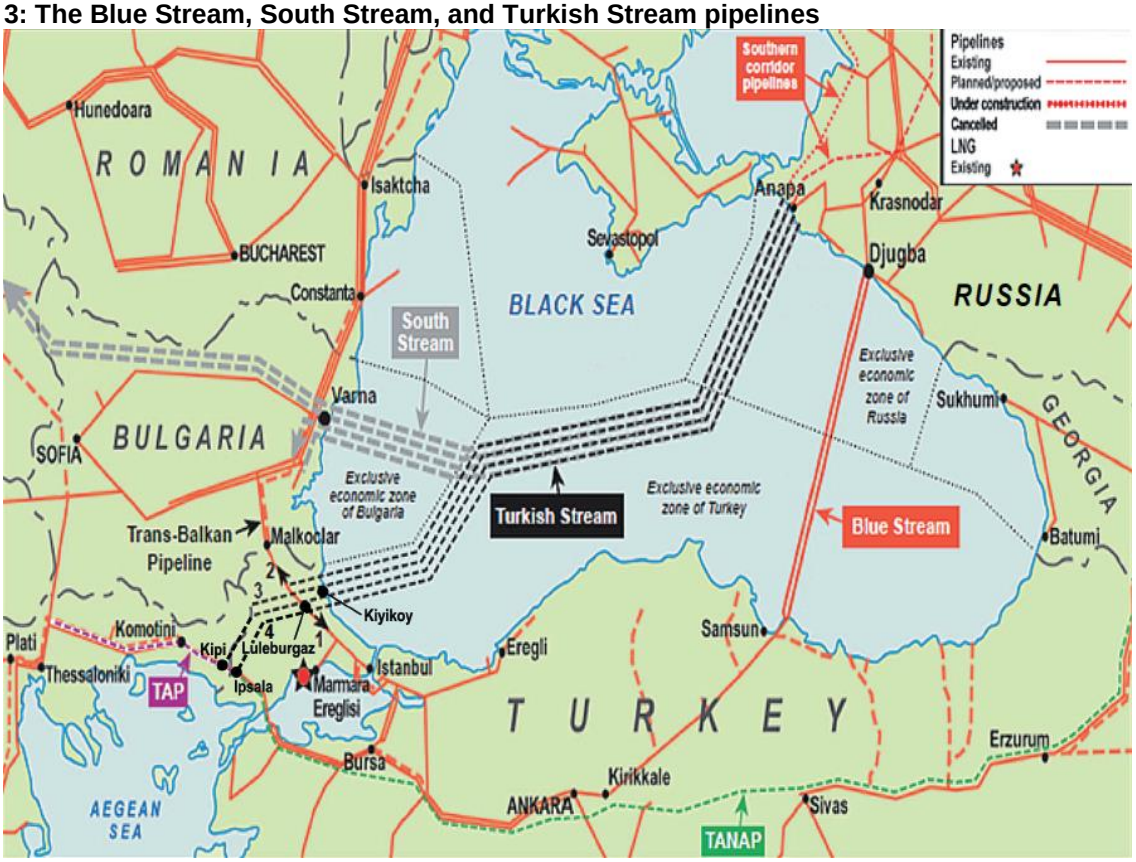
Source: Oxford Institute for Energy Studies

Map 2: The Nord Stream pipelines



Source: Oxford Institute for Energy Studies

Map 3: The Blue Stream, South Stream, and Turkish Stream pipelines



Source: Oxford Institute for Energy Studies

The answers to all three of these questions depend to some extent on the expected level of European gas demand and of Russian imports into Europe. If, for example, European demand continues to fall, and Russian imports fall to the same extent, it would not be many years before the currently existing non-Ukrainian pipeline capacity could carry all the Russian gas that Europe required. We think that such a scenario is possible but unlikely. It is more likely that, between now and 2030, European gas demand will recover from its current relatively low level. (Our colleague Anouk Honore has written about this.[5])

As for the proportion of European demand that will be met by Russian supply, this depends above all on:

- the availability of European domestically-produced gas (output of which is falling – in the last 2-3 years more quickly than forecast, due to the unexpectedly rapid decline of the Groningen field in the Netherlands, and in the coming years with the added problem of indications that Norwegian production may have peaked). The fall in gas prices to historically low levels during the period 2014-16 may accelerate the decline of North Sea production;
- the level of non-Russian imports (principally LNG, of which quite large quantities are likely to become available in the period 2016-2020); and

[5] Honore (2014).

- how Russian gas is priced in comparison to these other sources. (Note that, following the opening-up of the Yamal peninsula gas fields, there are *no* significant production capacity constraints on Russia's ability to deliver gas to Europe, at any feasible level of demand. On the contrary, as of 2015 Gazprom had 100 bcma or more of spare production capacity.[6])

Scenarios suggesting that Russian gas imports to Europe could in 2020 be 130-180 bcm, and during the 2020s could be anywhere in a range between 180 bcm and 280 bcm have been published by our colleague Howard Rogers.[7] He argues that the issue will be decided in large part by comparative prices. Changes in the level of Russian gas exports to Europe over the last decade show that comparative prices have already become an important determinant of volumes. Total Gazprom sales in Europe rose gradually up until 2007-08, when they reached 171-174 bcma. They then fell sharply, to a range of 151-162 bcma, as European demand fell and a significant differential opened between the oil-linked prices of Russian gas and the price of other gas at European hubs. In 2013, after Gazprom made concessions on prices in its sales contracts that closed this gap, its total sales in Europe spiked up to a record 174 bcm, before falling again to 159 bcm in 2014. During this same period, oil-linked prices were largely replaced in the major European gas markets (with the exception of Spain) by hub-based prices. While oil-linked pricing remains dominant in Gazprom's sales contracts, Gazprom showed (e.g. in 2013) its ability to adapt to the changed market, and in our view confirmed its position as the swing supplier to the European market.[8] The assumption in this paper is that it will retain the ability to, at least, defend its market share – although whether it will do so, and how, will only become clear over time.[9] We also see the volume of purchases of Russian gas already committed under long-term contracts as a good indicator of the likely *minimum* level of purchases up to 2030. In broad terms, up to 2020 there are 170 bcma of sales (~126 bcma at 70% take-or-pay level) contracted; up to 2025, 150 bcma (105 bcma at 70% ToP); and up to 2030, 115 bcma (~80 bcma at 70% ToP). (More detail in Sections 5 and 7 below.)

The other commercial factor to be borne in mind is the evolution of the European gas market towards market-based pricing and a greater proportion of spot, rather than contract, sales. These changes have been analysed in other OIES publications.[10] A question for this paper is whether these changes will make much difference to transportation of Russian imports. We suggest that there are two ways in which it might. First, while long-term contracts currently are more widely used for Russian imports than for gas from some other sources, the trend away from long-term contracts will also impact these imports. In the 2020s, it seems as likely that incremental Russian imports (i.e. volumes above those covered by existing contracts) will be sold on shorter term or spot contracts, and that to the extent that long term supply contracts (LTSCs) continue to be employed, they will be for terms significantly shorter than ten years. The range of total import volumes in a market with fewer LTSCs is likely to be wider.[11] Second, the efforts by Ukraine, and the EU, to integrate the Ukrainian gas market, and transport infrastructure, into the European market raise the possibilities that, in addition to gas being transported through

[6] Gazprom CEO Aleksei Miller has stated that in 2014, when Gazprom's output was 444 bcm, it had the capacity to produce 617 bcma, implying more than 170 bcma of shut-in or unused capacity. Production in 2015 was 418 bcm, suggesting that spare capacity increased in that year. See Miller's speech to the company's 2015 annual meeting (http://www.gazprom.com/press/miller-journal/512053/.) Many industry observers think the real figure is more like 100 bcma, or less, but in any case this underlines the ability to meet European demand in all realistic scenarios.

[7] Rogers (2015), especially pp. 14 and 28-33. We use these assumptions in the scenarios in section 6 below.

[8] Stern (2014) in Henderson and Pirani (eds.) (2014); Gazprom Annual Reports.

[9] For extended discussion of the issues, see Henderson and Mitrova (2015); Stern (2015a); Henderson (2016).

[10] See, most recently, Rogers (2015) and Stern and Rogers (2014).

[11] The range of Russian export volumes to Europe could be 100 bcma to 200 bcma depending in the first instance on the path of natural gas demand in Asia. The oncoming glut of LNG from projects under construction in Australia and the US is likely to challenge Russia's market share in Europe. Adherence to oil indexation as opposed to a more competitive pricing paradigm which discourages the investment from future competing LNG supplies may see Russia's volumes to Europe further eroded in low Asian and European demand scenarios. See Rogers (2015).

Ukraine on a new contractual basis, (i) Ukraine's large storage capacity could be used by participants in other central and eastern European markets, and (ii) some gas for consumption in Ukraine (and ultimately in the EU) may be sold on Ukraine's eastern border to companies other than Naftogaz Ukrainy, currently the only purchaser at that point. We discuss such possible outcomes below in section 9.

Background: security of gas supply and transit via Ukraine

We have argued above that the most likely scenarios are ones in which the total volume of Russian gas imports to Europe, and the total desirable pipeline capacity, will be higher than the total existing non-Ukrainian pipeline capacity for the foreseeable future. It is difficult to know how much higher. We set out our view below (see section 5). The importance or otherwise of constructing new pipeline capacity therefore turns on parties' perceptions of Ukrainian transit risk. In the constant public discussions about this, all sides refer to "security of supply". Russia has argued that the transit dimension of security of supply has remained weak as far as Ukraine is concerned and therefore transit diversification projects are necessary to ensure security of supply to Europe. Not only its European customers but also the German government supported this argument with regard to Nord Stream 1 and German, Dutch, and French companies invested in it despite the economic downturn. The concept of security of supply is used by the post-2014 Ukrainian government to support an opposing argument: it contends that security of supply will be assured by investing in the Ukrainian transit network and changing the legal and contractual basis on which it operates; at least part of the European political establishment – although not, generally, those primarily responsible for energy and gas market decisions – accepts this argument and sees this as preferable to transit diversification (broadly, for political reasons).[12]

In discussing security of supply, it is important to bear in mind the distinctions, and relationships, between:

- long-term strategic issues such as investment in new infrastructure;
- shorter-term, smaller-scale issues relating to interconnectivity, system regulation, etc, that are important for ensuring the most rational use of existing infrastructure;
- measures specifically designed to ensure against supply interruptions (e.g. storage arrangements).

In this paper, we use a relatively narrow gas-related "security of supply" definition focussed on the assurance of conditions under which gas can be delivered to buyers, with an acceptable level of threat of supply and price disruptions, which may arise in any part of the supply chain (including source, facility, and transit).[13]

Events in 2014-15 require a reconsideration of how the various parties perceive security of supply of Russian gas to Europe. The military conflict and political instability in Ukraine was at first seen, certainly in Russia, to strengthen the argument that security of supply requires 100% diversification away from transit via Ukraine. But events have undone that logic. Firstly, because gas has flowed to Europe uninterrupted during 18 months when Russian-Ukrainian and Russia-EU relations were at their worst since the end of the cold war. A precedent has been set: issues with a bearing on security of supply were settled even when negotiations on almost everything else have broken down. Secondly, because in June 2015 the Russian political leadership, and Gazprom, both publicly shifted away from their

[12] For the Russian argument see, for example, Gazprom (2014b). For the Ukrainian position, see for example, Naftogaz (2015b).

[13] Yafimava (2011), p.17.

previous position that they would not sign any further transit contracts with Ukraine relating to the years after 2019.

The implication, albeit unstated, is that Russia considers that the transit of some volumes across Ukraine is not incompatible with security of supply, and that 100% transit diversification away from Ukraine remains desirable, but not at any cost. This shift could be explained by Russia's growing pragmatism and understanding that:

- it will be impossible to reduce transit across Ukraine to zero by 2020 (and possibly until 2025) due to political opposition from the EU, which has significant power in respect of Gazprom's ability to build and utilise alternative export pipelines;
- the Ukraine transit route is the shortest for deliveries to south east European countries and Turkey and hence would be preferred from a commercial point of view should acceptable terms be agreed for a post-2019 transit contract and should physical security of transit across Ukraine be guaranteed.

Thus it follows that, should concrete steps be taken to achieve these conditions, Gazprom would be more willing to continue to transit some gas volumes (albeit reduced) across Ukraine post-2020.

We assume in the paper that Russia is likely to retain this attitude. The caveat is that this could change in the case of a further serious deterioration in Russia-Ukraine and therefore Russia-EU relations.

Background: political factors

The unresolved military conflict in eastern Ukraine, Russian support for the separatist forces, EU and US sanctions and Russian counter-sanctions have all produced the most serious deterioration in relations between Russia and Ukraine, and Russia and the EU, since the end of the cold war. We will try to identify the ways that this breakdown may influence the transportation of Russian gas imports.

One obvious result of the deterioration of political relations has been the calls made by European politicians for dependence on imported Russian gas to be reduced. In a paper published last year, with colleagues, we argued that, for Europe as a whole, the only real prospects for diversification away from Russian gas were either (i) a substantial increase in LNG imports to Europe or (ii) substitution of gas by other fuels, which seemed unlikely, but could take place if the political opposition to Russian gas grew.[14] We argued that up to 2020 some central eastern and south eastern European countries that are very heavily dependent on Russian gas imports would probably undertake additional investment, e.g. in interconnector capacity and LNG import terminals, to reduce this dependence. However, given that some of these countries receive Russian gas via non-Ukrainian routes (e.g. the Baltic states) and that others have quite small markets (some south eastern European countries) this will not make a substantial impact on the volume of gas transit through Ukraine that will be required.[15] In short the aspiration of some central eastern and south eastern European countries to reduce dependence on Russian gas has little impact on the question addressed by this paper, i.e. the ways in which Russian gas will be transported to Europe and in particular the role of Ukraine in transit.

On the other hand, a further development of European energy policy, the adoption of the "Energy Union" plan in February 2015 – which contains a specific proposal to strengthen the EU's strategic partnership

[14] Stern (ed.) (2014).

[15] In 2014, total Russian exports to eight south eastern European countries (Greece, Romania, Bulgaria, Bosnia-Herzegovina, Croatia, Macedonia, Serbia and Slovenia) were 7.8 bcm. While many of these countries are among the most heavily dependent (up to 100%) on Russia for gas supplies, any sourcing of alternative supplies, while important to them, will not make a big difference to estimates of transit capacity requirements through Ukraine or via other routes.

with Ukraine – could enhance the integration of Ukraine into the European gas market.[16] This is discussed in Sections 8 and 9 below.

Political change within Ukraine is also an important factor that will shape the gas transport regime after 2019. In general, up until the removal of president Yanukovich, the policy of all post-Soviet Ukrainian governments was to retain constructive relations with both Russia and Europe, and to resist attempts to be pulled into the camp of one at the expense of the other. To state the obvious, the ousting of Yanukovich, the annexation of Crimea and the military conflict in eastern Ukraine have changed this. In the period prior to 2020, there seems little prospect of constructive dialogue between the Russian and Ukrainian governments. The deterioration of political relationships has weakened economic and social relationships between the two countries. As well as completing the EU Association Agreement – the failure to sign which triggered the civil conflict that deposed Yanukovich – the government has sought a closer relationship with NATO and re-opened the issue of NATO membership that was briefly, and completely unsuccessfully, championed by former president Yushchenko (2004-08).

Under these political conditions, not only will the Russian government continue to support transit diversification efforts, but the Ukrainian government will continue to seek to disengage from Russia as a supplier of gas and other energy commodities.

2. Trends in the Russia-Ukraine gas relationship, 2015

There have been several significant groups of developments in 2015 relevant to the issue of post-2019 transit of Russian gas to Europe: the re-working of Russian transit diversification policy in the light of the cancellation of South Stream, the emergence of price competition in the Ukrainian gas market between "reverse flow" gas and direct Russian imports, and related legal and regulatory changes in Ukraine.

Russian transit diversification policy: from South Stream to Turkish Stream and Nord Stream 2

In December 2014, Russian president Vladimir Putin and Gazprom CEO Alexei Miller announced that the South Stream project (which would carry gas to the Bulgarian Black Sea shore bypassing Ukraine, 63 bcm in four strings) was cancelled due to unresolved Third Energy Package (TEP) regulatory problems with the European Commission (EC) and Bulgaria,[17] and that a similar project, Turkish Stream, which would carry the same amount of gas to the Turkish coast, would be launched. The initial vision was that 14 bcm/year would be delivered through the first string to Turkey (thus replacing the volume currently delivered via Ukraine, Moldova and the trans-Balkan pipeline across Romania and Bulgaria), while the rest would be delivered through its other three strings to the Turkish-Greek border (Map 3).[18]

Gazprom's existing European LTSCs stipulate that gas must be delivered to certain delivery points at certain European borders (see section 5) rather than to the Turkish-Greek border, from which they are

[16] EC (2015c) 'Energy Union Strategy'.
[17] For details on South Stream and its cancellation see Pirani, Stern and Yafimava (2015).
[18] 'South Stream project is closed over Bulgarian position, Turkey set to be Gazprom's new route south', *Interfax*, Russia & CIS Oil and Gas Weekly, 27 November-3 December 2014, pp. 11-13.

from several hundred, to more than a thousand, kilometres away. So Miller's statement could have been interpreted either as Gazprom's intention to:

- deliver its gas, re-routed away from Ukraine, only as far as the Turkish-Greek border, thus necessitating changes of delivery points agreed in its European LTSCs (which the European buyers would be highly unlikely to agree to, given the distance from their markets to the Turkish-Greek border and the absence of sufficient pipeline infrastructure in between), or
- deliver its gas to the existing delivery points, necessitating construction of new pipelines from the Turkish-Greek border to bring it there (which European buyers would be highly unlikely to agree to build themselves).

The statement was met in Europe with a significant degree of disbelief and essentially dismissed as bluff, with the EC vice president for Energy Union, Maroš Šefčovič, saying that the project 'would not work', given the seemingly insurmountable challenges that Gazprom would have to overcome.[19] However, it began to be taken more seriously when Gazprom made it clear that it had no intention of renewing the existing transit contract with Naftogaz upon its expiry at the end of 2019. This argument was expressed most colourfully by Gazprom deputy CEO, Alexander Medvedev, in June 2015: he said that "under no circumstances", even "if the sun will replace the moon", will Gazprom enter into a transit contract with Naftogaz after 2019.[20] (The authors, with colleagues, had argued in a paper published in January 2015 that by 2020 elimination of Ukrainian transit by 2020 would be unrealistic, given both physical and regulatory constraints, but that a *significant reduction* would be possible.[21])

In the summer of 2015 the Russian leadership changed its view on post-2019 transit, apparently having recognised the seriousness of political, regulatory and contractual limitations on Gazprom's ability to end transit via Ukraine by that date. President Putin ordered Gazprom to carry out negotiations on a possible new transit contract with Naftogaz which would replace the existing transit contract upon expiry.[22] Putin's statement was significant as it suggested a direct political intervention aimed at improving the gas relationship with Ukraine. Putin's position was soon echoed by Miller, who said that there *could* be a new transit contract, but not on "unprofitable, unfair, unacceptable" terms.[23] In July 2015, prime-minister Dmitry Medvedev made a similar assertion during a visit to Slovenia.[24] In September 2015, Miller assured Šefčovič that Gazprom was 'prepared to hold negotiations with Ukraine' on the post-2019 transit contract and that Gazprom had never said it was 'automatically reducing the amount of transit across Ukraine to zero'.[25] In December 2015, Putin, speaking at the annual press conference, expressed Russia's willingness to continue transiting gas across Ukraine should the latter ensure 'reliable, market-based operation of the transit system, […] regulation in line with the highest standards'.[26]

In our view, this changed stance does not suggest that the Russian government, or Gazprom, have abandoned the transit diversification policy, but that they have had to acknowledge that it will take longer, and be more difficult to achieve, than they had previously hoped. Gazprom's transit diversification policy is long-standing and the company has progressively reduced its dependence on

[19] 'EU energy chief plays down practicality of proposed Russia-Turkey pipeline', *Wall Street Journal*, 22 January 2015.
[20] 'Gazprom will not transit gas across Ukraine even if the sun will replace the moon', *Interfax*, 9 June 2015.
[21] Stern, Pirani, and Yafimava (2015), p. 9.
[22] 'Russia cuts gas supplies to Ukraine as Kiev refuses to pay proposed Q3 price, *Interfax*, Russia & CIS Oil and Gas Weekly, 25 June-1 July 2015, p. 9; 'Kreml' peredumal prekrashchat' tranzit gaza cherez Ukrainu posle 2019 goda', *RBC*, 26 June 2051.
[23] 'Russia cuts gas supplies to Ukraine as Kiev refuses to pay proposed Q3 price, *Interfax*, Russia & CIS Oil and Gas Weekly, 25 June-1 July 2015, p. 9.
[24] 'US LNG will not come cheap for Europe, Nord Stream 2 expansion plans intensifying – Medvedev, *Interfax*, Russia & CIS Oil and Gas Weekly, 23-29 July 2015, p. 7
[25] 'Gazprom CEO tells EC about planned amounts of gas supplies on each route to EU', 14 September 2015.
[26] Vladimir Putin's press conference (transcript) (in Russian), 17 December 2015.

transit across Ukraine first and foremost, but also across Belarus and Moldova. More than twenty years of transit disputes reinforced the Russian leadership's determination. Blue Stream (the Black Sea offshore pipeline to Turkey, 16 bcma) (Map 3) and Yamal-Europe (the transit pipeline across Belarus and Poland, 33 bcma) (Map 1) were both built to reduce transit across Ukraine. (There was also a proposal to build Yamal 2, a pipeline to move gas directly from Belarus into Poland and south to Slovakia, thus further reducing transit across Ukraine). After disputes with Ukraine in 2006 and Belarus in 2007, plans for the construction of Nord Stream (the Baltic Sea offshore pipeline to Germany, 55 bcma in two strings) were put in place (Map 2). The January 2009 Ukraine crisis, when no Russian gas flowed to Europe across Ukraine for two weeks in the middle of winter (causing a humanitarian emergency in some south eastern European countries) confirmed to Gazprom that it had no reliable instrument for reducing transit risk other than avoidance – and ensured that Nord Stream 1 went ahead.[27] The result was that transit of Russian gas across Ukraine was reduced by half between 2006 and 2014 (from 128.5 bcm to 62 bcm). Plans to build South Stream, and then Turkish Stream and Nord Stream 2, clearly carried, and carry, the potential to eliminate transit via Ukraine almost completely.

The Turkish Stream project has experienced several serious setbacks, which are likely to cause delays beyond 2020 and possibly cancellation. Notwithstanding much initial enthusiasm on the part of Russia and Turkey and signature of a memorandum of understanding (MoU) in December 2015,[28] the parties have failed to sign an intergovernmental agreement (IGA) on the project despite negotiating for most of 2015.[29] Gazprom also failed to secure a number of permits from the Turkish government it would need to proceed with the project: Turkey has not granted permission to build the offshore section of the pipeline in its exclusive economic zone (EEZ) and in its territorial waters, although it cleared the usage of the South Stream environmental impact assessment (EIA) study and granted the permits to conduct engineering and surveying.[30] Despite not having the necessary permits, Gazprom lifted suspension of its contract with Saipem of Italy (originally contracted to build the offshore section of South Stream) to build an offshore section of Turkish Stream.[31] This decision was made in the aftermath of Miller's announcement in May 2015 (after a meeting with Turkish energy minister Taner Yildiz) that an agreement was reached for gas to start flowing via Turkish Stream in early 2016; however, this announcement was subsequently refuted by the Turkish ambassador to Russia, Umit Yardim, who stated that the project would only be launched after 2017.[32] As disagreements continued, Gazprom cancelled the Saipem contract in July 2015.[33]

The failure to conclude the IGA is explained by inability to resolve a number of commercial issues including:

- a gas price discount to be granted to the Turkish state gas company Botas (reportedly Gazprom offered a 10.25% discount on the actual price whereas Botas demanded a 10.25% discount on the base price (Po) which would result in a higher discount;[34]

[27] Yafimava (2011), pp. 92-96.
[28] Gazprom (2014c).
[29] Reportedly it was decided in June 2015 to negotiate an IGA on one string of Turkish Stream rather than on all 4 strings, as initially planned, see 'Russia and Turkey negotiate an agreement on one string of Turkish Stream for now' (in Russian), *Vedomosti*, 28 July 2015.
[30] Gazprom Export (2015).
[31] 'Gazprom enters construction stage for offshore portion of Turkish Stream gas pipeline', *Interfax*, Russia & CIS Oil and Gas Weekly, 7-13 May 2015.
[32] 'Ankara expects Turkish Stream pipeline to be launched after 2017', *Interfax*, Russia & CIS Oil and Gas Weekly, 21-27 May 2015.
[33] 'Russia's Gazprom cancels Saipem deal on the Black Sea gas pipeline', R*euters*, 8 July 2015**.**
[34] *'Turkey plays with Gazprom on a weak lyra' (in Russian),* Kommersant*, 18 March 2015.*

- ways of formalising the discount (reportedly Russia wanted to make the price discount conditional on the signature of the Turkish Stream IGA whereas Turkey refused simultaneous signature);
- the role of Turkey in the project (the Russian position being that Turkey would be a transit corridor for Russian gas delivered via Turkish Stream pipelines whereas the Turkish position being to become a regional hub via e.g. re-selling Russian gas).[35]

Having failed to secure a discount on price, Botas submitted a price dispute to international arbitration in October 2015.[36] In addition to commercial disagreements, the project suffered delays due to Turkish general elections in June and November 2015 and subsequent government changes.

Thus the initial schedule whereby the parties agreed to build the first line of Turkish Stream to Kiyikoy in Thrace (western Turkey) to start deliveries (all to Turkey) at the end of 2016 while reaching full capacity by 2017, no longer looks realistic. Correspondingly the second line which, once having reached Kiyikoy, could continue for 80 km on Turkish territory to connect with the Trans-Balkan pipeline at Luleburgaz so that it could supply gas to south east Europe in reverse mode,[37] is also set to be delayed. Potentially the third and fourth lines, which could continue for a further 100 km from Luleburgaz to the Turkish-Greek border at Ipsala/Kipi could have been built after 2020: the third line could connect to, and utilise capacity in, the Southern gas corridor pipelines (Trans-Adriatic pipeline (TAP) or Interconnector Turkey-Greece-Italy (ITGI))[38] and the fourth line could connect to, and utilise capacity in, any future European 'vertical' gas corridor pipelines (e.g. Eastring or Tesla); less likely (but possibly) the third and the fourth lines could connect to the Bulgarian shore (thus realising the original South Stream concept).[39] However, following Russia's announcement in July 2015 on halting the work on its 'southern corridor' pipelines (the pipelines in the south of Russia which would have delivered gas to the third and fourth strings of Turkish (or South) Stream),[40] it became clear that, at least initially, the Turkish (or South) Stream would be limited to just two pipelines with total capacity of 31.5 bcma.

Turkish Stream's immediate prospects, already marred by commercial disagreements, were dealt a further serious blow by Turkey's downing of the Russian military jet Su-24 over the Turkish-Syrian border in November 2015.[41] The incident has led to sharp deterioration of the Russia-Turkey political and security relationship, with Putin labelling Turkey's actions a 'stab in the back'.[42] It was not immediately clear how and whether the Turkish Stream project would be affected, as the Russian government introduced several restrictive economic measures against Turkey and suspended the work of the bilateral intergovernmental commission, tasked with *inter alia* negotiating the Turkish Stream

[35] 'Turkish Stream to turn into a 1-line project unless concessions from Moscow, says Özdemir', *Natural Gas Europe*, 9 November 2015.
[36] 'Turkey goes to international arbitration over Russian gas price: official', *Platts*, 27 October 2015. In August 2015 the then Turkish energy minister, Taner Yildiz, stated that the parties had agreed the 10.25% discount (but did not specify whether the actual or base price would be reduced) but no documents were signed to formalise it, see 'Yildiz: no further delays expected on Russian gas price discount', *Natural Gas Europe*, 3 August 2015. In respect of arbitration, it is not clear whether Botas is asking for a bigger reduction or whether it was promised but did not receive this reduction, or whether any price reduction was conditional on the IGA being signed. If the price discount is connected to the Turkish Stream IGA then this would delay the project further.
[37] Roberts (2015), pp. 8-11.
[38] An EC official has confirmed that Gazprom's usage of capacity in TAP would be possible, see 'Russia can use Trans-Adriatic pipeline, Commission confirms', *EurActive*, 6 March 2015.
[39] 'Bulgaria hopes to build a scaled down version of the South Stream' (in Russian), *Bulgaria Today*, 4 December 2015.
[40] 'Gazprom experiences freezes in the south' (in Russian), *Kommersant*, 7 July 2015.
[41] 'Turkey downing of Russia jet 'stab in the back' – Putin', *BBC*, 24 November 2015.
[42] Ibid.

IGA.[43] According to unnamed Gazprom officials, interviewed by Reuters, Gazprom expected the project to be 'frozen' for 'several years'.[44]

However, it is argued here that as far as Russia is concerned the project is unlikely to become a fatal casualty of worsened bilateral relationship, with Russia likely to agree to renew the negotiations on the project should Turkey ask for it. Russia's attitude is explained by the fact that it sees Turkish Stream as purely a commercial project (and hence compatible with its downgraded political and security relationship with Turkey), allowing it to eliminate Ukrainian transit in respect of existing supplies to western Turkey as well as meet an increase in Turkish demand. It also sees Turkish Stream as a transit diversification project in respect of its exports to Europe. This is suggested by Putin's statement, made in December 2015, that the project's revival would be conditional on receiving 'written guarantees' from the EC acknowledging that all pipelines routes [for Russian gas to Europe – ***authors' note***] – including through Turkey – are 'priority projects and will be supported'.[45] This was further confirmed by the Russian energy minister, who said that Russia would be ready to work on the project should Turkey and European countries 'demonstrate their interest definitively'.[46] However, the EC is unlikely to provide any such guarantees, especially as Turkish Stream's absence would imply continued gas transit across Ukraine (which could be conveniently in line with the EU political position of preserving a transit role for Ukraine, see section 3).

Furthermore, as far as the current Turkish leadership is concerned, there are reasons to believe that the project might be put on hold or cancelled altogether. In contrast to Russia, Turkey sees it as a strategic project, potentially increasing its import dependence on Russia (but without necessarily turning it into a 'hub' as it had previously hoped), desirability of which is being re- assessed against the background of dramatically worsened bilateral relationships. Should this thinking prevail, Turkey might decide not to continue with the project and cancel its offshore permits.[47] However, such a decision would imply Turkey's continuing dependence on Ukrainian transit for two thirds of Russian gas imports. It could also create a potential shortage of capacity for additional Russian imports should its demand continue to increase as expected (as the Trans-Balkan pipelines and Blue Stream only allow limited room for expansion[48]), given the possibility of limited realistic alternatives up to the mid-2020s.[49]

Should Turkey believe this is too risky an outlook to accept, it might renew negotiations on Turkish Stream. Should it do so and should the parties overcome their disagreements over the course of 2016-2017, it would still be technically possible to build and start operating one (if Turkey cooperates) or two (if Turkey *and* the EC cooperate) strings of Turkish Stream by 2020. However, should Turkey decide against Turkish Stream and should its political relations with Russia continue to worsen, it might not only cancel Turkish Stream but also attempt to complicate construction of any other Russian offshore pipelines, which would have to run through the Turkish EEZ in the Black Sea, thus negatively impacting prospects of any alternative pipeline projects e.g. South Stream.[50]

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[43] The Russian government directive, On measures for implementation of the presidential decree N 583 of 28 November 2015 'On measures ensuring national security of the Russian Federation and its citizens against criminal actions and on application of specific economic measures towards the Turkish Republic', N 1296 of 30 November 2015.

[44] 'Exclusive - Russia may freeze Turkish Stream gas project: Gazprom sources', *Reuters*, 1 December 2015.

[45] Vladimir Putin's press conference, 17 December 2015.

[46] 'Novak: Russia is ready to carry out the Turkish Stream project' (in Russian), *RIA Novosti*, 14 January 2016.

[47] It has been rumoured that Turkey has already cancelled the permits; if true this would indicate that such thinking is prevailing, see 'Interview: Stern on gas supplies, markets in the year ahead', *Natural Gas Europe*, 21 January 2016.

[48] In October 2014, Gazprom agreed to expand Blue Stream's capacity of 16 bcma by 3 bcma (at the Turkish request), see Gazprom (2014a). In October 2015 the expansion has been reportedly scaled down to 1 bcma, see 'Gazprom mulls reduction in Blue Stream natural gas link capacity expansion', *Platts*, 5 October 2015.

[49] For an analysis of these alternatives see Stern (ed.) (2014).

[50] Any offshore Black Sea pipeline, connecting the Russian coast to the Bulgarian coast, would need to run either through the Turkish or Ukrainian EEZs. It goes without saying that the Ukrainian government would not grant permission for this, whereas

Meanwhile as it became clear during 2015 that the Turkish Stream pipelines would not be built as quickly as initially expected, Gazprom revived its plans to expand the existing Nord Stream 1 system by building two additional pipelines (Nord Stream 2) which would double its capacity to 110 bcma. In September 2015 Gazprom concluded a Nord Stream 2 shareholders agreement with Germany's BASF and Uniper,[51] France's Engie,[52] Austria's OMV and the Netherlands-UK Shell[53] and in December 2015 it issued a tender call for offshore pipeline construction, with France's Technip, Switzerland's Allseas, the Netherlands' IHC and Italy's Saipem all participating.[54]

Gazprom's efforts in respect of South Stream, Turkish Stream and Nord Stream 2 suggest that the company has remained fully committed to its transit diversification policy. However, while the 2014 Ukraine political and military crisis has strengthened Gazprom's commitment, it also created new *political* barriers to the construction of new Russian gas pipelines – in addition to *regulatory* barriers posed by the EU TEP – thus making implementation of transit diversification policy significantly more difficult (see Sections 3 and 4). Furthermore, a sharp drop in oil and gas prices (more than 50% since the second half of 2014), and sanctions imposed by the EU (and the US) on Russia in response to its annexation of Crimea and policy on eastern Ukraine, have created additional *commercial* barriers, limiting Gazprom's ability to finance new projects, and the profitability of such projects for investors.

"Reverse flow" to Ukraine, direct Russian supply and transit

Throughout the post-Soviet period, arrangements for transiting Russian gas across Ukraine were made in negotiations that also covered supply to Ukraine. Intergovernmental agreements often covered both supply and transit; only in 2006 were commercial contracts signed that were not underpinned by intergovernmental agreements; in 2009 separate commercial supply and transit contracts were signed – but even then, the transit contract was signed not by Ukrtransgaz, the company responsible, but by its parent, Naftogaz Ukrainy. (The OIES natural gas research programme has published extensively on this relationship.[55])

Despite the deterioration of Russia-Ukraine political relations since February 2014, the transit contract has remained in force and the transit of gas to Europe has continued uninterrupted. However, actions have been taken by both parties which could potentially impact if not transit itself certainly perceptions of its security. These include

- Naftogaz's proposal to apply its new tariff methodology to transit services [56] (adopted in December 2015, see section 8 below),
- the Ukrainian regulator's decision to fine Gazprom $3.4 bn for alleged violation of competition law through 'inaction' which resulted in 'failure to accept transit services' (adopted in January 2016),[57]

any Russian attempt to build a pipeline without having such permission – based on the argument that part of the Ukrainian EEZ might have become part of the Russian EEZ following Crimea annexation - would be doomed due to the fact that Ukraine's internationally recognised borders include Crimea. In practical terms this would (at the very least) mean that it would be impossible to secure western financing and technological expertise for offshore pipe-laying.

[51] Formerly known as E.On.

[52] Formerly known as GdF Suez.

[53] Gazprom, BASF, E.On, Engie, OMV and Shell have signed a shareholders agreement on Nord Stream 2, Gazprom press release, 4 September 2015.

[54] 'Tender of large diameter' (in Russian), *Kommersant*, 13 January 2016.

[55] See, most recently, Pirani and Yafimava (2014). For history and analysis of transit issues in the Russia-Ukraine gas relationship in the 2000s, see Yafimava (2011).

[56] Naftogaz (2015a).

[57] Ukraine's antimonopoly committee, statement, 25 January 2016.

- and Gazprom's decision to end its balancing agreement with Naftogaz under which the latter had been compensated for using gas from its storage to cover daily fluctuations in European demand (adopted in June 2014).[58]

The supply contract, although subject to a great number of amendments, has also remained in force. Since 2014, both contracts have been underpinned by trilateral political agreements (between the EC, Russia and Ukraine) in respect of deliveries to, and transit across, Ukraine during winter seasons 2014-15 and 2015-16.

Gazprom ceased deliveries to Ukraine in the summer of 2014, after talks on price discounts and debts for gas delivered broke down; at the same time, Gazprom and Naftogaz took a series of cases against each other to the commercial arbitration court in Stockholm. As the winter of 2014 approached, and commercial negotiations had reached an impasse, the EC intervened and brokered a trilateral political agreement, underpinning amendments in the supply contract ('winter package' 2014-15), which opened the way for a resumption of direct imports and for debt repayment. For the purposes of this discussion, the important point about the restart of direct imports in Q4 of 2014 was that they effectively marked the start of price competition between directly imported gas and reverse flow volumes. In the year since then, despite political factors continuing to influence Russia-Ukraine trade, price competition has played a key role.

In Q4 2014 and Q1 2015, a total of 2.68 bcm was imported directly from Russia (Table 1), compared to about 6.5 bcm of reverse flow imports from Europe, that were priced $30-40/mcm lower than the direct imports. In Q2 and Q3 2015, Russia changed its policy and made gas available at prices $30-40/mcm lower than the price of reverse flow gas. Ukraine nevertheless bought little Russian gas in Q2 2015, and none in Q3 – while buying 5.15 bcm of reverse flow gas at a premium of around $30-40/mcm to Russia's offered prices – presumably in order to minimise dependence on Russia, but this was clearly not the cheapest option. For Q4, Gazprom offered direct imports at a price a few dollars lower than reverse flow prices; this offer was again formalised through a trilateral political agreement underpinning amendments in the supply contract, thus constituting the 'winter package' 2015-16.[59] In early October Naftogaz paid for 2 bcm of direct Russian imports for Q4; in response, reverse flow volumes sank temporarily, but rose during the quarter to meet winter demand. In January 2016, with European hub prices at very low levels, Naftogaz was able to buy reverse flow gas at slightly lower prices than Gazprom's announced price of $212/mcm.[60] In addition to these imports, Gazprom has since February 2015 exported about 0.2 bcm/month of gas directly to the territories controlled by separatist forces in eastern Ukraine. It has priced these according to the 2009 contract, but who is responsible for payment, and on what contractual basis, is disputed. Prices and volumes of Ukraine's imports in 2014-15 are shown in Table 1.

[58] 'Gazprom eksport otkazalsia ot balansirovki tranzita cherez Ukrainu', *Vedomosti*, 19 June 2014.
[59] Notably this was only initialled but not signed by the parties, as opposed to the similar trilateral political agreement, which underpinned the 2014-15 'winter package'.
[60] Author's research; Pirani (2015).

Table 1. Gas imports into Ukraine: prices and volumes

			From Russia			From Europe	
			Price, $/mcm	Volume, bcm		Price, $/mcm	Volume, bcm
2014	**Q1**		268.5	6.09		n/a	0
	Q2		485	7.84		282	0.6
	Q3		n/a	0		352	1.63
	Q4		378	0.52		353	2.84
2015	**Q1**		329	2.16		294.84	3.615
	Q2		247	1.54		275.27	2.718
	Q3		247	0		265.68	2.399
	Q4		227.36	2.37		230-250	1.268
2016	**Jan**		212	0		188-211	0.915

Sources: news reports, customs statistics, author's estimates

The conclusions with respect to reverse flow are:

- First, at least for 2015, the EC has succeeded, with the trilateral political agreements, in creating the basis for continued gas transit, and a minimal level of gas imports to Ukraine, at a time of extreme political tension. Significant problems remain, including those surrounding levels of gas storage in Ukraine.[61] But in the absence of any substantial change in political relations and/or in the military conflict, it is possible that this pragmatic political procedure could continue at least until the Stockholm arbitrators rule on the Gazprom-Naftogaz dispute, which will be in 2017 at the earliest – or even until the expiry of the sales and transit contracts at the end of 2019.
- Second, bearing in mind that future Russian direct exports to Ukraine will in any case be at a much lower level than in the past (see section 9 below), the pricing arrangements that have

[61] In recent years, it has become common for alarm to be expressed in autumn about whether the volume of gas stored in Ukraine for the winter will be sufficient to ensure the reliable flow of gas to Europe. In the autumn of 2015, the Ukrainian energy ministry suggested that 17 bcm would be needed; Gazprom executives suggested 19 bcm. We suggest treating these figures with caution, for at least the following two reasons. First, engineers familiar with the system say it is difficult to name a figure for the minimum safe level of storage from a technical standpoint, because the volume has never fallen to anything close to such a level. Rough figures for guidance, given by Ukrtransgaz storage managers at an industry conference in Kyiv in October 2015, were: excluding cushion gas (that is always excluded from statistics), 4.8 bcm of the stored gas is buffer gas, i.e. cannot be removed; roughly 2 bcm is required for balancing transit flows; the remainder (12.2) is stored to ensure that Ukraine's winter demand can be met promptly; 19 bcm is the ideal total level. Second, the required level of storage must be related (according to ratios that we do not know) to the level of Ukraine's own consumption and to the level of transit. At the start of the winter season in 2013 (when there was 15 bcm) and 2014 (when there was 16.6 bcm), storage levels were much lower than in previous years. But in both of these years, storage was *higher* as a proportion of, for example, its 2006 level, than was Ukrainian consumption and the total transit volume – that is, storage levels had fallen, but not as far proportionally as consumption and transit volumes had fallen. On the other hand, winter was relatively mild in both of these years. All this suggests that the minimum *technical* level required is much lower than 17 bcm, while the minimum level to ensure uninterrupted winter supply to Ukrainian customers is much higher. Moreover, higher figures have been mentioned by politicians and managers in discussions about financing storage, in order to support various negotiating positions. In mid-January 2016, storage levels were at 11.7 bcm, compared to 9.8 bcm in mid-January 2015. See also Pirani, Stern and Yafimava (2010), pp. 42-46.

emerged in 2014-15 appear to be leading the two sides towards future commercial arrangements that are linked to prices in the European market, either directly or via European hubs.

- Third, while much political heat has surrounded the issue of Gazprom's capacity contract with Eustream and other obstacles to virtual reverse flow (see section 8 below), it should be borne in mind that the aggregate physical reverse-flow capacity through Budnice on the Ukraine-Slovakia border, Beregovo on the Ukraine-Hungary border, and Drozdovichi on the Ukraine-Poland border (i.e. without any capacity at Velke Kapusany) is around 15 bcma[62] (i.e. comfortably higher than reverse-flow imports in 2014 and 2015).

Ukrainian transit risk factors

In the 2000s, transit security of the Ukrainian corridor was one of the weakest dimensions of European gas supply security, as amply demonstrated by the 2006 and 2009 transit crises. All the main parties to disputes over the transit of Russian gas to Europe – the Russian, Ukrainian and European governments and companies – have at various times cited supply and/or transit risks, either to support negotiating positions or to justify their actions. For example (see below, section 3), European politicians commonly refer to Russian gas supply risks that are actually related to their perception of Russia-EU political relations. A lesser example is the exaggerated claim, by both Ukrainian and Russian companies, about the level of gas storage required in western Ukraine to ensure uninterrupted gas transit to Europe (see footnote 61 above), made during negotiations with international financial institutions about funding storage purchases. Since perceptions of risk differ so widely, it is important to specify the range of issues to which the term could refer. Here we consider first the factors that might result in disruption to the transit through Ukraine of Russian gas bound for Europe, and their importance; and then the responses of market players that indicate their perceptions of risk.

Prior to the Ukrainian political crisis of 2014, the main risk to gas transit arose from a series of Russian-Ukrainian disputes (i.e. the 2006 and 2009 "gas wars", and a series of 'near misses'), usually triggered by Naftogaz Ukrainy's failure to pay for imported supplies and the accumulation of debts. Naftogaz and Gazprom have been in international arbitration since early 2014, arguing *inter alia* over gas prices, debts, and transit tariffs arising from obligations in their January 2009 supply and transit contracts, with compensation claims running into billions of euros.[63]

Changes in commercial conditions and negotiations since 2014. Meanwhile, political and commercial conditions have changed fundamentally. Firstly, the post-Soviet system of supply and transit contracts between Gazprom and Naftogaz, underpinned by Russian-Ukrainian political agreements, collapsed. From October 2014 a new system, where the existing supply and transit contracts have been underpinned by tripartite agreements between the parties, with active mediation by the EC, made possible 'winter packages' for 2014-15 and 2015-16. These represented contractual amendments underpinned by trilateral governmental declarations setting out the conditions for continued supplies to, and transit across, Ukraine. Promised financial support from both the European Bank for Reconstruction and Development (EBRD) (300 mn euros) and the World Bank (500 mn euros) proved necessary to secure the 2015-16 package, enabling purchases of gas by Naftogaz during winter 2015-16.[64]

Secondly, the volume of Ukrainian consumption and imports has fallen steeply, with direct imports from Russia falling furthest, thereby reducing the risk of non-payment. Thirdly, all imports are being made at prices related to those on the European hubs and a pre-payment system has been introduced. Although

[62] Naftogaz (2014), p. 82.
[63] A judgement is not expected until early 2017 (at the earliest).
[64] The EBRD money has been made available but may only be used for purchasing reverse flow gas. At the time of writing, the World Bank money – which can be used for purchasing gas both via direct and reverse flow – has not yet been made available. See 'Demchyshyn hopes World Bank will issue loan for gas purchases in a month or two ', *Interfax-Ukraine*, 13 January 2016.

the very serious economic crisis in Ukraine means that some consumers are failing to pay, these debts are not rapidly passed along the supply chain as happened previously; moreover, the IMF and other international financial institutions have (largely for political rather than economic policy reasons) begun to supervise closely Ukraine's state finances, including those of Naftogaz. Fourth, a fall of more than 40% in European hub prices between the beginning of 2014 and the end of 2015 has substantially reduced funding requirements.

Negotiating risks. For these reasons, the possibility of disputes arising from non-payment has been substantially reduced, although not eliminated. Spikes in gas demand, caused by exceptional weather conditions, or further payment problems arising from Ukraine's serious economic difficulties, could still occur. The tripartite framework, pre-payment terms and involvement of international financial institutions (IFIs) make a large-scale payment crisis less likely than in the past, and resulting supply interruptions less likely still. However the EC has made it clear that such financial support is conditional on Ukraine's adoption and implementation of gas sector legislation compliant with the EU energy law (the energy *acquis*)[65] – although such conditions have in the past frequently been softened in line with geopolitical considerations. While Ukraine has adopted the new gas law and the law on gas transport (with Energy Community Treaty (EnCT) secretariat staff involved in drafting this legislation), implementation remains problematic; with the failure to ensure independence of the national regulator being a major concern.[66] Should there be a further serious deterioration in political relationships between Russia and Europe, Russia might withdraw from tripartite negotiations on transit, which would affect the parties' ability and willingness to resolve commercial gas issues.

While both supply and transit contracts between Gazprom and Naftogaz are in place until the end of 2019 – which as of 2014 have been underpinned by tripartite agreements between the Russian government, the Ukrainian government and the EC – there is no contractual framework either for supply or for transit upon their expiry. An important issue is whether and on which terms a new post-2019 transit contract will be agreed. Although both parties have confirmed their willingness to conclude a new transit contract, several issues e.g. tariffs and capacity access rights are likely to prove contentious (see section 8).

Pipeline integrity risks. Another source of risk, as with all pipeline corridors, is the physical condition of the pipes, which require refurbishment. But since transit volumes are now half of what they were ten years ago, and are not expected to exceed 60 bcma in future, the demands on the system are substantially lower than they were. The conclusions of an extensive 2011 study of the network by Mott MacDonald were that at least $4.3 bn would need to be spent over the next 7 years for modernisation of the network, while at least $2.8 bn would need to be spent over the next 8-10 years to keep the network in operational condition.[67] Accident statistics suggest that the Urengoy-Pomary-Uzhgorod pipeline – the main transit corridor carrying gas to central and east European countries – must be addressed as a matter of priority.[68] In December 2014, the European Investment Bank (EIB) and the

[65] Notably, in February 2016, Christine Lagarde, the IMF's managing director, stated that 'it is hard to see how [a $40bn IMF-led rescue of the economy] can continue and be successful' without Ukraine making a 'substantial new effort' to reform', see 'IMF warning sparks Ukraine pledge on corruption and reform', *Financial Times*, 10 February 2016.
[66] Energy Community CESEC monitoring report, 12/2015.
[67] But this may have assumed the continued transit of more than 100 bcma, 'Experts have evaluated technical state of the Ukrainian gas transmission network', 14 November 2011.
[68] Followed by the Soyuz and Brotherhood pipelines (carrying gas to central and eastern Europe) and the Eletz-Kremenchug-Ananiev-Tiraspol-Izmail pipelines (carrying gas to south eastern European countries). In July 2014, more than two years after the Mott MacDonald study was conducted, a massive explosion took place on the Urengoy-Pomary-Uzhgorod pipeline; it is possible that this was a technical failure though the Ukrainian authorities suggested terror attack as the main (but never proven) cause, see 'Ukraine suspects gas pipeline blast was an attack', *Reuters*, 17 June 2014.

EBRD have approved loans to Ukraine – 150 mn euros each – to finance Urengoy-Pomary-Uzhgorod modernisation (total cost is $660 mn).[69]

Political/military risks. A final source of risk is the military conflict in eastern Ukraine and associated acts of terrorism. We concur with the recent UN assessment, suggesting that 'a further escalation of the conflict may lead to interruption of the Russian natural gas flow through Ukraine'.[70] We consider that the continuation of a low-level "frozen conflict" in Donetsk and Lugansk is the most likely scenario; in this case, the main transit pipelines to Europe will not be affected. But pipelines are vulnerable to isolated acts of terrorism and should the military conflict re-escalate and spread further north – which we do not believe is a likely scenario – clearly this could pose risks to the network. However, even if the insurgency remains contained to eastern regions, for as long as no lasting settlement is reached, sabotage and attacks on pipelines cannot be ruled out.[71]

Market and corporate perceptions of Ukrainian transit risk

There is little evidence in the European traded gas market of a Ukrainian risk premium. The disputes of 2005-09 caused price spikes. The most recent price spike that was clearly related to Russian imports was that of February 2012, when protracted cold weather across the Eurasian land mass drove up prices.[72] None of the winters since then have produced a market reaction – despite political instability in Ukraine – although this is partly because the market has been comfortably supplied, and even oversupplied, during that period, a situation which seems likely to continue through the late 2010s.

We take companies' actions and investment decisions as a reflection of their assessment of risk. The most negative assessment of Ukrainian transit risk is that of Gazprom, which has prioritised the transit diversification projects discussed in this paper. Major north western European purchasers of Gazprom gas have, at least in words, supported this strategy; an indication of the seriousness with which they regard Ukrainian transit risk will be the timing of investments in Nord Stream 2, currently the leading diversification project.

However, central and particularly south eastern Europe – the region singled out by Šefčovič as being potentially endangered by redirection of Russian gas flows away from Ukraine via alternative pipelines - will remain vulnerable to potential interruption of transit across Ukraine. Therefore continued active involvement of the EC in the Ukraine-Russia gas relationship (both as a mediator and a provider of financial support to Ukraine), aimed at increasing security of transit across Ukraine, will be necessary at least until 2020 and possibly beyond.

The conclusion is that, as long as the tripartite negotiating framework between Russia, Ukraine and the EU remains in place, the risk of interruption of transit across Ukraine – ironically, given the catastrophic state of the economy and the disastrous breakdown of Russian-Ukrainian relations – is lower than it was prior to 2014, although technical breakdown and politically-related sabotage events remain possibilities. Any breakdown of EU-Ukrainian relations – due to failure to implement promised reforms – could threaten Ukrainian ability to pay for gas which would again raise transit concerns.

[69] EBRD (2014).
[70] UN (2016).
[71] The fact that Ukrainian activists have blown up four power pylons which resulted in lasting power cuts to Crimea suggests that a similar scenario is possible in respect of transit pipelines, see 'Crimea without power after pylons blown up', *BBC*, 22 November 2015.
[72] Henderson and Heather (2012).

3. European views of Ukrainian transit and Russian transit diversification policy

European political attitudes: the EU position

Just as Russia's determination to advance with transit diversification policy has strengthened after the 2014 Ukraine crisis, the European attitudes towards construction of *any* new Russian export pipeline capacity towards Europe have become increasingly hostile. While the European Commission (EC) cautiously welcomed construction of Nord Stream 1 in 2011-12, its attitude towards South Stream has been lukewarm from the start – though this was mostly attributed to South Stream's alleged incompatibility with the Third Energy Package (TEP) – and turned distinctly negative in 2014.

As a result of the 2014 Ukraine crisis, the EU has become reluctant to support any new Russia-led export pipeline (and other) initiatives due to the deterioration of bilateral political relations. The EU's political agenda has expanded to include maintaining a gas transit role for Ukraine, partly to ensure that Ukraine continues to receive payment from Gazprom for transit services (much needed support for the country's strained finances) and partly to enable Ukraine to maintain reverse gas flows (contractually European but physically Russian gas purchased by Naftogaz from European traders and flowed eastwards) to the extent that direct purchase of large volumes of Russian gas remain commercially and politically unattractive for Kiev. Adoption of this position has forced the EC to defend the Ukraine's record as a reliable transit country (e.g. EU Climate and Energy Commissioner, Miguel Arias Canete, calling Ukraine 'a safe transit route' through which 'gas should continue to flow'[73]). This is not easy given that Ukraine violated transit non-interference provisions of the Energy Charter Treaty (ECT) during the January 2006 and 2009 transit crises (though the EC has never made a public statement to this effect).[74]

While the overall EU attitude towards Nord Stream 2 is definitively negative, it incorporates many different nuanced views as to whether the project is or is not needed in Europe and whether and how it can be built and utilised. One view is that Nord Stream 2 is 'not needed' because there is enough capacity through existing pipelines via Ukraine to deliver Russian gas to Europe, whereas if built it will deprive Ukraine of transit revenues and upset the existing gas flow patterns in Europe thus potentially impacting security of supply of central and south east European countries. This view has been most clearly expressed by the EU vice president for Energy Union, Maroš Šefčovič, who spoke of undesirability of any new Russian export pipelines in general:[75]

> "If the aim of these projects [new Russian transit diversification pipelines] is to gradually drain the Ukrainian transit route, it is simply unacceptable for the EU, as it will change the European gas balance, [and will] place central and south east European countries into a very difficult situation";

and undesirability of Nord Stream 2 in particular:[76]

> '[The EU] need to know if there is some kind of intention to close down the Ukrainian transit, what this project [Nord Stream 2 – authors' note] may mean for Ukraine and central Europe…The eastern European countries will clearly have their energy security decreased'.

[73] 'Ten EU nations say Nord Stream gas extension not in EU interests', *Reuters*, 27 November 2015.
[74] Yafimava (2011), p. 290.
[75] 'Šefčovič: EC does not accept the Russia's plans to eliminate transit across Ukraine' (in Russian), *RIA Novosti*,
[76] 'Russia gas link plan will hurt east EU security, Šefčovič says', *Bloomberg*, 1 October 2015.

Another EU view is that Nord Stream 2 – or any other new export pipelines – can be built as long as it complies with the TEP and the Energy Union principles and objectives. As such it is expressed in e.g. the State of the Energy Union report,[77] presented in November 2015:

> 'The Commission takes note of the plans of commercial companies to build further pipelines connecting Russia and Germany through the Baltic Sea. If built, Nord Stream 3 and 4[78] would not give access to a new source of supply and would further increase transmission capacity from Russia to the EU, while even now this is only used at 50% rate. These pipelines will have to comply fully with EU law. The Commission will access any such project against the European regulatory framework on its own merits. The EU will only support infrastructure projects that are in line with the core principles of the Energy Union, including the EU Energy Security Strategy';

and in the European Council meeting conclusions, presented in December 2015:[79]

> 'Any new infrastructure should entirely comply with the Third Energy Package and other applicable EU legislation as well as the objectives of the Energy Union'.

This view, while reflecting the EC lack of enthusiasm towards Nord Stream 2, does not reject the project outright but suggests that it can be implemented if it is in line with the EU 'rules', understood as EU energy *acquis* (including the TEP) *and* the Energy Union objectives.

However, bundling the *acquis* and the Energy Union objectives together as part of the EU 'rules' is analytically problematic given that the former represents a legally-binding set of legislation whereas the latter is not (until and unless new legislation is adopted on its basis thus becoming part of the *acquis*). Furthermore, while the judgement on whether the project complies with the TEP is a matter of legal analysis and analytical argument (ultimately capable of standing on its merit in the European Court of Justice (ECJ), if need be), the judgement on the project's compliance with the Energy Union objectives is far more difficult to make. Moreover any such judgement would necessarily be (at least partly) political.

There are several reasons for that. Firstly, there is a lack of clearly defined Energy Union principles and objectives. The Energy Union Strategy only stipulates the Energy Union's main *dimensions* (which include inter alia energy security, solidarity and trust, a fully integrated European energy market, and decarbonisation of the economy).[80] The State of the Energy Union report singles out the Energy Security Strategy as one of the core principles of the Energy Union (thus also implying that there are others) which itself is based on the following *pillars* (which include inter alia 'building a well-functioning and fully integrated internal market', 'diversifying external supplies and related infrastructure', 'improving coordination of national energy policies and speaking with one voice in external energy policy').[81] Whether the Energy Union's dimensions or Energy Security Strategy's pillars constitute – partly or wholly – the Energy Union's objectives and principles, is open to debate.

Secondly, there is a lack of clarity as to what weight the EU should attach to each objective (or principle) given that different member states view them differently. Deciding on which objective (principle) is 'more important' for the EU would necessarily turn the compliance assessment into a political process.

Thus the European Council Conclusions' requirement for Nord Stream 2 (and any other new infrastructure) to be compliant not only with the TEP but also with the Energy Union objectives has

[77] EC (2015d) State of the Energy Union report 2015.
[78] Here the State of the Energy Union report refers to two strings of Nord Stream 2.
[79] European Council (2015a) European Council meeting – Conclusions.
[80] EC (2015c) Energy Union Strategy.
[81] EC (2014a) European Energy Security Strategy.

introduced a degree of politicisation in the decision process, thus suggesting that the EU 'political judgements can override regulation'.[82] Clearly the EC understands that such judgements, if acted upon, risk discrediting the EU energy *acquis* among future investors in infrastructure bringing gas (energy) supplies to the EU, especially those from outside the EU (not necessarily from Russia).

Therefore it is argued here that even if the EU political judgement might be that Nord Stream 2 contravenes Energy Union objectives and principles, it is unlikely to block the project openly on political grounds.[83] It is more likely to decide to enforce this political position by regulatory action, designed to delay or block this, or any other, Russian transit diversification project by challenging its compliance with both the TEP and the Energy Union objectives (or principles).

Although the EC does not want to see construction of any new Russian export pipelines to Europe, and argues that the Ukraine route is perfectly capable of maintaining large scale transit, it has continued to stress that it expects the obligations in Gazprom's LTSCs with European buyers to be fulfilled, irrespective of any political crisis in Ukraine or between the latter and Russia. This view is signified by the statement made in April 2014 by (the then) EC president, Jose Manuel Barroso:[84]

> "The contractual reliability of the Russian Federation as a supplier of gas is at stake in this matter…I would like to recall that supply contracts are between European companies and Gazprom. It therefore continues to be Gazprom's responsibility to ensure the deliveries of the required volumes as agreed in the supply contracts. The European Union has repeatedly stated that we expect commercial operators on all sides to continue respecting their contractual obligations and commitments".

Thus the EC position, as manifested by these statements, appears to be suggesting that Gazprom is expected to meet all of its contractual obligations to supply gas to Europe under its LTSCs while only using export infrastructure that is already in place (and its attempts to build and utilise any new infrastructure on the EU territory will be severely constrained).

Given that currently there is insufficient export capacity to allow Gazprom to honour its existing LTSCs in full without having to transit gas across Ukraine, security of the Ukraine transit route will continue to be paramount for Gazprom's ability to serve its existing contractual obligations.

European political attitudes: EU Member States' positions

While the EC position in respect of Nord Stream 2 could be summed up as negative, the position of Germany (where the Nord Stream 2 pipelines would land) appears to be more difficult to capture.[85] The German Chancellor, Angela Merkel, has avoided endorsing or rejecting the project and stressed that it is 'first and foremost a business proposition' and that 'the necessary legal framework conditions' have to be established for it to go ahead, while wishing for 'solutions where Ukraine is not completely excluded as a transit country but where Ukraine can also play a role as a transit country'.[86]

The German Vice Chancellor, Zigmar Gabriel, was more forthcoming where he stated (during a meeting with the Russian president Putin in October 2015) that Nord Stream 2 is in Germany's interest, while also noting the importance of assuring that the legal/regulatory competence in respect of the Nord Stream 2 decision-making process stays with the German authorities, thus reducing possibilities for

[82] Stern (2015b).
[83] Under the Treaties, the EC might not have enough legal competence to do so anyway, though such analysis is beyond the scope of this paper and beyond the expertise of its authors.
[84] EC (2014b) Letter from President Barroso to President Putin.
[85] See Meister (2015).
[86] European Council (2015b).

'external interference'.[87] Gabriel immediately came under fire from the media and many European observers which interpreted his words as an attempt to limit application of the EU law by the EC in respect of Nord Stream 2.[88]

However, in our view Gabriel's remarks should be interpreted as a call for respecting the EU law by *preserving* the existing division of competences between the EC and member states, whereby 'ensuring compliance of transmission […] system operators […] with their obligations' under [the 3rd Gas] Directive and other relevant Community legislation'[89], including as regards cross-border issues', remains the duty of member states' national regulators rather than that of the EC. Most commentators ignored Gabriel's call, made at the same meeting, for defining Ukraine's role as a transit country post-2019, in conjunction with Nord Stream 2, thus effectively calling for an inclusive solution.[90] Gabriel reiterated this position during his visit to Poland in January 2016, saying that Nord Stream 2 could only proceed if gas flows through Ukraine continued post-2019.[91]

By and large, European member states which are major markets for Russian gas have neither expressed support nor criticism of Nord Stream 2. The only country in this group to have raised objections was Italy, the prime-minister of which, Matteo Renzi, heavily criticised the project in the run up to the European Council meeting in December 2015 demanding a substantive debate to be held.[92] However this criticism should be seen in the context of Italy's unhappiness about the cancellation of South Stream – and the role played by the EC in it[93] – which would have delivered Russian gas to Italy bypassing Ukraine (via which Italy currently receives all its Russian gas imports).[94] Furthermore, Renzi's *démarche* appears to have been part of negotiating tactics to ensure that, if built, Nord Stream 2 could supply gas to Italy. A few weeks later the news appeared of a telephone conversation between Renzi and Putin[95] and a meeting between high-level Italian and Russian governmental officials, which indicates Italy's interest in participating in Nord Stream 2.[96]

By contrast to the majority of western European countries, the positions of central eastern European countries, the Baltics, and Ukraine towards Nord Stream 2 are distinctly negative, the reasons for which are both economic (a potential loss of transit revenue) and political.[97] (This comes as no surprise - such was their attitude towards Nord Stream 1.) For example, the Polish president, Andrzej Duda, has stated

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[87] 'Meeting with the Vice Chancellor, minister of the economy of Germany, Zigmar Gabriel' (transcript) (in Russian), 29 October 2015.
[88] 'Transcript reveals Russia, Germany unconcerned with EU law for Nord Stream II', *Natural Gas Europe*, 22 November 2015.
[89] Directive (EC) 2009/73/EC, Art. 41.
[90] Meanwhile, it is understood that the EC has been carrying out an analysis of the political and legal implications of Nord Stream 2, and that high level meetings have taken place between the EC and the German national regulator on the matter, see European Council (2015c).
[91] 'UPDATE 2-Germany seeks to calm Polish concerns over Nord Stream-2', *Reuters*, 29 January 2016.
[92] 'Italy's Renzi joins opposition to Nord Stream 2 pipeline deal', *Financial Times*, 15 December 2015.
[93] Stern, Pirani, and Yafimava (2015).
[94] 'Italy's Renzi joins opposition to Nord Stream 2 pipeline deal'.
[95] This telephone conversation was followed by a statement on the Russian president's website that both parties confirmed the importance of continued joint work on 'beneficial energy projects'. Given that no specific project was named it is possible that not only Nord Stream 2 but also South Stream were discussed. See 'Telephone conversation with the prime minister of Italy Matteo Renzi' (in Russian), 8 January 2016. Note that in February 2016 Gazprom, Greece's DEPA and Italy's Edison signed a memorandum of understanding (MoU) on gas deliveries across the Black Sea from Russia via (unspecified) third countries to Greece and from Greece to Italy, see Gazprom (2016).
[96] 'Nord Stream, an Italy's role in a gas pipeline between Russia and Germany' (in Italian), *Corriere della Sera*, 10 January 2016.
[97] A general anti-Nord Stream 2 argument states that the project would lead to deterioration of overall EU security of supply, loss of transit status by several European countries and Ukraine thus reducing their bargaining power towards Gazprom, and cause 'internal bottlenecks' in the EU gas transmission system. For more exhaustive critiques of Nord Stream 2 see Łoskot-Strachota (2015) and Riley (2015).

that 'everything' must be done to stop the pipelines from being built as they 'hurt[s] European Union unity when dealing with the conflict in Ukraine' and 'completely neglect[s]' Polish interests.[98] Slovakia's prime-minister, Robert Fico, has labelled the expansion of Nord Stream as 'betrayal', lamenting a potential loss of 'billions of euros' by Slovakia and Ukraine.[99] The Ukrainian prime-minister, Arseniy Yatsenyuk, has called the project 'anti-European' and 'anti-Ukrainian'.[100] The Lithuanian president, Dalia Gribauskaite, has been most categorical of all, stating that Nord Stream 2 'should not be built'.[101]

Moreover, in November 2015, a letter was prepared (Poland and Slovakia allegedly championing the initiative)[102] to be signed by several central, eastern, and south eastern European countries and the Baltics, and sent to the EC, expressing the position that the Nord Stream 2 project runs counter to EU interests and risks further destabilising Ukraine. The letter (the full version of which has never been made public) has reportedly called for 'an inclusive debate' on the Nord Stream 2 project at the December 2015 European Council meeting and asked for the closest regulatory scrutiny to be applied to the project. [103] It was reported originally that 10 member states (Bulgaria, the Czech Republic, Poland, Romania, Slovakia, Greece, Hungary, Latvia, Lithuania, Estonia) have signed the letter[104] but it has since transpired that several countries refused to sign, including – according to various sources – Bulgaria, the Czech Republic, Greece, and Romania.[105]

European corporate view

European energy companies, including the large customers that account for most of Gazprom's European sales, have of course made very few comments in the public domain about the issues discussed in this paper. For many of them, commercial sensitivities determine this caution in public. Nevertheless, some obvious points can be made about their practical reactions to the issues, as follows:

-- in June 2015, EON, Shell and OMV, who are among Gazprom's largest business partners in Europe, signed an agreement with Gazprom to launch the Nord Stream 2 project, indicating continued support for the principle of transit diversification, and these partners have suggested that regulatory exemption from third-party access rules could be granted to Nord Stream 2 onshore extensions;[106]

-- among the large buyers of Russian gas in Europe, only one – RWE of Germany – has entered the reverse flow trade (despite Gazprom's public opposition to that trade).

In late 2015 and early 2016, with opposition to Nord Stream 2 being expressed in political terms, the Nord Stream 2 consortium – implicitly with the support of the European shareholders – began to respond publicly to claims that the pipeline runs counter to EU economic and energy policy goals. In an exchange of letters in the *Financial Times*, Nord Stream 2's head of communications rejected claims that the project could be used as a political weapon against European governments by Russia, and argued that it is "a substantial part of the long-term solution" of Europe's future additional gas import

[98] 'Polish president claims Nord Stream 2 construction must be stopped', *Sputnik News*, 7 October 2015; 'Nord Stream 2 pipeline expansion hurts EU unity, Poland says', *Bloomberg*, 8 September 2015.
[99] 'Slovak PM calls Nord Stream expansion deal 'a betrayal', *EurActive*, 10 September 2015.
[100] 'Nord Stream 2 is anti-European, anti-Ukrainian project – Yatsenyuk', *Ukrinform*, 10 September 2015.
[101] 'Nord Stream 2 should not go ahead, President Grybauskaitė says', *Delfi*, 17 December 2015.
[102] 'Greece and the Czech Republic have refused to take part in the adventure against Russia' (in Russian), *EER*, 3 December 2015.
[103] 'Ten EU nations say Nord Stream gas extension not in EU interests', *Reuters*, 27 November 2015.
[104] Ibid.
[105] 'Czechs decide not to sign Nord Stream-2 opposition letter', *Reuters*, 2 December 2015. 'Greece and the Czech Republic have refused to take part in the adventure against Russia', op.cit., 'Seven EU countries oppose Nord Stream', *EurActive*, 30 November 2015.
[106] 'E.On makes case for TPA exemption for OPAL extension', *Natural Gas Europe*, 18 September 2015.

requirement; he said that by supplying gas to the single market, it would "enable more liquidity" and enhance competition.[107]

Conclusions

Due to EU member states' highly divergent (and some highly negative) attitudes towards dependence on Russian gas and Nord Stream 2, the EC cannot and will not *support* the project – politically or financially. The question is whether the EC will *oppose* the project and, if so, on which grounds. This paper argues that the EC appears to have formed a political position of preserving a significant volume of Russian gas transit across Ukraine, and is set to enforce it through regulatory action, designed to limit, delay or block additional export capacity for Russian gas such as Nord Stream 2 and other transit diversification projects. European energy companies that buy Gazprom's gas, and are its business partners in other respects, clearly support the Nord Stream 2 project and are largely indifferent to the political arguments made in favour of maintaining transit through Ukraine at a significant level.

However, the EC's ability to delay and block Nord Stream 2 and other transit diversification projects is significant but not absolute (see section 4), and security of the Ukrainian transit corridor cannot be guaranteed. For this reason, it is argued here that the optimal outcome for Europe would be to reach a compromise: an inclusive solution, allowing Nord Stream 2 to go ahead, while assuring that Ukraine would continue to play a transit role (albeit reduced) even after Nord Stream 2 is built.

4. New Russian gas export pipelines to Europe: examining the limits of EU regulatory powers

New Russian gas export pipelines – if built – would deliver Russian gas directly to Europe, by-passing Ukraine. However, once this gas has left Russia it will have to be transported across EU, non-EU Energy Community Treaty (EnCT) countries, and non-EU non-EnCT countries – travelling long distances and crossing multiple borders – before it reaches contractual delivery points specified in Gazprom's existing LTSCs (see section 5). These are mostly located between EU countries but also between EU and non EU EnCT countries.

Gas transmission inside the EU is governed by the EU energy *acquis*, including:

- the Third Energy Package (TEP) for gas adopted in 2011, including the Third Gas Directive,[108] Gas Regulation 715,[109] and Agency for the Cooperation of Energy Regulators (ACER) Regulation 713;[110]
- the pan-European Network Codes (NCs) for cross-border issues, development of which is envisaged by Gas Regulation 715, including (in the first instance) the Capacity Allocation Mechanisms (CAM),[111] Tariffs, Balancing[112] and Interoperability[113] NCs – of which the first two

[107] See Lissek (2016a) and Lissek (2016b). See also Korchemkin (2015), Stern (2015b), Riley (2016), Aslund (2016).
[108] Directive (EC) 2009/73/EC.
[109] Regulation (EC) 715/2009.
[110] Regulation (EC) 713/2009.
[111] Regulation (EC) 984/2013.
[112] Regulation (EU) 312/2014.
[113] Regulation (EU) 2015/703.

are still under development.[114] (General regulatory guidance for the development of NCs is provided by the periodically revised Gas Target Model (GTM), developed by European regulators.)[115]

It could be argued that gas transmission inside non-EU EnCT countries (the non-EU Balkans, Ukraine, and Moldova) is also governed by the EU energy *acquis* – as these countries, having joined the EnCT, are committed to implement the energy *acquis*. But the EC legal/regulatory powers to ensure implementation in non-EU countries is significantly more limited. Furthermore, non-EU EnCT countries have a right but not an obligation to implement the pan-European NCs for cross-border issues with neighbouring EU countries.[116] While the EU has significant powers in ensuring implementation of the *acquis* in EU countries and limited powers to do so in non-EU EnCT countries, it has no such powers in respect of non-EU non-EnCT countries (e.g. Turkey), where gas transmission is governed by national laws, not necessarily either compliant or consistent with the *acquis*.[117]

Gazprom has faced a significant problem of complying with the changing EU regulatory environment as set by the *acquis*, both in respect of existing and new pipeline capacity.[118] This section will assess whether and how – from a regulatory perspective – Gazprom would be able to build and utilise capacity in its new export pipelines directed towards Europe. This assessment is made by means of:

- reviewing the EU regulatory frameworks (existing and under development), which govern building and utilisation of capacity in new pipelines;
- analysing the EC ability to stop or delay the building of, and limit utilisation of capacity in, these pipelines on regulatory grounds.

The TEP, the CAM NC Incremental, the Tariffs NC, the Guidelines of Good Practice on Open Seasons (GGPOS) Procedures

The TEP has mandated unbundling of transmission assets,[119] certification of transmission system operators (TSOs), regulated third party access (TPA) to pipeline capacity based on published tariffs (or their methodologies) fixed or approved by national regulators, [120] and congestion management procedures[121] – unless an exemption is granted by a national regulator and approved by the EC.

While the TEP has outlined *general regulatory rules*, it has not outlined *specific regulatory procedures* as to how these rules should be applied in respect of existing and incremental (new) pipeline capacity. Such procedures were developed in respect of *existing* capacity as part of the CAM NC, which entered into force in November 2013 and have applied from November 2015. However no procedures were developed in respect of incremental capacity; the European regulators acknowledged their importance,

[114] CAM NC, although adopted in 2013, was soon re-opened to include a new chapter on incremental capacity.
[115] CEER (2011); ACER (2015).
[116] Rzayeva (2014).
[117] Following the deterioration of the Russia-Turkey political relationship in late 2015, the EC has renewed its efforts to persuade Turkey to join the EnCT.
[118] For a detailed overview and analysis of these problems see Yafimava (2013).
[119] The Third Gas Directive listed ownership unbundling (OU), Independent Transmission Operator (ITO), and Independent System Operator (ISO) as three possible options but OU being the only possible option where on 3 September 2009 the TSO did not belong to a vertically integrated company.
[120] The Gas Regulation 715 stipulated that tariffs are to be set separately for every Entry and Exit point, not to be calculated on the basis of contract paths, transparent and cost-reflective, facilitating trade and competition, avoiding cross-subsidisation, not restricting liquidity thus effectively prescribing the Entry Exit tariff methodology. The Tariffs NC will provide a detailed set of rules and procedures on tariffs.
[121] The Gas Regulation 715 stipulated long-term UIOLI mechanisms, surrender of contracted capacity, oversubscription and buy back (all October 2013), short-term UIOLI mechanisms (July 2016).

but deemed the issue too complex to be addressed in the CAM NC at the time. As a result, incremental capacity was excluded from all of the CAM NC provisions apart from bundling and short term reservation quota.[122]

However, the CAM NC was re-opened in 2013, specifically with an aim of developing regulatory procedures for incremental capacity (dealing with financing, construction, and capacity allocation) and including these in the CAM NC as an additional chapter (CAM NC Incremental). The Tariffs NC, which has also been under development, will contain regulatory procedures in respect of tariffs (or their methodologies), applied to both existing and incremental capacity.

Both the CAM NC Incremental and the Tariffs NC are expected to enter comitology (a process by which regulation is codified and which takes place in authorised committees where the EC is assisted by representatives of the member states) in mid-2016 and come into force in 2017-18. This suggests that it will be impossible to use its procedures for construction and allocation of any *significant* new multi-border pipeline capacity before or by 2020.

It could be argued that such capacity could be built and allocated under the classic Open Seasons (OS) approach, outlined in the (not legally binding) Guidelines of Good Practice on Open Season (GGPOS) procedures adopted in 2007, while respecting the TEP's general provisions (see above) instead of waiting for the CAM NC Incremental and Tariffs NC to be finalised. However, the European regulators have long argued that the classic OS procedure, as outlined in the GGPOS procedures, lacks transparency and coordination, and hence called for a more elaborate OS procedure to be developed.[123]

Given that such a procedure is being developed as part of the CAM NC Incremental, it would be increasingly difficult for a project promoter to continue using the classic OS procedure. Nonetheless it would not be impossible to advance an incremental capacity project prior to the CAM NC Incremental coming in force, should a TSO design its own tailor-made OS procedure that would be broadly in line with the principles outlined in the draft CAM NC Incremental. Although choosing this route might bring the project's start date forward somewhat, it is still unlikely that any significant new pipeline capacity could be built before or by 2020.

In addition a project promoter could apply for a Project of Common Interest (PCI) status, allowing a project to speed up due to favourable regulatory treatment, accelerated permitting, rules for cross-border cost allocation, and eligibility for EU financial assistance, but in full compliance with the energy *acquis*.[124] A project applying for such status needs to be seen as contributing towards one of the EU 'priority corridors' and to meet a set of criteria, both defined in such a way as to make it unlikely (although arguably not impossible) for onshore extensions/sections of Russian pipelines to qualify.[125] Notably the onshore sections of South Stream applied but were not included into the 2013 PCI list, whereas some pipelines (e.g. Tesla and Eastring) that could potentially transport Russian gas delivered via Turkish Stream, were included in the 2015 PCI list.[126]

This analysis suggests that building and using Nord Stream 2 *onshore* extensions (from the German shore to Baumgarten at the Austrian-Slovak border) or Turkish Stream onshore extensions (from the Turkish-Greek border to Baumgarten) or South Stream onshore sections (from the Bulgarian shore to

[122] Regulation (EC) 984/2013.
[123] Yafimava (2013), p.23.
[124] Regulation (EC) 347/2013.
[125] Yafimava (2013).
[126] However both Tesla and Eastring were explicitly excluded from the list of priority projects under the CESEC initiative. See Memorandum of Understanding on a joint approach to address the natural gas diversification and security of supply challenges as part of the Central and South East Gas Connectivity (CESEC) initiative, the Action Plan, and Appendix to the Action Plan (List of all CESEC projects).

Baumgarten) under the TEP and/or NCs (and even if awarded a PCI status) would be *hardly possible by 2020* (albeit arguably not entirely impossible).[127] Construction of Nord Stream 2 (which is entirely offshore) or Turkish Stream or South Stream *offshore* sections would be entirely feasible by 2020. But construction of onshore extensions/sections would also be necessary by 2020 if Gazprom were to abandon transit across Ukraine and deliver gas under its existing LTSCs without changing delivery points.

One of the main reasons why the development of EU regulatory procedures for incremental capacity has advanced at a glacial pace, is that there has been limited interest on the part of *European* players in having such procedures in place, as they have had no plans to build major new multi-border pipelines in the post-2000 liberalised EU gas market environment. Those (few) new pipelines that have since been built were mostly built under the exemption regime (see below). Gazprom has been the only supplier making – and proposing to make – substantial investment in such pipelines. Correspondingly there has been little appetite on the part of the EU authorities to accelerate the development of generic regulatory procedures for incremental pipeline capacity that would be mostly used by Gazprom. In the absence of generic regulatory procedures for incremental capacity Gazprom has attempted to build and access new pipelines on the basis of intergovernmental agreements (IGAs) and exemptions, but both avenues have proved fully or partly unsuccessful.

Intergovernmental Agreements

Gazprom has attempted to build its South Stream pipelines on the basis of IGAs with host countries, but failed, because the EC argued that such IGAs must be, but were not, compliant with the TEP. The EC called for these IGAs to be renegotiated or cancelled, and opened two infringement procedures (one on the grounds of TEP non-compliance and the other on the grounds of alleged illegality of pipeline procurement) against Bulgaria, where the pipelines were planned to come ashore. This led first to suspension of construction in Bulgaria in August 2014 and ultimately to project cancelation in December 2014.

Under existing legislation, the EC has the powers to examine *ex post* all IGAs in order to determine their compliance with the *acquis* and request amendments;[128] however, the value of *ex post* compliance verification is limited due to extreme practical difficulty in amending finalised agreements. Currently for the EC to be able to have an *ex ante* insight (by means of providing assistance or participating as an observer in IGA negotiations), a member state invitation or approval are required. However, the EC is expected to be granted the right of *ex ante* verification of IGAs, not requiring a member state invitation or approval, as part of a new legislative package to be adopted in 2016 in furtherance of the Energy Union initiative.[129] (The set of proposals was unveiled by the EC in February 2016).[130] This suggests that the EC would be able to stop any future pipeline project, should it be based on a (set of) IGA(s) containing provisions deemed incompatible with the *acquis*.

[127] I.e. within Gazprom's desired timeframe, dictated by the expiry of the Ukrainian transit contract. Furthermore, questions remain as to whether, and to what extent, the CAM NC Incremental new procedure will have addressed Russia's concerns in respect of its 'missing capacity' problem, a hypothetical situation of not being able to secure sufficient capacity by means of auctions at all interconnection points along a transportation route, necessary for delivery under existing long term supply contracts. For details see Yafimava (2013).

[128] EC (2012a).

[129] 'EU seeks new powers to vet member state energy deals', *EurActive*, 26 January 2016.

[130] EC (2016) Energy Security Package.

Exemptions

Gazprom has attempted to access capacity in one of the onshore extensions of Nord Stream 1 (the OPAL pipeline) on the basis of *exemption* from the TEP (Art.36 of the Third Gas Directive) but has only been able to gain access to 50% of its capacity. The exemption decision-making process is such that a national regulator decides and the EC approves (or not) whether and which exemption(s) could be granted. Although the German regulator granted Gazprom an exemption in 2009 allowing it to use 100% of capacity, the EC capped it at 50% in 2011.

After more than two years of negotiations, Gazprom and the EC reached a solution which would allow Gazprom to use 100% of pipeline capacity unless it was wanted by a third party (this was to be determined through an auction). The EC repeatedly delayed its approval, citing technical difficulties, but in truth due to the worsening EU-Russia political relationship in the aftermath of the 2014 Ukraine crisis; ultimately the decision was never approved and the exemption expired at the end of 2014. Gazprom has applied for a new exemption but reportedly has been refused by the German regulator; legal proceedings are understood to be under way. At the time of writing, the issue remains unresolved and Gazprom is unable to use more than 50% of capacity.[131]

Notably, in the gas auction organised by Gazprom in September 2015 only 0.17 bcm of the 3.2 bcm of gas offered and 1.2 bcm sold, was sold with delivery via OPAL. This has demonstrated the lack of demand for OPAL capacity on the part of third parties.[132] Given that the *raison d'etre* of the EC 50% cap was to promote competition and allow third parties to access OPAL, the lack of interest in such access has made the EC decision look increasingly illogical, strongly suggesting that it may have been political rather than regulatory.

Arguably, under the exemption regime, Gazprom would be able to build onshore extensions of Nord Stream 2 and/or Turkish Stream, or onshore sections of South Stream, before or by 2020 – i.e. faster than under the TEP and/or the NCs – but unless the OPAL problem is resolved satisfactorily, it is unlikely that Gazprom would apply for exemptions and it is equally unlikely that the EC would grant them. Furthermore, even if the OPAL issue is resolved, it might be politically impossible for the EC to grant exemptions to any *new* Russian pipelines in the post-2014 Ukraine crisis environment. This is a marked change from the pre-crisis environment, when the EC itself encouraged Gazprom in 2013 to apply for an exemption in respect of onshore sections of the South Stream pipelines, though Gazprom decided not to apply, arguably because of its negative experience with OPAL.[133]

New pipelines: way forward

Given that the EC is unlikely to approve exemptions to onshore extensions of Russian export pipelines due to its apparent determination to enforce its political position of preserving significant transit across Ukraine through regulatory action (see section 3), the most realistic option for these extensions to be built and utilised is to proceed in full compliance with the TEP and with the NCs (as they become part of the *acquis*). Compliance with the TEP requires a TSO, which owns and operates onshore extensions (starting from the Nord Stream 2 pipelines' entry point into Germany[134]), to provide non-discriminatory access to capacity and charge regulated tariffs to all shippers (including Gazprom). It also requires the TSO to be certified to ensure compliance with unbundling requirements *and* to assess the impact on

[131] As confirmed by Šefčovič, see European Council (2015c).
[132] 'E.On makes case for TPA exemption for OPAL extension', *Natural Gas Europe*, 18 September 2015.
[133] 'EC: Russia should apply for South Stream exemption', *Natural Gas Europe*, 7 December 2013.
[134] Notably, CAM NC Incremental applies to interconnection points with third countries at the discretion of the national regulator, hence irrespective of where EU jurisdiction starts it will be the German national regulator who decides if it applies at the interconnection point.

security of supply (Art.11).[135] A national regulator is obliged to refuse certification if the unbundling requirement is not met *and* if it has not been demonstrated that certification 'will not put at risk the security of energy supply of the member state *and* the Community'; the EC opinion to be sought on both accounts prior to decision. Compliance with unbundling requirements would also limit Gazprom's share in a TSO to 50%.[136]

The criteria for the security of supply impact assessment are very vague, and suggest significant discretion over the certification decision on the part of both national regulators and the EC. While a national regulator is obliged to take 'utmost account' of the EC's opinion, it nonetheless has a right to issue a certification decision that diverges from that of the EC, thus suggesting that it can prevail over the EC. The TSO certification decision process therefore differs markedly from the exemption decision process, where the EC necessarily prevails over a national regulator. Compliance with the CAM NC Incremental and the Tariffs NC can only be established once these NCs are finalised. Should compliance with both the TEP and the NC be assured, the EC would not be able either to prevent the building of, or limit the usage of capacity in, these pipelines.

While the TEP certainly applies to export pipelines' onshore extensions located on the EU territory, some commentators argue that the TEP should also apply to offshore pipelines themselves. Following this logic, Alan Riley and Wojciech Jakobik have advanced the view that the TSO certification procedure should be carried out not only in respect of onshore, but also offshore, pipelines, running in the territorial waters of EU member states.[137] This appears to be a minority view as legal argument for it does not appear to be strong: neither the EC nor the member states' national regulators have ever advanced this view in respect of other pipelines intended to bring Russian gas to Europe (e.g. Nord Stream or more recently South Stream pipelines) or non-Russian gas to Europe (Enrico Mattei or Pedro Duran Farell pipelines) and existing case law is not convincing. Furthermore, given that the main purpose of the TEP (and its predecessor, the Second Energy Package, SEP) is to stipulate the rules for the *internal* EU market, the logic of its application to pipelines located *outside* the EU appears dubious.[138]

It is argued here that the EC is unlikely to act in line with this view but should it attempt to do so it would certainly be challenged by the Nord Stream 2 promoters in the European Court of Justice (ECJ). Even if the ultimate ruling would most likely be against the EC, this could delay the project by several (2-3) years. In that case, Nord Stream 2 would not be able to start operating until the early to mid-2020s. However, this potentially delayed start of Nord Stream 2 could align with the likely timing of the construction of its onshore extensions.

Conclusions

Our analysis suggests that it is highly unlikely (albeit not impossible) that Gazprom would be able to build Nord Stream 2 or Turkish Stream onshore extensions, or South Stream onshore sections, on EU territory under a market-based approach by 2020. But it would be able to do so by the early to mid-

[135] Otherwise known as 'the Gazprom clause'.
[136] A share above 50% necessarily suggests 'control' of a TSO by a vertically integrated undertaking (i.e. Gazprom) but a TSO can still be deemed 'controlled' even if this share is below 50%, depending on whether an undertaking can still exercise control even without having a majority stake.
[137] For Riley's views see 'Transcript reveals Russia, Germany unconcerned with EU law for Nord Stream II', *Natural Gas Europe,* 22 November 2015; for Jakobik's views see Jakobik (2015).
[138] In February 2016, the media reported on apparent differences of opinion between the EC Legal Services and the EC Directorate-General for Energy (DG ENER) on the matter of TEP applicability to Nord Stream 2, with the former suggesting that the TEP does not apply to Nord Stream 2 and the latter suggesting the opposite, see 'Legal opinion undermines EU's ability to block Nord Stream pipeline', *Politico*, 7 February 2016, and 'Russian gas link extension may face EU law compliance risk', *Bloomberg*, 4 February 2016.

2020s, provided it gets national regulators' approval. Arguably it could bring start dates forward if it were to secure exemptions from the TEP, but in the post-2014 Ukraine crisis political environment this appears unlikely as it would require EC political goodwill (given its significant degree of discretion over exemptions) – which is absent. It would also require Gazprom's trust that the EC would not take political decisions in its consideration of the case for exemptions – which is also absent.

It is argued here that the EC appears prepared to use its regulatory powers to delay or block the building of, and the usage of capacity in, new Russian gas export pipelines directed towards Europe, in order to defend its political position of maintaining significant transit across Ukraine. These regulatory powers are *strong but not absolute* and they only apply on EU territory. They are stronger in respect of exemption decisions (where the EC prevails over a national regulator), PCI status awards (where the EC adopts the PCI lists), and IGAs (where the EC has the power to request amendment or cancellation, and is expected to get the power of ex ante approval in 2016). These powers are weaker in respect of TSO certification decisions (where a national regulator prevails over the EC).

Ultimately the EC has sufficient regulatory powers to delay by several (2-3) years the building of onshore extensions, and (with much more difficulty) offshore sections, of Russian export pipelines, but is unlikely to be able to stop them. It also has sufficient regulatory powers to limit Gazprom's usage of capacity in onshore extensions once they are built, but more so if they are built under an exemption regime, and less so if built in strict compliance with the TEP and the NCs. Overall, the EU regulatory barriers faced by new Russian pipelines appear significant but not insurmountable.

5. Gazprom's contractual commitments under existing long-term supply contracts (LTSCs)

Export volumes and time profile

Prior to assessing the additional export pipeline infrastructure that Gazprom would have to build before 2020 in order significantly to reduce transit across Ukraine, it is important to understand the company's existing export commitments towards its European buyers, including volumes to be delivered to specified delivery points.

The majority of Gazprom's gas exported to Europe is sold on the basis of LTSCs with expiry dates stretching up to 2035 (Annex Figure A.1).[139] These LTSCs oblige Gazprom to deliver gas of agreed volumes to agreed delivery points over a number of years thus providing security to the buyer. They also oblige European buyers to purchase a minimum offtake – "take or pay" (TOP) quantity – at a defined price, irrespective of other opportunities that might arise in other export or domestic markets. Under-delivery by Gazprom constitutes a breach of contractual obligations. Under-offtake by a European buyer only constitutes a breach if the buyer did not pay for the gas it failed to take below contractual minimum TOP volumes. Although annual TOP levels in many LTSCs have been reduced from the traditional 85 to 70% of annual contract quantity (ACQ) (on average) during the 2010-2015 period (either through re-negotiation or arbitration at the request of European buyers), this may have had the effect of extending the life of contracts as buyers are still contractually obliged to take the contracted volumes over a longer period. Overall there are significant limitations on the options to reduce the volumes in these LTSCs or to terminate them before expiry.

[139] Stern (2014).

Previous OIES research suggested that gas supply and demand fundamentals are such that Europe's ability to reduce its *overall* dependence on Russian gas up to 2030 is limited.[140] Therefore, even should Gazprom's LTSCs not continue to their expiry, or should their terms be renegotiated to allow for their TOP clauses be reduced significantly or abolished altogether,[141] new contracts would probably have to be concluded for *similar* volumes with delivery to European hubs. Gazprom would still need to secure access to a *similar* amount of transportation capacity.

Delivery points in Gazprom's European LTSCs

Russian gas exported by Gazprom only becomes the property of individual European buyers once it has reached its delivery points in Europe, as agreed in the LTSCs. These delivery points are located on the former borders between 'eastern' and 'western' Europe (far away from the Russian borders) which reflects the old cold war political division in Europe. Gazprom's major delivery points are located at the Ukraine-Slovakia border (Velke Kapusany, 2,288 GWh/d or 72.2 bcma), the Slovakia-Austria border (Baumgarten, 1,539.2 GWh/d or 48.6 bcma), the Poland-Germany border (Mallnow, 931 GWh/d or 29.4 bcma), the Czech-German border (Waidhaus, 903.7 GWh/d or 28.5 bcma), the Ukrainian-Polish border (Drozdovichi, 133.4 GWh/d or 4.2 bcma), the Ukraine-Hungary border (Beregovo, 600.3 GWh/d or 19 bcma) and the Ukraine-Romania border (Isaccea, 755.3 GWh/d or 23.8 bcma) (Annex Tables A.2, A.5, and A.6).[142]

Although the LTSCs were renegotiated in the 1990s (following the break-up of the USSR) and extended (at the request of European buyers) during 2004-2006, most delivery points have remained unchanged. However some changes have occurred. For example, the delivery points for Engie were moved from the Austrian-Slovak border at Baumgarten and the German-Czech border at Waidhaus to the French-German border at Mendescheim, and the delivery point for RWE Transgaz was moved from the Czech-Slovak border at Lanzhot to the Czech-German border at Brandow (as of 2013) to be served via Nord Stream. Nonetheless, Gazprom has remained extremely reluctant to change delivery points in its existing LTSCs. For example, the delivery point for (some) Russian gas for Germany at the German-Czech border at Waidhaus, has been retained, despite the fact that gas is delivered there via Nord Stream, Germany (OPAL), and the Czech Republic (Gazelle), rather than via Ukraine, Slovakia and the Czech Republic as previously.

Despite such reluctance, Gazprom's attitude towards changing delivery points in its existing LTSCs might be shifting as the company appears prepared to contemplate such changes on a case-by-case basis. In 2015, Gazprom's deputy CEO, Alexander Medvedev, said that the practice of renegotiating and changing delivery points is 'absolutely normal' and there is 'nothing critical' about it.[143]

This paper argues that Gazprom would prefer to retain those delivery points that could be served by using existing (Nord Stream, Yamal Europe, Blue Stream) and future new (Turkish/South Stream, Nord Stream 2, Yamal Europe 2) Ukraine transit-free export pipelines. However, Gazprom might want to change those delivery points that could only be served via Ukraine. In so doing, however, it will have to make difficult judgements as these delivery points could only be changed, under the TEP, from flanges to hubs (and not to other flanges), whereas the move towards compulsory delivery to hubs - and hence potentially towards hub prices – might be considered by Gazprom as detrimental to its LTSC portfolio.

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[140] Stern (ed.) (2014). Although individual highly vulnerable countries with small consumption could reduce and even eliminate it, albeit at a price much of which would need to be met by EU taxpayers.

[141] This might be what happened to the Gazprom-RWE Transgaz contract to supply gas to the Czech Republic, which explains why Gazprom's deliveries to the Czech Republic have decreased sharply in 2014; notably this development was preceded by arbitration.

[142] Yafimava (2011), p.78.

[143] 'Gazprom threatens the Europeans by refusal to transit across Ukraine', *Nezavisimaya Gazeta*, 10 June 2015.

Furthermore, Gazprom might be more reluctant to initiate such changes itself, wary that this might trigger counter-requests from its European buyers to change other contractual parameters thus causing existing contracts to be affected in ways that are impossible to predict, both in respect of their value and their very existence.[144]

In this context, the order, made in June 2015 by the Russian president, Vladimir Putin, to Gazprom to discuss conditions for a possible post-2019 transit contract with Ukraine, and its quick confirmation by Gazprom's CEO, Alexei Miller, suggest growing understanding in Russia that both Gazprom's ability to build new export pipelines by 2020 and to renegotiate delivery points without adversely affecting its LTSCs portfolio, have their limits.

Countries receiving Russian gas across Ukraine and their vulnerability to transit interruptions

In 2014 Gazprom sold around 150 bcm of gas under the LTSCs;[145] 59.4 bcm was transited through Ukraine to European countries and Turkey; around 2.8 bcm was also transited across Ukraine to supply Moldova. Out of these LTSC export volumes around two thirds was delivered to European countries and the rest was delivered (predominantly) to Turkey and (small volumes) to Moldova. Gazprom would be unable to deliver some of this gas without transiting through Ukraine due to shortage of alternative export capacity.

Several European countries, predominantly those in southern Europe, receive *all* of their Russian gas imports exclusively via Ukraine (Table A.3): Austria, Greece, Italy, Bosnia & Herzegovina, Bulgaria, Croatia, Hungary, Romania, Serbia, Slovakia, Slovenia, FYROM.[146] Other countries only receive *some* of their Russian gas imports via the Ukrainian transit corridor, while receiving the remainder via other corridors such as Yamal-Europe, Nord Stream 1 and Blue Stream: France, Poland and Turkey.[147]

These countries' dependence on the Ukrainian transit corridor and their vulnerability to any potential interruption associated with it, is not uniform. Their vulnerability and resilience to supply interruptions (including those caused by transit interruptions) can be measured by the supplier concentration index (SCI)[148] and the N-1 standard.[149] These calculations were made by the EC as part of the staff working document accompanying its Energy Security Strategy.[150] Among countries receiving all their Russian gas via Ukraine – as listed above – those characterised by higher SCI are more vulnerable to transit interruptions as they have fewer alternative suppliers, who could deliver gas via different route(s) (Table A.3). Notably, of these countries, in 2012 only Italy and Croatia had an SCI below 30% (assumed to be a reasonable threshold). All others, including Bulgaria, Greece, Hungary, Slovakia and Austria (in 2012) and Bosnia & Herzegovina, FYROM, Serbia (in 2013), had SCIs above 30%.[151] Among EU countries in this group, Bugaria and Greece also did not meet the N-1 standard.

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[144] See footnote 141.
[145] There are significant statistical difficulties of identifying exactly how much gas was sold under LTSCs due to some discrepancies between Gazprom and Gazprom Export data.
[146] The Czech Republic would have been in this group too as prior to 2013 it was receiving all of its Russian gas imports via Ukraine, but as of 2013 these have been delivered to the Czech-German border (via Nord Stream 1 and OPAL).
[147] Germany was receiving some of its Russian gas imports via Ukraine too but it is understood that this is no longer the case.
[148] SCI is a measure of diversification and the exposure to suppliers outside the EU/EEA, defined as the sum of squares of the quotient (multiplied by 100) of net positive gas imports and the gross inland gas consumption; smaller values of SCI indicate higher diversification and therefore lower risk (if one believes that supplies from outside the EU/EEA are inherently more risky).
[149] The N-1 standard is a measure of resilience requiring that in case of disruption of the single largest piece of gas infrastructure, the capacity of the remaining infrastructure is suffiicent to satisfy an exceptionally high demand.
[150] EC (2014a) European Energy Security Strategy.
[151] However SCI should be treated with caution as e.g. the Austrian very high SCI of 96.8 does not mean that Austria is as

The vulnerability of south eastern European countries was also demonstrated by the so called "stress-tests" conducted by the EC (jointly with ENTSOG) in 2014, and by the Ten-Year Network Development Plan (TYNDP), prepared by ENTSOG in in 2015.[152]

6. New Russian Gas Export Pipelines to Europe: scenarios up to 2020

Construction of scenarios

The degree to which Gazprom would be able to reduce transit across Ukraine depends, first and foremost, on how much *additional* export pipeline capacity can be built by 2020. We argue that Gazprom, supported by the Russian government, will aim to build – alone or with partners – as much new transit-free Europe-bound export pipeline capacity as possible by 2020, within the limit of the existing and likely political, contractual, and regulatory constraints (see section 1). The paper considers the following scenarios of how much new export pipeline capacity might be built by 2020 (Annex Table A.4):[153]

- Scenario A:
  - no new export pipelines (neither Nord Stream 2 nor South Stream nor Turkish Stream nor Yamal Europe 2) are built, Blue Stream is not expanded, the 50% OPAL capacity cap remains in place;

- Scenario A*:
  - no new export pipelines (neither Nord Stream 2 nor South Stream nor Turkish Stream nor Yamal Europe 2) are built, Blue Stream is not expanded, but the 50% OPAL capacity cap is lifted;

- Scenario B:
  - one string of Turkish Stream will be built to the western coast of Turkey (15.75 bcma) to serve the Turkish market; [154]

- Scenario C:
  - two strings of Turkish Stream will be built (total 31.5 bcma) so that the first string would connect to the western coast of Turkey and the second string would connect with the Trans-Balkan pipeline, thus allowing Gazprom to deliver gas to south east Europe as reverse flow;

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vulnerable as for example Bosnia & Herzegovina or FYROM (which both have their SCI at 100). Austria transits large volumes of Russian gas which 'distorts' its SCI due to intra-EU trade movements not being reported as exports; the same was true for the Czech Republic and Slovakia both of which had very high SCI of 79.3 and 82.3 in 2012. It is understood that their SCI must have decreased substantially in 2013 due to significant reduction of transit, and (in case of the Czech Republic) imports, of Russian gas.

[152] ENTSOG (2015).

[153] Nord Stream technical capacity is 55 bcm (with forward connection to NEL (20 bcm) and OPAL (36 bcm) but as Gazprom's usage of OPAL is capped at 18 bcm, Nord Stream capacity is assumed at 38 bcm in those scenarios which do not envisage construction of onshore extensions in Europe (i.e. A and B). It is assumed at 55 bcm in all scenarios which envisaged construction of onshore extensions in Europe. The logic behind these assumptions is that Gazprom is very unlikely to embark on construction of new pipelines requiring onshore extensions in Europe if the OPAL cap is not lifted.

[154] 'Russia and Turkey discuss an agreement on one string of Turkish Stream only' (in Russian), *Vedomosti*, 28 July 2015.

- Scenario D:
  - one string of Turkish Stream (15.75 bcma) to the western coast of Turkey and one string of Nord Stream 2 (27.5 bcma) to the coast of Germany[155];
- Scenario E:
  - two strings of Turkish Stream (31.5 bcma) and one string of Nord Stream 2 (27.5 bcma);

- Scenario F:
  - two strings of Turkish Stream (31.5 bcma) and two strings of Nord Stream 2 (55 bcma);

- Scenario G:
  - two strings of Turkish Stream (31.5 bcma) and one string of Yamal Europe 2 (15 bcma);

- Scenario H:
  - two strings of Nord Stream 2 (55 bcma) and one string of Yamal Europe 2 (15 bcma);

- Scenario I:
  - two strings of Nord Stream 2 (55 bcma) only;

- Scenario J
  - one string of Turkish Stream (15.75 bcma) to the western coast of Turkey and two strings of Nord Stream 2 (55 bcma);

- Scenario K
  - one string of South Stream (15.75 bcma) to the Bulgarian coast and onwards to the Slovak-Austrian border (Baumgarten), and one string of Nord Stream 2 (27.5 bcma);

- Scenario L:
  - one string of South Stream (15.75 bcma) to the Bulgarian coast and onwards to the Slovak-Austrian border (Baumgarten) and two strings of Nord Stream 2 (55 bcma);

- Scenario M:
  - one string of South Stream, one string of Turkish Stream, and one string of Nord Stream;

- Scenario N:
  - two strings of South Stream (31.5 bcma) only.

[155] In addition to the already existing two strings of Nord Stream 1.

Analysis of scenarios

The paper evaluates how much gas Gazprom will have to continue transiting across Ukraine post-2019 by calculating the difference between its supply commitments (estimated at the 70% and 85 % TOP levels) under existing LTSCs, and the amount of existing and newly built non-Ukrainian export capacity under each scenario (section 6). This exercise is based on the assumption that the Gazprom's existing export model – with gas delivered to border delivery points under LTSCs – will be preserved, with LTSCs continuing to remain in place until their expiry and delivery points remaining (largely) unchanged (section 5).

We also conduct a similar exercise by calculating the difference between the maximum and minimum volumes that Gazprom is likely to export post-2019 and the amount of existing and newly built non-Ukrainian export capacity under each scenario (section 6). The export volume range is based on the OIES modelling of global supply and demand dynamics,[156] with the minimum volume estimated at 130 bcma[157] and the maximum volume - at 180 bcma.[158] This exercise is based on the assumption that the delivery points in Gazprom's existing contracts will undergo transition during 2015-2019 with gas to be (largely) delivered to the hubs. The resulting difference between the export volumes (taken both at the level of contractual commitments and the level suggested by modelling) and export capacity will serve as an indication of the Ukrainian transit volume post-2019 (given that this gas will have no other transportation route by which to reach Europe).

We then use this Ukrainian transit estimate to demonstrate which European countries are likely to be supplied by Russian gas through Ukraine post-2019 (given the delivery points specified in existing LTSCs) under each scenario. The aim of this exercise is to demonstrate which European countries' security of gas supply will remain dependent on Ukrainian transit post-2019.

Assessing the likely range of residual Ukrainian transit in 2020 under each scenario: Gazprom's overall export capacity

Prior to conducting an assessment of Gazprom's ability to deliver gas to its European buyers without using the Ukrainian transit corridor in 2020, it is useful to understand Gazprom's ability to do so in 2014. Our calculation suggests that Gazprom would have been able to send 5 bcm through a direct pipeline to Finland, 38 bcm through Nord Stream 1 (below the pipeline's technical capacity of 55 bcm due to the existing 50% cap on the use of one of its onshore extensions, OPAL, see section 4), 33 bcm through Yamal-Europe, 16 bcm through Blue Stream, 15 bcm through the Northern Lights pipeline (but as this pipeline could only serve Lithuania and Poland with additional westward flow being limited, its export capacity is assumed at 10.4 bcm) thus amounting to some 102.4 bcm. This could reach 119.4 bcm should the OPAL cap be lifted. Thus, at the 2014 level of exports of approximately 150 bcm under its LTSCs, had it been unable to transit gas across Ukraine, Gazprom would have been unable to deliver between one quarter and one third of its contracted export volumes to its contractual delivery points.

Gazprom exports to Europe post-2019: estimates based on the LTSCs time profile

According to the Energy Research Institute of the Russian Academy of Science (ERI RAS), Gazprom's LTSCs time profile (Annex Figure A.1) is such that in 2020 European buyers will be committed to pay for gas volumes ranging between 122 bcm (at an assumed ToP level of 70% of ACQ) and 148 bcm (at an assumed 85% TOP level). This time profile includes contracts with buyers in Austria, Denmark,

[156] Rogers (2015); the model reaches its conclusions independent of long term contractual commitments.
[157] Ibid., p. 4, scenario 3 "Low Chinese demand, low European demand, Russia supports European hub prices".
[158] Ibid., p. 39, scenario 3 "Low Chinese demand, low European demand, Russia supports European hub prices".

Finland, France, Germany, Italy, Netherlands, Switzerland, the Czech Republic, Hungary, Poland, Slovakia, Greece and Turkey but excludes contracts with buyers in the Balkans and the Baltics.[159]

We re-calculate Gazprom's LTSCs time profile by including data on contracts with buyers in the Balkans and the Baltics and updating data on other European buyers.[160] Our calculation suggests that in 2020 European buyers will be committed to pay for gas volumes ranging between 126 bcm (at an assumed 70% TOP level) and 153 bcm (at an assumed 85% TOP level) (i.e. slightly, but not materially, higher than the 122 and 148 bcm levels, suggested by ERI RAS research).

On its part Gazprom would have to deliver as much gas as its European customers nominate (up to a maximum which can be up to 125% of ACQ[161]) and although it is only required to deliver contractual minimum TOP volumes, it would have to pay penalties for failing to deliver the difference between contractual minimum and nominated volumes.[162] This suggests that Gazprom would need to have access to export capacity *at least* within the 126-153 bcm range for meeting its TOP commitments,[163] but more if it wants to avoid penalties for not meeting maximum nominations and maximise sales.

We have then compiled data on Russian export pipeline capacity, which Gazprom (as the holder of pipeline gas export monopoly[164]) would be able to use to meet its contractual commitments towards European buyers post-2019. Table A.4 (see Annex) shows the amount of existing pipeline capacity in 2015 and the amount of potential additional capacity that could be built by 2020 under various scenarios.

The difference between Gazprom's contractual commitments (as estimated above) and the amount of existing and new non-Ukrainian capacity, provides an estimate of Ukrainian residual transit volumes in 2020 under various scenarios which shows that:

- at a 70% ToP level, residual Ukrainian transit would be:
    - 23.6 bcm under Scenario A (no new pipelines, OPAL remains capped),
    - 6.6 bcm under Scenario A* (no new pipelines, OPAL cap is lifted),
    - 7.8 bcm under Scenario B (one string of Turkish Stream is built, OPAL remains capped);
    - zero under all other scenarios;

- at a 85% ToP level, residual Ukrainian transit would be
    - 50.6 bcm under Scenario A,
    - 33.6 bcm under Scenario A*,
    - 34.8 bcm under Scenario B,
    - 2.1 bcm under Scenario C (two strings of Turkish Stream, OPAL cap is lifted) and under Scenario N (two strings of South Stream, OPAL cap is lifted),
    - zero under any other Scenario.

[159] For information on the Gazprom-RWE Transgaz contract to supply the Czech Republic see footnote 141.
[160] Based on Gazprom Export information, which has become available since ERI RAS research has been published, see Gazprom Export (2014), pp. 10-21.
[161] A ToP clause of 85% of ACQ and a possibility to nominate to a maximum of up to 125% of ACQ would be normally expected in a traditional Gazprom European LTSC. However, given that the ToP levels have been reduced to 70% (on average) in these LTSCs (as a result of negotiations and arbitrations between Gazprom and its European customers in the 2010s), it would not be surprising if maximum nomination levels have also been reduced.
[162] For example, Gazprom did not meet the nominations of some of its European buyers during September 2014-March 2015 when it was trying to support hub prices and prevent reverse flow to Ukraine, and hence had to pay penalties, see Stern (2015a).
[163] Stern (ed.) (2014), pp. 4-5.
[164] Federal Law 'On gas supply in the Russian Federation', N 69-ФЗ, 31 March 1999. Notably, Gazprom is likely to continue to remain the holder of a pipeline gas export monopoly in 2020 and possibly beyond, see Yafimava (2015).

Thus in order to honour its existing commitments in full at 70% TOP, Gazprom would need to continue transiting some 24 bcm across Ukraine in 2020, if the OPAL cap is not lifted and export pipelines are not built. However, Gazprom would only need to transit some 7-8 bcm across Ukraine if either the OPAL cap is lifted or one string of Turkish Stream is built.

In order to honour its commitments in full under 85% TOP, Gazprom would need to continue transiting some 51 bcm across Ukraine in 2020, if the OPAL cap is not lifted and new pipelines are not built, whereas the removal of the OPAL cap or construction of one string of Turkish Stream would reduce this figure to 34 bcm. The removal of the OPAL cap and construction of two strings of Turkish Stream or two strings of South Stream would decrease this figure to 2 bcm. Under all other scenarios Gazprom's Ukraine transit needs would be zero.

Gazprom exports to Europe post-2019: estimates based on modelling

This calculation assumes that Gazprom's existing LTSCs will continue to be operational until their expiry in the late 2020s and the early 2030s (Annex Figure A.1). However, according to OIES research, even if (some or all of) these LTSCs do not continue until expiry, Europe would still need to import Russian gas in amounts close to that contracted under existing LTSCs, at least until the 2030s and possibly beyond.[165] While the exact volumes of European imports of Russian gas in 2020 would depend on global gas supply and demand dynamics – and specifically on availability of LNG which is Europe's main alternative to Russian gas – 130-180 bcma appears to be the likely range.[166]

Comparison of this volume range with availability of existing and new non-Ukrainian export capacity in 2020 under each scenario, shows that:

- at the minimum level of exports of 130 bcm, Gazprom would have sufficient capacity under all Scenarios apart from Scenarios A, A* and B when the shortage range would be 10.6-27.6 bcm:
    - 27.6 bcm under Scenario A,
    - 10.6 bcm – under Scenario A*,
    - 11.8 – under Scenario B;

- at the maximum level of exports of 180 bcm, Gazprom could be short of capacity in the range of 1.6-77.6 bcm:
    - maximum shortage (77.6 bcm) under Scenario A (no new pipelines, OPAL cap is not lifted),
    - minimal shortage (1.6 bcm) under Scenario E (two strings of Turkish Stream, one string of Nord Stream 2, OPAL cap is lifted) and Scenario M (one string of South Stream, one string of Turkish Stream, one string of Nord Stream 2, OPAL cap is lifted),
    - shortage of ~60-62 bcm under Scenario A* (no new pipelines, OPAL cap is lifted) and Scenario B (one string of Turkish Stream, OPAL cap is not lifted),
    - shortage of ~ 29 bcm under Scenario C (two strings of Turkish Stream, OPAL cap is lifted) and Scenario N (two strings of South Stream, OPAL cap is lifted),
    - shortage of ~14-17 bcm under Scenario D (one string of Turkish Stream and one string of Nord Stream 2, OPAL cap is lifted), Scenario G (two strings of Turkish Stream, one string of Yamal Europe 2, OPAL cap is lifted) and Scenario K (one string of South Stream and one string of Nord Stream, OPAL cap is lifted),

[165] Stern (ed.) (2014).
[166] Rogers (2015).

- shortage of 5.6 bcm under Scenario I (two strings of Nord Stream, OPAL cap is lifted),
- zero shortage under Scenario F (two strings of Turkish Stream and two strings of Nord Stream, OPAL cap is lifted), H (two strings of Nord Stream, one string of Yamal Europe 2, OPAL cap is lifted), J (one string of Turkish Stream, two strings of Nord Stream, OPAL cap is lifted) and L (one string of South Stream, two strings of Nord Stream 2, OPAL cap is lifted).

This calculation allows us to conclude – and this is consistent with the conclusion made earlier on the basis of estimated contractual export commitments – that if no new export capacity is built by 2020, Gazprom would be unable to deliver some 27.6 bcm out of its minimum export volumes of 130 bcm, unless it was willing to use the Ukrainian network. In order to avoid this situation, at least one additional export pipeline would need to be built. If no new capacity is built by 2020 and the OPAL capacity cap is not lifted, Gazprom would be unable to deliver up to 77.6 bcm out of its maximum export volumes of 180 bcm; under some scenarios, Gazprom could be short of 5.6-62 bcm of capacity but would be (just about) able to meet them under Scenarios E (two strings of Turkish Stream, one string of Nord Stream 2, OPAL cap is lifted) and M (one string of Turkish Stream, one string of South Stream, one string of Nord Stream, OPAL cap is lifted) and to meet them with a significant capacity surplus under Scenarios F (two strings of Turkish Stream and two strings of Nord Stream, OPAL cap is lifted), H, J and L (all envisaging construction of three strings of various combinations of Nord Stream 2, Turkish Stream, South Stream and Yamal Europe 2).

An overall conclusion, emerging on the basis of these calculations, is that if no new pipelines are built by 2020 and if the OPAL cap is not lifted, Gazprom could face shortage of non-Ukrainian export capacity in the range of 27.6 to 77.6 bcm (and further down to 10.6-60 bcm if the OPAL cap is lifted) – given its potential range of 130-180 bcm of exports to Europe in 2020[167] – if it were to deliver these volumes to the delivery points specified in existing LTSCs or else to bring these volumes to European hubs (should such changes be agreed in the existing and/or new contracts), thus being forced to continue transiting these volumes across Ukraine. However, given its LTSCs' time-profile, Gazprom would only be *contractually committed* to deliver 126-153 bcm by 2020 under its existing LTSCs – at 70% and 85% ToP respectively – thus bringing its shortage of non-Ukrainian export capacity down to 23.6-50.6 bcm (and further down to 6.6.-33.6 bcm if the OPAL cap is lifted).

Given that the European gas market is likely to remain in surplus (at least) until 2020 – driven by the arrival of a new LNG wave in late 2015 – and might only start to "tighten" post-2020,[168] it is reasonable to expect that in 2020 Russian gas exports to Europe under LTSCs will not be significantly higher (and might be lower) than they were in 2014 (~150 bcm). In this case, given that Gazprom's existing 70% TOP contractual commitments will constitute around 126 bcm in 2020, even in the absence of new export pipelines and provided that the OPAL cap is lifted, Gazprom would have almost sufficient *overall* capacity to meet its minimum TOP obligations without having to use the Ukrainian transit corridor, only falling short by some 6.6 bcm. This shortage would increase to 23.6 bcm if the OPAL cap is not lifted. Therefore some 6.6-23.6 bcm of minimum contractual TOP volumes would have to be transited across Ukraine and therefore new post-2019 contract would need to be concluded (i.e. up to 5 years thus matching Gazprom's LTSC time profile, see Annex Figure A.1) for these volumes.

Gazprom would surely prefer to use its transit-free routes for exports at contractual TOP levels to the maximum extent possible (thus only sending 'residual' TOP volumes, not 'fitting' into transit-free pipelines, through Ukraine). But for volumes in excess of TOP obligations (~34 bcm, assuming exports

[167] Rogers (2015).
[168] According to ENTSOG, after 2025 a much tighter supply and demand balance is expected. The whole of Europe would then risk becoming strongly dependent on both Russian gas and LNG. ENTSOG (2015), p. 211.

in 2020 remain at the 2014 level, and potentially up to maximum nominations[169]), Gazprom might want to continue using the Ukrainian corridor for deliveries above TOP levels, given that a failure to deliver these volumes would result in penalties and lost revenues (see section 6). This would necessitate conclusion of short-term transit contracts (i.e. less than 1 year) with the Ukrainian TSO, thus taking advantage of Ukraine's membership of the Energy Community Treaty (EnCT), which obliges the Ukrainian TSO to provide such service in line with the TEP. This would necessitate Gazprom's continued usage of the Ukrainian corridor, with the most likely range of 40-60 bcm (i.e. effectively at the 2014 level) but possibly higher at 60-75 bcm. The transit volumes would consist of residual TOP volumes (i.e. those TOP volumes for which there is no capacity in transit free export pipelines) and volumes nominated in excess of TOP.

Thus should Gazprom be able and willing to use the Ukrainian corridor post 2019, it could either continue delivering to flange delivery points as specified in its contracts until they expire, or offer its European buyers to either amend existing contracts or conclude new contracts which would specify alternative delivery points at hubs. Alternatively, should Gazprom be unable or unwilling to use the Ukrainian corridor either for residual TOP volumes or contracted volumes above minimal TOP commitments, it could offer its European buyers either to amend the existing contracts or to conclude new contracts which would specify the Russia-Ukraine border as a new delivery point. In that case European buyers would need to make their own contractual arrangements with the Ukrainian TSO for shipping this gas across Ukraine (thus suggesting that the Ukrainian corridor will remain utilised, albeit not by Gazprom).

In that case, it is conceivable that volumes transited across Ukraine by European buyers could potentially be higher than volumes transited by Gazprom (see above). Should delivery points be moved to the Ukraine-Russia border, the European buyers would have new potential sales opportunities in respect of this gas, and therefore they might be more willing to nominate maximum volumes – something they might be more reluctant to do in respect of gas arriving at their national borders.

7. Gazprom's European deliveries under LTSCs in 2020: how much and where?

Whereas Gazprom's *overall* export pipeline capacity might be nearly sufficient for meeting existing contractual commitments at 70% TOP level in 2020 (if the OPAL cap is lifted and even if no new export capacity is built), Gazprom's ability to deliver gas to contractually specified delivery points at various European borders (see section 5) might be constrained by the availability of matching (existing and newly built) capacity[170] in Europe as well as Gazprom's ability to access it.[171] In this section we assess which countries Gazprom would be able to serve by delivering gas to contractually specified delivery points, given existing technical capacities of entry points for Russian gas to Europe (Annex Table A.5) and existing technical capacities at various European interconnection points (Annex Table A.6). These tables provide an indication of potential constraints. The estimates resulting from this exercise are inevitably approximate as they do not take into account the existing contractual arrangements for such capacities (i.e. the time-profile of Gazprom's and European shippers' capacity contracts).

[169] It must be noted that in the post-2008 environment of reduced European gas demand, maximum nomination rights are not an issue given that Gazprom's actual sales to Europe are understood to have largely remained at the 70% TOP level.
[170] The EU legal framework setting out the regulatory procedure for development and utilisation of incremental capacity in the EU territory has been under development for several years and is not expected to come in force earlier than 2017-2018, see Stern, Pirani and Yafimava (2015).
[171] For an explanation of 'capacity mismatch' problem, see Yafimava (2013).

The purpose of this exercise is to determine which European countries might not be able to receive full volumes of this contracted gas at (i) 70% TOP levels of 126 bcm, (ii) 2014 export levels of 150 bcm, and (iii) maximum export levels of 180 bcm, due to shortage of, and/or mismatch between, Russian export capacity and domestic European transmission capacity, unless (some of) this gas will be delivered via Ukraine.[172] In turn, this will demonstrate which European buyers should be most interested in strengthening the security of the Ukrainian transit corridor. Symmetrically, it will also demonstrate which European buyers would be interested in accelerated construction of alternative export infrastructure should security of the Ukrainian corridor not be assured.

- Scenario A:
    - no new export pipelines (neither Nord Stream 2 nor South Stream nor Turkish Stream nor Yamal Europe 2 is built, Blue Stream is not expanded),[173] the 50% OPAL capacity cap remains in place;

Under Scenario A, Gazprom would be certainly able to serve Germany, France, and Poland at 70% TOP and 2014 export levels (and possibly up to maximum export levels) without Ukrainian transit. However, Gazprom's ability to do so in respect of Austria, Hungary, the Czech Republic, and Slovakia is constrained: it would be unable to serve parts of their demand at 2014 levels and might be unable to serve them in full at 70% TOP levels.[174] Furthermore, Gazprom would be unable to meet a significant part of Italian demand even at 70% TOP levels. No deliveries to south east European countries (Greece, Bulgaria, Romania, Bosnia & Herzegovina, FYROM, and Serbia) and to western Turkey would be possible without Ukrainian transit.[175]

- Scenario A*
    - no new export pipelines (neither Nord Stream 2 nor South Stream nor Turkish Stream nor Yamal Europe 2 are built, Blue Stream is not expanded), but the 50% OPAL capacity cap is lifted;

Under Scenario A*, in contrast to Scenario A, Gazprom would be able to serve the Czech Republic, Slovakia, Austria and Hungary at 2014 export levels and above, due to the OPAL cap lifting. Yet it would still be unable to meet a significant part of Italian demand even at 70% TOP levels, without using Ukrainian transit. And no deliveries to south east European countries and western Turkey would be possible.

- Scenario B:
    - one string of Turkish Stream will be built to western Turkey (15.75 bcma);

Under scenario B, Gazprom would be able to replace its deliveries to western Turkey via Ukraine, Romania, and Bulgaria (the Trans-Balkan pipeline) by deliveries via one string of Turkish Stream but would not be able to serve any future increase in Turkish demand. South eastern Europe would have to continue to be served via Ukraine. Gazprom's ability to serve central and north western European

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[172] Gazprom's supplies to the Baltics are not considered as Gazprom would be able to serve them in full both in respect of contracted volumes and maximum demand volumes in 2020 via Belarus (the Northern Lights pipelines); note that in respect of 2020 deliveries Gazprom only has contractual commitment towards Latvia, which has a long term contract in place, whereas contracts with both Lithuania and Estonia expired at the end of 2015 and have not thus far been renewed.

[173] See footnote 48.

[174] The status of the Gazprom Export's contact to supply the Czech Republic is unclear, see footnote 141; Hungary should not be included in the assessment of Gazprom's 70% TOP commitments, as the Gazprom's contract to supply Hungary will expire at the end of 2019 thus suggesting that Gazprom has no contractual supply commitments towards Hungary in 2020, see 'Gazprom extends gas contract with Hungary until 2019', *Interfax*, Russia & CIS Oil and Gas Weekly, 11-17 February 2016.

[175] Some gas delivered by Gazprom to eastern Turkey via Blue Stream could be re-delivered through Turkey to western Turkey but ability to do so is limited due to internal bottlenecks on the westward flow in the Turkish transmission system, see Rzayeva (2014).

countries would remain unaffected and be identical to that under Scenario A (if the OPAL cap remains in place) or Scenario A* (if the OPAL cap is lifted).

- Scenario C:
  - two strings of Turkish Stream will be built (total 31.5 bcma);

Under Scenario C, a second string of Turkish Stream would allow Gazprom to serve south eastern European markets at 70% TOP and 2014 export levels (by utilising capacity in the Trans-Balkan pipeline in reverse mode), as well as to meet potential increase in Turkish demand.[176] Despite the fact that a second string of Turkish Stream would not be utilised in full (due to limited demand in the Balkans), its usage for transporting gas further northwards would be limited by lack of interconnections, suggesting thus Gazprom's ability to serve central Europe would remain identical to that under Scenario A (if the OPAL cap remains in place) or Scenario A* (if the OPAL cap is lifted).

- Scenario D:
  - one string of Turkish Stream (15.75 bcma) and one string of Nord Stream 2 (27.5 bcma);

Under Scenario D, three strings of Nord Stream and the existing Yamal Europe capacity would allow Gazprom to serve Germany, France, the Czech Republic, Slovakia, Poland, Austria, Hungary, and Italy at 2014 export levels, although this would require expansion of both the OPAL pipeline and the Czech transmission system (to serve Italy). However, Gazprom would still be unable to serve Italy in full should its total export levels reach their maximum of 180 bcm. The impact of one string of Turkish Stream would be the same as in in Scenario B i.e. Gazprom would be able to replace its deliveries to western Turkey via Ukraine. South eastern Europe would have to continue to be served via Ukraine.

- Scenario E:
  - two strings of Turkish Stream (31.5 bcma) and one string of Nord Stream 2 (27.5 bcma);

Under Scenario E, Gazprom's ability to deliver would be the same as under Scenario D with the difference that it would be able to serve south eastern European countries via the second Turkish Stream pipeline and the Trans-Balkan pipeline in reverse mode instead of via Ukraine. However, Gazprom would still be unable to serve Italy in full should total exports reach 180 bcm.

- Scenario F:
  - two strings of Turkish Stream (31.5 bcma) and two strings of Nord Stream 2 (55 bcma);

Under Scenario F, Gazprom would be able to serve all of its markets in Europe and Turkey even at the maximum level of exports of 180 bcm without having to use Ukrainian transit.

- Scenario G:
  - two strings of Turkish Stream (31.5 bcma) and one string of Yamal Europe 2 (15 bcma);

Under Scenario G, Gazprom would be able to serve all north western and central European countries in full not only at 70% TOP and 2014 export levels but also close to maximum export levels due to the addition of one string of Yamal Europe 2. This would require expansion of interconnections between Poland and Slovakia which would enable deliveries to central Europe through the additional string of

[176] See Stern, Pirani and Yafimava (2015) for analysis of potential regulatory difficulties.

Yamal Europe 2 via Slovakia; however Gazprom would still be unable to serve Italy at 70% TOP and above.

- Scenario H:
    - two strings of Nord Stream 2 (55 bcma) and one string of Yamal Europe 2 (15 bcma);

Under Scenario H, Gazprom would be able to serve all of its European buyers in full at maximum export levels, without having to use Ukrainian transit. Deliveries to south east European countries would require construction of additional interconnection points between central and south east European countries to enable deliveries through the additional string of Yamal Europe 2 via Slovakia. Gazprom would have to continue deliveries to western Turkey via Ukraine.

- Scenario I:
    - two strings of Nord Stream 2 (55 bcma) only;

Under Scenario I, Gazprom would be able to serve all of its European buyers – except south eastern Europe – even at the maximum 180 bcm level, although expansion of the OPAL system and the Czech transmission network capacity would be needed to enable deliveries to Italy. In theory, south eastern Europe could also be served via Nord Stream 2 but this would require significant investment in new pipeline capacity. There is no *commercial* rationale for building such capacity under the current regulatory regime, given that the region's gas demand is very small and declining. If no such capacity is built Gazprom would need to continue deliveries to south eastern Europe via Ukraine. Turkey would also continue to be served via Ukraine.

- Scenario J
    - one string of Turkish Stream (15.75 bcma) and two strings of Nord Stream 2 (55 bcma);

Under Scenario J, Gazprom would be able to serve all European countries – except south eastern Europe – at the maximum export level of 180 bcm by using four strings of Nord Stream and the existing two strings of Yamal Europe 1, subject to expansion of the OPAL pipeline and the Czech transmission system. As under Scenario I, deliveries to south eastern Europe would be possible should new capacity be built in the region – but there is no commercial rationale for this under the current regulatory regime. As far as Turkey is concerned, Gazprom would be able to replace its deliveries to western Turkey via Ukraine by deliveries via one string of Turkish Stream.

- Scenario K
    - one string of South Stream (15.75 bcma) and one string of Nord Stream 2 (27.5 bcma);

Under Scenario K, Gazprom would be able to serve all European countries by a combination of Yamal Europe 1, three strings of Nord Stream and one string of South Stream at 2014 export levels and above. North west and central Europe would be mostly served via Yamal Europe and two existing strings of Nord Stream, whereas Italy would be served via a third string of Nord Stream (this would require expansion of OPAL and expansion of the Czech network). South east European countries would be served by one string of South Stream, which would also allow to meet future increases in Italian demand. Deliveries to western Turkey would continue across Ukraine.

- Scenario L
    - one string of South Stream (15.75 bcma) and two strings of Nord Stream 2 (55 bcma);

Under Scenario L, Gazprom would be able to serve all European countries (except south eastern Europe) via Yamal Europe and four strings of Nord Stream even at maximum export levels of 180 bcm, though this would also require expansion of OPAL and the Czech system. One string of South Stream

could be used for serving both south eastern Europe and western Turkey but it is impossible to know how much of which markets would be served specifically by South Stream and how much would continue to be served by transit through Ukraine.

- Scenario M
    - one string of South Stream (15.75 bcma), one string of Turkish Stream (15.75 bcma), and one string of Nord Stream 2 (27.5 bcma);

Under Scenario M, a combination of Yamal Europe 1 and two existing strings of Nord Stream 1 would allow Gazprom to serve Germany, France, Poland, the Czech Republic, Slovakia, Austria and Hungary at 2014 export levels and above. One additional string of Nord Stream 2 would serve Italy, and one string of South Stream would serve all of south east European demand. One string of Turkish Stream would serve western Turkey but not allowing for any increase in Turkish demand (the latter could be served via spare capacity in South Stream).

- Scenario N
    - two strings of South Stream (31.5 bcma) only;

Under Scenario N, a combination of Yamal Europe 1 and two existing strings of Nord Stream 1 would allow Gazprom to serve Germany, France, Poland, the Czech Republic, Slovakia, Austria and Hungary at 2014 levels and above. Two strings of South Stream could serve the Italian demand (provided that onward connections towards Italy are built) and all of south east European demand. Deliveries to Turkey would continue via Ukraine.[177]

This exercise has demonstrated that if no new export pipelines (Nord Stream 2, Turkish Stream, South Stream, Yamal Europe 2) are built by 2020 and if the OPAL cap (limiting the usage of existing Nord Stream 1) is not lifted (i.e. Scenario A) several European countries in central and southern Europe as well as Turkey will continue to depend significantly, overwhelmingly, or wholly on Ukrainian transit for Russian gas imports (assuming post-2019 supplies at the 2014 level). By maximising the use of its non-Ukrainian export capacity Gazprom would be able to re-route some of its European exports and serve part of Italian, Austrian, Hungarian, Czech, and Slovak demand via Nord Stream and Yamal Europe, but a significant part of these countries' Russian gas imports would continue to be delivered via Ukraine. Whereas Bulgaria, Romania, Greece and western Turkey would have to continue to receive all of their Russian gas imports exclusively through Ukraine.

Gazprom's ability to deliver gas to contractual delivery points is more constrained when assessed on the basis of matching export capacities and domestic European capacities, compared to when assessed purely on the basis of overall export capacities. Our analysis shows that under some scenarios Gazprom's ability to use new (non-Ukraine) pipeline capacity to deliver gas to specified delivery points is constrained, specifically, by the lack of matching 'downstream' capacities in European networks – most importantly the lack of a 'north-south' gas interconnections corridor in central eastern and south eastern Europe.

Under our Scenario A, Gazprom would be able to meet its 70% TOP contractual obligations in respect of north western European countries, bringing gas to specified delivery points, without transiting Ukraine. However, its ability to do so in respect of several central European countries would be constrained. Furthermore, it would be unable to do so in respect of a significant part of Italian demand as well as in respect of all south east European countries and Turkey (overall estimate ~ 40-45 bcm). Thus, if no new export pipelines are built by 2020, Gazprom would have to conclude a new transit

[177] Should the South Stream project be revived, it would be reasonable to expect that it would deliver gas to Italy rather than to Turkey (despite the latter being geographically closer to Russia) because of Italy's ENI being a shareholder. On the other hand, Turkey could prevent construction of South Stream – or any other offshore pipeline in the Black Sea should it not be delivering gas to Turkey – due to it having to run through the Turkish EEZ.

contract with Ukraine, enabling it to bring gas to specified delivery points, to honour its maximum contractual obligations towards European buyers. It also might choose to take advantage of increased sales opportunities in Europe and avoid paying penalties for failing to meet nominations (see section 6).

Should Gazprom be unable to transit gas across Ukraine due to e.g. absence of a new transit contract, it would need to change the delivery points in some contracts to the Russia-Ukraine border. Should its European buyers not agree to such changes, Gazprom would remain contractually obliged to deliver gas to existing delivery points, thus necessitating transit across Ukraine, or else face significant penalties. Should its buyers agree to such changes they themselves would need to enter into transportation arrangements with the Ukrainian TSO, enabling them to transport Russian gas from the Russia-Ukraine border to their markets. This suggests that if no new export pipelines are built, then the security of supply of Italy, Austria, Hungary, the Czech Republic, Slovakia, Greece, Bulgaria, Romania, FYROM, Serbia, Bosnia & Herzegovina and Turkey in respect of their Russian gas imports will depend (to varying degrees) on whether and how political, contractual, regulatory, commercial, technical and security issues associated with Ukrainian transit post-2019 will be resolved (section 2).

Construction of any new Russian export pipeline towards Europe or Turkey is fraught with significant difficulties. At the time of writing, it is not possible to suggest with any degree of certainty which new pipeline scenario will come to fruition by 2020. Given significant EU regulatory challenges and political opposition, which could lead to delays of Russian pipelines directed towards Europe (see sections 3 and 4) and given a sharp deterioration of the Russian-Turkish relationship, which could lead to delays and cancelations of pipelines directed towards Turkey (see section 2), it is more likely that no new pipelines will be built by 2020. However, some of these pipelines are likely to be built by the early to mid-2020s. We believe that among the most likely pipeline scenarios are those envisaging construction of two strings of Nord Stream 2 (Scenario I), one string of Turkish Stream (Scenario B), two strings of Nord Stream and one string of Turkish Stream (Scenario J); two strings of South Stream (Scenario N) also remain a possibility.

8. Transit across Ukraine: possible contractual arrangements

The scenarios discussed above indicate that, notwithstanding Gazprom's transit diversification efforts, some significant volumes of Russian gas will definitely continue to be transported across Ukraine after 2019. The analysis in Sections 6 and 7 suggests that Gazprom would only be contractually committed to deliver 126-153 bcma to European buyers by 2020 (under 70% and 85% TOP respectively), implying a transit requirement through Ukraine of 23.6-50.6 bcma (if the OPAL cap is not lifted) or 6.6.-33.6 bcma (if the OPAL cap is lifted), and that, most likely, Gazprom would need up to 60 bcma (and at the very most, 75 bcma) of Ukrainian transit (including contracted and yet-to-be-contracted volumes). The issue of possible contractual arrangements for transit has already been aired publicly. In our view the options deserving consideration are:

Gazprom transports gas volumes under a new post-2019 transit contract.

Up until mid-2015, Gazprom managers had stated that the company would not sign a new contract to transit gas across Ukraine. In June 2015, after the policy shift on this issue by President Putin (see section 2 above), they changed their stance, stating that they would agree only to a contract that did not harm the company's interests. We have shown above that Gazprom is contractually committed to deliver gas at points on or beyond Ukraine's western border for many years after 2020, and that under the most likely scenarios of transport capacity availability will need significant transit across Ukraine.

Refusal in advance to negotiate a transport contract would seem to be damaging to Gazprom's commercial interests, and the change of management attitude in mid-2015 is thus logical.

The gas market reforms underway in Ukraine mean that a future contract is likely to differ from past contracts in that:

-- Past transit contracts have been signed with Naftogaz. The Ukrainian government and current Naftogaz management have highlighted this as inconsistent; Ukrtransgaz, a (100%) subsidiary of Naftogaz, is the transport system operator (TSO). Progress is now being made towards putting in place the legal basis for an independent TSO and the unbundling of Naftogaz; proposed privatisation of a 49% stake in the gas transmission system (albeit excluding investors from Russia)[178]; and placing gas storage facilities in a separate entity. The stated aim of the legislation is to conform with Ukraine's commitments under the Energy Community Treaty (EnCT). While making these changes will certainly take time, it may be assumed that any future transit contracts will be signed with Ukrtransgaz, and that Ukrainian regulators are likely to insist on conformity with standards similar to those in the EU Third Energy Package (TEP).

-- At present, Gazprom Export handles transit arrangements with the Slovak TSO, Eustream, in respect of the interconnection point at Velke Kapusany on the Ukraine-Slovakia border, on the largest corridor, consisting of four pipelines, by which Russian gas exports reach European destinations. (Ukrtransgaz, the transport division of Naftogaz Ukrainy, transports gas to Uzhgorod on the Ukrainian side of the Ukraine-Slovakia border, and interconnection arrangements from Uzhgorod to Velke Kapusany on the Slovakian side of the border are made (i.e. nominations met and shipper code pairs exchanged with Eustream, the Slovakian TSO) by Gazprom Export.) In addition, Gazprom has booked all of the capacity in this pipeline corridor but substantially reduced use of it in recent years, due to its transit diversification policy. The arrangements in Slovakia are covered by a legacy interconnection agreement and a capacity contract between Gazprom Export and Eustream. The Ukrainian government and Naftogaz have publicly urged that all these arrangements cease, on the grounds that they negatively impact the energy security of some EU countries and frustrate the supply of gas to Ukraine via "reverse flow".[179]

There are two sets of issues in dispute: (i) those relating to the Eustream-Gazprom capacity contract and (ii) those relating to the interconnection arrangements between Uzhgorod and Velke Kapusany (which are currently between Gazprom Export and Eustream). These interconnection arrangements remained unchanged throughout the post-Soviet period, but following the political changes in Ukraine in 2013-14, Naftogaz management publicly disavowed them. Naftogaz has stated that "direct interconnection agreements are the only legal basis for cooperation between TSOs in the Energy Community", and argued that relations between the parties need to be "brought into compliance with the national legislation that implements the Third Energy Package in Ukraine".[180] Given the priority now being given to such changes by the Ukrainian government, it is extremely unlikely that any post-2019 transit contract between Gazprom Export and Ukrtransgaz would continue the present interconnection arrangements.

As for the Eustream-Gazprom capacity contract, which covers the 2008-2028 period, Gazprom would likely resist any changes that could result in losing its booked (but not utilised) capacity. The Slovak TSO would also be opposed as it would be losing a significant amount of money currently paid by Gazprom for capacity booked but not utilised in line with a 'ship-or-pay' provision in the contract. This

[178] Law no. 1645-VII "on the introduction of amendments concerning the reform of the unified gas transport system of Ukraine" (government draft law no. 4116a).
[179] Letter from Arseniy Yatseniuk to Donald Tusk, Jean-Claude Junker and Martin Schulz, June 2015 and "Facilitating Reverse Flow Capacity from West to East", opinion by Wikborg Rein (both published by Naftogaz Ukrainy).
[180] Naftogaz argues in its annual report that Gazprom Export, by transferring shipper codes directly to European TSOs on Ukraine's western border, "performs a number of important TSO functions" and thereby "violates EU energy legislation". Naftogaz (2014), p. 83.

suggests that any legal challenge to the contract would be very difficult and take a long time to complete. Nonetheless it is not impossible and could be made through the usage of congestion management procedures (CMP). These CMP are stipulated by the Gas Regulation, which *inter alia* requires the implementation, as of 1 October 2013, of long-term use-it-or-lose-it (UIOLI) mechanisms. These oblige national regulators to require to withdraw 'systematically underutilised capacity' where unused capacity has not been 'sold or offered under reasonable conditions and where other network users request firm capacity'. [181] Should these mechanisms be implemented, Gazprom would retain its rights and obligations under the capacity contract until the capacity is reallocated and to the extent that it is not reallocated. However, it must be noted that application of CMP in respect of interconnection points between an EU member state and a third country is subject to the decision of the former's national regulator, thus suggesting that the Slovak regulator has a right but not an obligation to apply CMP in respect of interconnection points with Ukraine.

--In December 2015 the Ukrainian national regulator introduced entry-exit tariff methodology to be used for calculation of tariffs for domestic gas transportation and transit.[182] In January 2016 Naftogaz stated that while previously transit tariffs were defined in the transit contract between Naftogaz and Gazprom, these will now be set by the Ukrainian national regulator in line with new methodology. Naftogaz has since invited Gazprom to re-negotiate the contract's terms to bring tariffs into conformity with new methodology, thus potentially resulting in (at least) a 50% increase.[183] The Ukrainian energy minister, Volodimyr Demchyshin, has since acknowledged that Naftogaz has no legal grounds for charging Gazprom tariffs in line with new methodology until a new transit contract is signed, and will not do so.[184] Although Gazprom is unlikely to agree to changes in tariffs prior to expiry of the existing contract at the end of 2019, the issue cannot be avoided in any negotiation of a post-2019 transit contract and is likely to become contentious: Gazprom has said that it will resist changes disadvantageous to it commercially, and projected that new tariffs calculated in this way would be significantly higher than on other transit routes.[185]

It is likely that the resolution of all the legal issues outlined above might require an active participation of the EC in the negotiation of an intergovernmental agreement (IGA) between Ukraine and Russia, thus leading the EC to continue the gas diplomacy it has conducted in 2014-15 while negotiating the two 'winter packages'. Such an IGA could serve as an important political and legal underpinning to a post-2019 transit contract.

Gazprom ceases to transport gas volumes across Ukraine.

Should Gazprom not sign a transit contract with Ukrtransgaz for the period after 2019, it would be faced with a number of difficult choices. As we have shown in our scenarios, it is unlikely that it would be able to transport all of the gas it is contracted to supply by alternative routes. We estimate (see section 6 above) that, to meet current contractual commitments 24-51 bcma of Ukrainian transit capacity would be required (assuming 70% and 85% TOP levels respectively, and assuming that no new infrastructure is complete and the OPAL cap not lifted). It could then either (i) ask the buyers of its gas to renegotiate the contracts, thereby adjusting its commitments to deliver, (ii) offer to deliver the gas at the eastern

[181] Regulation (EC) 715/2009; EC (2012b). The CMP only apply in the event of contractual congestion i.e. a situation where the level of firm capacity demand exceeds the technical capacity.
[182] Naftogaz (2015a).
[183] Naftogaz (2015a); 'Tranzit gaza. Ukraina gotovit Rossii novyi schet', 6 May 2015, Apostroph/UA Energy; 'Ukraina vtroe povysit stoimost tranzita rossiskogo gaza', 18 January 2016, Apostroph/UA Energy; 'Ukraine has increased a tariff for Russian gas transit by factor of 1.5', *Vedomosti*, 19 January 2016.
[184] 'Kiev will invoice Gazprom old tariffs for transit' (in Russian), *RIA Novosti*, 28 January 2016.
[185] Gazprom CEO Alexei Miller has estimated the implied new tariff at the equivalent of $5/mcm/100 km. 'Putin poruchil provesti s Ukrainoi peregovory o tranzite', *Finmarket*, 26 June 2015.

border of Ukraine, or (iii) declare *force majeure* on its contracts, citing e.g. an unsuccessful negotiation with Ukrtransgaz, and obstructions placed in front of its export strategy by the EC in respect of other pipelines.

Option (i), asking buyers to renegotiate contracts, could work to Gazprom's disadvantage. If the current weakness of demand in the European gas market continues, those buyers could use such a negotiation as an opportunity to reduce the take-or-pay limits, whereas Gazprom could use it as an opportunity to reduce the deliver-or-pay commitments in contracts. Those who did not wish to do that could use such a negotiation as an opportunity to press for other commercial concessions from Gazprom. (The period since 2009 has already seen an unprecedented level of renegotiations of these contracts, driven largely by the effects of the economic recession and changes in the European gas market.[186]) Gazprom might in any case consider such renegotiations if, for example, it is unable to achieve a transit contract that it considers compatible with its commercial interests.

Option (ii), offering to shift the delivery points to the eastern border of Ukraine, would change the character of the gas trade fundamentally, potentially weakening Gazprom's commercial position. It should be recalled that the Ukrainian government, and some Ukrainian politicians, have at various times since the "gas war" of 2009 urged that the sales point for Russian gas be moved to Ukraine's eastern border. The European buyers of Gazprom's gas always rejected such proposals outright, as they prefer the current arrangement under which Gazprom takes the Ukrainian transit risk.[187] Gazprom's strategy at that time was, as far as possible, to sell its gas as far downstream as possible, i.e. to take the risks associated with both transit, delivery and supply. In the period since then Gazprom's sales strategy in Europe has changed substantially, and at the time of writing is still in the process of evolution. The question of whether it would change its position regarding sales on Ukraine's eastern border – i.e. whether it would be willing to sell to anyone except a unitary Ukrainian importer – depends in part on the evolution of its commercial strategy in Europe. There is also the possibility that it would aim to sell gas sufficient for Ukrainian domestic consumption, but not for re-export, at Ukraine's eastern border – although there is no way it would be able to influence resale, just as it found in 2014 that it was unable to influence purchasers in Europe who resold gas to Ukraine.

Option (iii), declaring *force majeure*, is an extreme and potentially risky stance, that would effectively take the issue of transit across Ukraine out of the hands of the companies involved and put it in the political arena. It would indicate that only a political solution could ensure continued transit of gas in Europe. One consequence might be that the EC might intervene (as it did to put in place a "winter package" for gas supplies to Ukraine in 2014-15 and 2015-16), with a view to concluding a tripartite political agreement that would ensure transit as long as it was necessary for security of supply reasons.

Conclusion

From 2019, selling gas to multiple buyers on Ukraine's eastern border could bring potential advantages to Gazprom, but these may well be outweighed by the disadvantages. First, Gazprom would free itself of the obligation to manage transit risk which, due to the deterioration of Russian-Ukrainian political relationships, has become increasingly difficult. Second, with regard to the Ukrainian market, as a dominant seller it would get obvious advantages from dealing with multiple buyers. Gazprom began to move in just such a direction in 2012-13, when it began to sell gas to non-Naftogaz buyers in Ukraine. In 2013 one such buyer accounted for half of the Russian gas imported to Ukraine.[188] Prior to that, in

[186] The OIES natural gas research programme has published extensively on these issues, including, most recently, Stern and Rogers (2014).
[187] See, e.g., Pirani and Yafimava (2014), pp. 196-197.
[188] Prior to that, in 2009-2011, Gazprom experimented with marketing gas in Ukraine via a wholly-owned subsidiary, Gazpromsbyt, but this was not successful, even at a time of better political relationships.

2009-2011, Gazprom experimented with marketing gas in Ukraine via a wholly-owned subsidiary, Gazpromsbyt, but this was not successful, even at a time of better political relationships. However, our view is that any such advantages may well be outweighed by the potential disadvantages for Gazprom with regard its European sales strategy. Selling gas on Ukraine's eastern border, to multiple buyers into a market that will probably have moved a long way towards integration with the rest of Europe, would potentially undermine Gazprom's commercial position and its ability to sell its gas at optimal prices in the European market as a whole. On the other hand, if by this time hub pricing has grown to account for the overwhelming proportion of European sales, then the issue facing Gazprom will be whether it wants to sell its own gas, and choose its customers, or whether it is happy to sell it into the market. These considerations will surely be the decisive ones.

9. Prospects for Ukraine's gas transport and storage businesses, and domestic market

Since the collapse of the USSR, the substantial Ukrainian gas market has been supplied on the basis of bilateral contracts between Gazprom and Ukrainian importers. The current import contract with Naftogaz Ukrainy expires at the end of 2019 at the same time as the transit contract. We assume that, with the break-up of old political and economic relationships between Russia and Ukraine, the future arrangements for gas supply, like those for transit, will be very different. Certainly Ukrainian government policy, and EC policy, is to integrate Ukraine more closely with the European market. Here we outline some likely directions of development of the market and the transit and storage businesses.

Projections of demand and supply

The Ukrainian market has changed very dramatically in volume terms. In the mid-2000s it amounted to 70-75 bcm/year of gas. As a result of the 2008-09 economic crisis, consumption fell to 50-60 bcm/year (55.8 bcm/year on average in 2009-13). The military conflict and associated political and economic crises in 2014-15 have produced further falls in consumption. 2014 consumption was 42.6 bcm, about 15% lower than in 2013; in 2015 it fell by a further 21% to 33.8 bcm.[189] In addition, Gazprom is supplying gas directly to the separatist-controlled areas of Donetsk and Lugansk, at a rate roughly equivalent to 2-2.5 bcm/year;[190] from mid-2015 Crimea has been excluded from the Ukrainian gas balance, and is reportedly consuming gas from its own production.

Given the uncertain political and economic outlook, forecasts of Ukrainian gas demand in the early 2020s can only be very provisional. Let us assume that (i) the separatist-controlled areas and Crimea continue to be excluded from the Ukrainian gas balance, (ii) in 2016-17 the economy recovers to the 2014 level, and continues to recover slowly thereafter, and (iii) the government's policy initiatives to reduce gas consumption continue to be implemented, but slowly. In this case we can envisage gas consumption of 40-45 bcma in the early 2020s. If the collapse of the economy continues, and recovery takes longer to start, and/or if the government's policies aimed at reducing consumption are more effective, consumption could be lower, e.g. 35-40 bcma. If e.g. the military conflict ends, reconstruction

[189] Author's research; Naftogaz (2016).

[190] In a period of roughly four months from mid-February to mid-June 2015, Gazprom delivered 704 mmcm of gas directly to the separatist-controlled areas. See, for example, 'Miller: Naftogaz dolzhen $212 m za gas dlia Donbassa', *RIA Novosti*, 26 June 2015.

begins and the economic recovery gets underway more quickly, it is possible to envisage consumption of 45-50 bcma.

How will this demand be met? Table 2 gives some indicative projections and deliberately makes modest assumptions on the level of Ukraine's own production and reverse flow supplies. It assumes that Ukraine's own production, which held up at 20.5 bcm in 2014,[191] will not fall despite the political and economic crisis, and could grow; the most optimistic illustration assumes it could grow by 5 bcm. This is more modest than government statements, which envisage a substantial increase in production. The table assumes that reverse flow deliveries will stay at only 10 bcm – about twice the 2014 total of 5.1 bcm, but lower than the currently available capacity of 14 bcm. Reverse flow deliveries in 2015 were 10.3 bcm, and government representatives have referred to the potential for much higher volumes of reverse flow deliveries. We are cautious because we assume – for the purposes of this discussion – that reverse flow deliveries may continue to be constrained by competition from Russian gas delivered directly, and by trading and payment risks.[192]

Table 2: Indicative projections of Ukraine's future import requirement

Projection of consumption, bcm/year	Projection of Ukraine own production	Projection of reverse flow deliveries (minimum)	Residual requirement*
35-40	20-23	10	2-10
40-45	20-23	10	7-15
45-50	22-25	10	10-18
* The residual requirement is the range between the lowest consumption projection minus the highest aggregate supply, and the highest consumption projection minus the lowest aggregate supply			

Source: author's estimates

The purpose of Table 2 is not to provide a definitive forecast of import levels. Rather, its value, using reasonably optimistic forecasts of demand levels and very cautious estimates of own production and reverse flow supplies, is to show that in *all* the scenarios illustrated, the residual requirement for directly-imported Russian gas will be far, far smaller than in the past. In the most extreme case, which assumes a reasonably rapid economic recovery, during which increases in consumption outstrip the effect of supply diversification policies, combined with only a modest increase in Ukraine's own production, it could reach 18 bcma; on the other hand, there are various scenarios under which demand for directly-imported Russian gas would be below 10 bcma. This compares to annual imports of about 50 bcma prior to 2009. The table also shows that if the policy support for reverse flow is successful, and more than 10 bcma is supplied in that way, the demand for directly-imported Russian gas *could* fall to zero. We consider it more likely that reverse flow will continue to be constrained by competition from directly-imported Russian gas, as it has been in 2014-15.

[191] The 2014 production figure included 0.3 bcm from Chernomorneftegaz of Crimea. Its output was not added to the Ukrainian balance after May 2014 and, it is assumed here, will not be added to it in future.
[192] See e.g. Pirani (2015).

How the Ukrainian market might develop

After 2019, Russian imports – bearing in mind the above points about volumes – will probably be sold on contracts of shorter duration, with lower take-or-pay limits, than in the past, and be sold to more than one importer. Market reform is being undertaken by the Ukrainian government, with the support of European and international agencies, and this will change the basis on which import contracts can be signed. Primary legislation has been adopted and regulations are now being developed (see section 8 above on transit); one industry body estimates that a virtual trading point could be established by 2017.[193] The issue of implementing reverse flow, whether physical or virtual, via the main Ukraine-Slovakia interconnection point at Velke Kapusany is currently in contention. However, with respect to the period after 2019, it may be assumed that Russian gas will be sold into a Ukrainian market in which destination clauses will not be permitted and there will be no legal restrictions on cross-border resale.

The likely consequence of this is that the trend that we have seen in 2014-15, for European hub prices to influence Ukrainian prices via reverse flow deliveries – even under conditions where volumes are limited – will continue. Contrary to some politicians' expectations, this does not by itself mean that import prices in Ukraine will necessarily be significantly lower. It does however mean that those prices will increasingly be influenced by prices in Europe.

How the transport and storage businesses might develop

From the above sections on gas transit and supply to Ukraine, it may be concluded that the utilisation of Ukrainian gas transportation capacity will probably continue to decline. Even if no new capacity is built (scenario A), capacity utilisation is unlikely by 2020 to increase significantly from the relatively low levels of the last ten years. It would only increase if Russian gas exports to Europe rose in the 2020s, and no extra pipeline capacity was built. Our scenarios above suggest transit volumes of 2.6-60.6 bcm in 2020 (see section 5, Annex Table A.4). If further transit diversification pipelines are built, capacity utilisation could fall significantly. Our scenarios suggest it could fall to zero. In the latter case, the IEA has warned of "serious challenges to the economic and technical operation of the system", and the need to invest in the reconfiguration of the system to enable it to handle much lower gas transit volumes and continue supplying all regions of Ukraine efficiently.[194] In corporate terms, the Ukrainian government intends to separate out Ukrtransgaz (see above), and to privatise 49% of it.[195]

Depending on the extent to which the Ukrainian market is integrated into the European market in regulatory terms, and the pace of the reform of Naftogaz, Ukraine's large storage capacity could in the period after 2019 be used to supplement existing capacities in central and eastern Europe. Maroš Šefčovič, the EC vice president for the Energy Union, has said that the EC sees benefit in such use of Ukrainian storage.[196] However, Ukraine's storage capacity would compete with storage facilities offered elsewhere in central Europe and would be constrained by geography (it is further away than other storage capacity from larger markets).

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[193] 'EFET sees Ukraine virtual hub within two years', *Platts European Gas Daily*, 23 July 2015

[194] IEA (2015), p. 356.

[195] The law provides for sale of a 49% stake to investors from the EU or the US (and notably, not from Russia). Law no. 1645-VII "on the introduction of amendments concerning the reform of the unified gas transport system of Ukraine" (government draft law no. 4116a). See, e.g., 'Podpisan zakon o reformirovanii sistemy upravleniia EGS Ukrainy', *Sudebno-iuridicheskaia gazeta,* 8 September 2014.

[196] 'Ukrainskiy vopros i energeticheskoe buduchee Evropy', Den'/UAEnergy, 6 May 2015.

10. Conclusions

The context for Russian gas exports to Europe after 2019, and in particular the transit arrangements, will be shaped in part by political and commercial changes that are already in progress.

Russia's policy of diversifying gas transit away from Ukraine has been strengthened in 2014-15 as a result of the military and political conflict in Ukraine and the resulting deterioration in Russia-Ukraine and Russia-EU relations. Russia and Gazprom remain committed to significant reduction of transit via Ukraine by 2020 but there is also growing understanding that complete reduction might not be possible until the mid-2020s and might not be commercially optimal should acceptable transit terms be agreed with Ukraine post-2019.

Opposition to this Russian policy at the political level in Europe has intensified as a result of the Ukraine crisis. Prior to 2014, the transit diversification projects faced opposition from regulators, which led to Gazprom being unable to use more than 50% of the OPAL pipeline, and, more seriously, to the cancellation of the South Stream project. From 2014, EC political leaders and some in member states expressed overt *political* (as distinct from regulatory) opposition to the transit diversification projects. This political opposition is unlikely to dissipate before 2020, given the lack of prospects for a settlement of the political conflict between Russia on one hand and the EU and (especially) the US on the other, over Ukraine.

In contrast, European companies that purchase substantial volumes of Russian gas remain supportive of transit diversification. This was demonstrated in September 2015 by the shareholder agreement between Shell, Uniper, BASF, Engie, OMV and Gazprom to build Nord Stream 2. Apart from Nord Stream 2, the most likely expansion of transit diversification capacity is via the Turkish Stream pipeline project. Negotiations on this stalled during 2015, due to both commercial disagreements and political factors in Turkey, and were effectively frozen in late 2015 at Russia's initiative after its military jet was shot down by Turkey over Syria; the outlook for resumption of these negotiations in 2016 appears bleak. Deterioration of the Russia-Turkey relationship makes a revival of South Stream more logical although Turkey is capable of preventing this by refusing to allow the pipelines to run through its exclusive economic zone.

Another crucial change in Russian-European gas trade is the continuing trend away from oil-linked prices and long-term contracts, towards hub prices and spot trading. Against the background of depressed demand (since 2008) and relatively low gas prices (since late 2014), Gazprom's major counterparties have reduced contract purchases to take-or-pay (TOP) levels and sought to renegotiate contract terms. There were indications in 2015 that, in extreme cases, contracts may not continue to their expiry dates. Gazprom has shown its ability and readiness to adapt to such market changes, by not only remaining active in spot markets but also in September 2015 offering gas at auction in St Petersburg at the German delivery points in Greifswald and Gaspool. In the period up to the early 2020s, during which increased availability of LNG for Europe may increase competitive pressures, Russia's large surplus production capacity means that, should it choose to do so, it can compete on price and defend its market share.[197] However, the total capacity required for the transit of Russian gas to Europe is unlikely to change substantially from the totals indicated in this paper.

A final point about the context concerns Ukraine. The post-Soviet gas relationship between Russia and Ukraine, with large volumes of direct imports and large volumes of transit, has ended. Russia has already implemented the maximum possible level of transit diversification, bringing transit via Ukraine down to 62 bcm in 2014. Moreover, Ukraine's own purchases of direct Russian imports have fallen precipitously, both due to sharply depressed gas demand and the start in 2012 of reverse flow

[197] Henderson (2016).

deliveries. The availability of reverse flow gas has resulted in a distorted form of price competition, whereby in 2015 Russia has priced direct imports at, or below, net-forward from European hubs (although Ukraine has for security of supply reasons bought some reverse flow gas at prices higher than those offered by Gazprom). In any case, neither by 2020 nor afterwards are direct Russian sales to Ukraine likely to return to anywhere near their pre-2007 levels of 50+ bcma; they will more likely be between zero and 18 bcma.

With these contexts in mind, our conclusions about post-2019 transit are as follows.

Gazprom is able to meet gas demand of north western European countries without using Ukrainian transit and potentially would be able to do so in respect of central and eastern European countries should the OPAL cap be lifted. If built, new export pipelines would have a significant impact on Gazprom's ability to deliver gas to those countries, which currently receive their Russian gas imports exclusively or predominantly via Ukraine, thus significantly reducing their dependence on Ukrainian transit. Two strings of Nord Stream 2 would enable Gazprom to meet demand of all European countries expect south eastern Europe and except Turkey; two strings of Turkish Stream would enable Gazprom to meet demand of south eastern Europe and Turkey; two strings of South Stream would enable Gazprom to meet demand of south eastern Europe and either Italy or Turkey. However, construction of new export pipelines is fraught with significant difficulties and at the time of writing it is not possible to suggest with any degree of certainty which – if any – pipelines will be built by 2020.

Our analysis of political, regulatory and contractual constraints suggests that Gazprom is extremely unlikely to be able to build any new export pipelines (including offshore and onshore extensions/sections) by 2020, enabling it to significantly reduce or eliminate transit across Ukraine, while honouring its existing LTSCs without having to change delivery points. We conclude that the most (and equally) likely Scenarios are those envisaging no new pipelines by 2020:

- Scenario A[198] (no new export pipelines, the OPAL cap is not lifted)
- Scenario A* (no new export pipelines, OPAL cap is lifted).

Based on the assessment of *overall* export capacity, if no new pipelines are built by 2020 and if the OPAL cap is not lifted (Scenario A), Gazprom could face a shortage of non-Ukrainian export capacity in the range of 27.6 to 77.6 bcm (given its potential range of 130-180 bcm of European exports in 2020) but it would only be *contractually committed* to deliver 126-153 bcm in 2020 (at 70% and 85% TOP respectively) thus bringing its shortage of non-Ukrainian export capacity down to 23.6-50.6 bcm, and further down to 6.6.-33.6 bcm, if the OPAL cap is lifted (Scenario A*). Given that TOP quantities (are understood to) have been reduced to 70% of ACQ and given that Russian gas exports to Europe in 2020 are not likely to be significantly higher (and might be lower) than they were under LTSCs in 2014 (150 bcm), even under scenarios envisaging no new pipelines by 2020, Gazprom would only be short of some 6.6-23.6 bcm of capacity necessary for meeting its minimum TOP obligations without having to use the Ukrainian transit corridor (depending on whether or not the OPAL cap is lifted). Thus Gazprom would need to conclude a medium-term transit contract with the Ukrainian TSO to transit *at least* 6.6-23.6 bcma of gas during 2020-25 (thus matching Gazprom's LTSC time profile). As far as volumes in excess of TOP obligations are concerned (~34 bcm and potentially up to maximum nominations), Gazprom might want to continue using the Ukrainian corridor for deliveries above TOP levels, given that a failure to deliver these volumes would result in penalties and lost revenues. In this case, Gazprom would need to conclude new post-2019 short-term transit contracts (i.e. less than 1 year) with the Ukrainian TSO. All of this would necessitate Gazprom's continued usage of the Ukrainian corridor, with the most likely overall range of 40-60 bcm (i.e. effectively at the 2014 level) but possibly higher at 60-75 bcm.

[198] For all Scenario details see section 7.

As far as individual countries are concerned, if no new export pipelines are built by 2020, Gazprom would not be able to serve parts of Austrian, Hungarian, Slovakian and Czech demand (unless the OPAL cap is lifted), a significant part of Italian demand, and any demand in south east European countries (Greece, Bulgaria, Romania, Bosnia & Herzegovina, FYROM and Serbia) and western Turkey, without Ukrainian transit.[199]

The Scenarios, envisaging construction of new pipelines, are less likely by 2020 but entirely possible in the early to mid-2020s. Among those, the most likely ones are:

- two strings of Nord Stream 2 (Scenario I) as a front-runner,
- one string of Turkish Stream (Scenario B),
- two strings of Nord Stream 2 and one string of Turkish Stream (Scenario J),

Also, although we do not believe two strings of South Stream (Scenario N) is the most likely scenario, it too has a chance.

Resolution of the status of the OPAL pipeline by 2020 is an important factor impacting decisions on any new pipelines, as without Gazprom being able to use more than 50% of its capacity, it is difficult to see how the Nord Stream 2 project – or any other project involving construction and utilisation of onshore capacity on the EU territory (i.e. all pipeline projects except one string of Turkish Stream) – can proceed.

Some final conclusions relate to Russian exports to Ukraine. With the expiry of the supply contract (at the same time as the expiry of the transit contract, at the end of 2019), the basis of Russian gas sales to Ukraine is likely to change. Given the deterioration in political relations, the model of a single buyer, which is a party to an import contract underpinned by bilateral intergovernmental agreements, is likely to be abandoned. Ukrainian gas market reform legislation adopted in 2015 provides for a market structure with multiple buyers. Assuming that progress towards Ukrainian integration with the European market proceeds, albeit slowly, gas sold on the Russian-Ukrainian border would under the market reform law be available for re-sale to European purchasers to the west. Under these circumstances, Gazprom would face a commercial decision about whether to limit sales e.g. to levels close to Ukrainian domestic demand, or whether to make gas available to multiple buyers. At present it appears that the advantages of making gas available to multiple buyers are outweighed by the disadvantages; however, Gazprom's reaction will probably depend, ultimately, on the progress of its sales strategy in the European market and the extent to which it will, by 2020, have moved towards hub sales and prices.

Alternatively, should Gazprom be unable or unwilling to use the Ukrainian corridor either for transporting residual TOP volumes or contracted volumes above minimal TOP commitments, it could re-negotiate its existing, or conclude new, contracts, which would specify the Russia-Ukraine border as a new delivery point. In that case European buyers would need to make their own contractual arrangements with the Ukrainian TSO for shipping this gas across Ukraine. In that case, volumes transited across Ukraine by European buyers could be higher than volumes that could be transited by Gazprom, as the European buyers would have new potential sales opportunities in respect of this gas arriving to the Ukraine-Russia border and hence might be more willing to nominate maximum volumes, something they are more reluctant to do in respect of gas arriving at their own national borders.

In conclusion, we see two possibilities for the transit of gas across Ukraine after 2019.

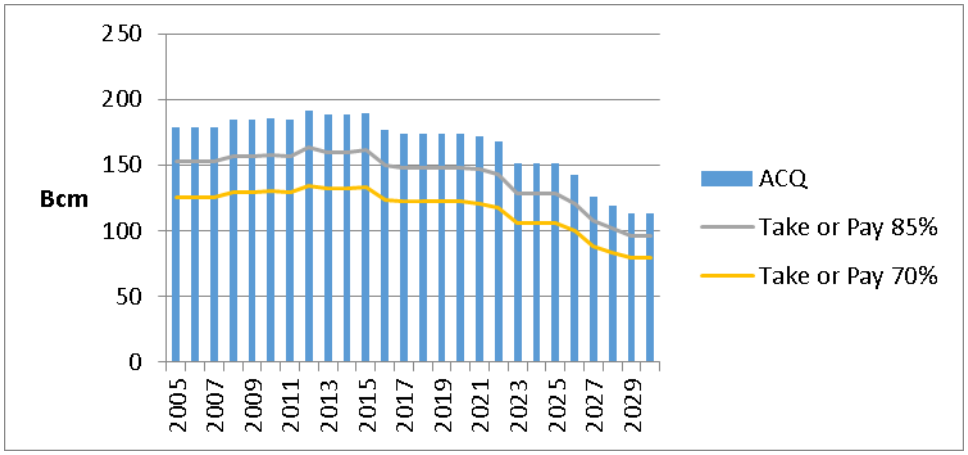
- That Gazprom successfully concludes a new transit contract (with Ukrtransgaz, under new Ukrainian legislation, after protracted negotiations on terms, and for a shorter period and with greater flexibility than previous contracts), or e.g. several contracts as suggested above.

[199] Some gas delivered by Gazprom to eastern Turkey via Blue Stream could be re-delivered through Turkey to western Turkey but ability to do so is limited due to internal bottlenecks on the westward flow in the Turkish transmission system, see Rzayeva (2014).

- That Gazprom does not conclude a new transit contract. In that case we see two further possibilities:
    - Gazprom and its customers agree to shift the delivery points in a proportion of long term contracts (possibly a minimum of 25 bcma without which it cannot meet minimum delivery obligations) to the eastern border of Ukraine
    - Gazprom prepares to declare *force majeure* on a proportion of its long term contracts, compelling political action to secure transit, probably in the form of tripartite negotiations between the EC, Russia and Ukraine. At the time of writing this seems less likely than other outcomes, but possible.

Annex

Figure A.1: Russian long-term supply contracts with OECD European countries to 2030: annual contract quantity and take-or-pay levels



Source: ERI RAS
NB Excludes Baltics and south east Europe (Bosnia & Herzegovina, Bulgaria, Croatia, Macedonia, Romania, Serbia and Slovenia)

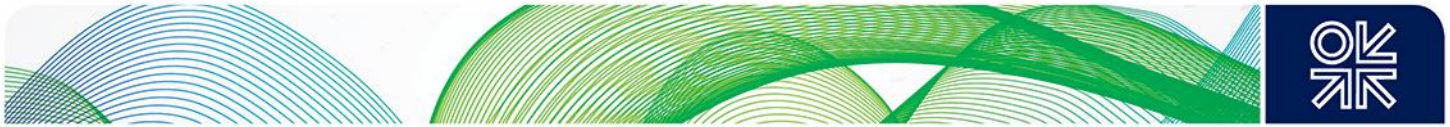
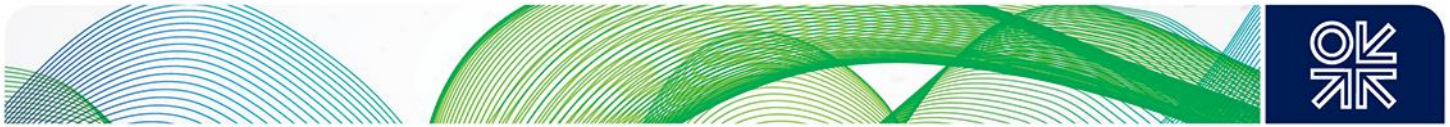


Table A.2: Russian gas exports to Europe: delivery points, volumes, and borders crossed (2014)

Countries	Volumes, bcm	Delivery points at borders (flanges)	Intra-EU borders and EU borders with non-EU countries	Number of borders crossed before reaching a delivery point*
WESTERN				
Austria	4.2	Baumgarten	Ukraine-Skovakia, Slovakia-Austria	2
Denmark	0.4	Ellund	Belarus-Poland, Poland-Germany, Germany-Denmark	3
Estonia	0.4	Narva		0
Finland	3.1	Imatra		0
France	7.6	Mendelscheim	Ukraine-Slovakia, Slovakia-Austria, Austria-Germany, Germany-France OR Belarus-Poland, Poland-Germany, Germany-France	4 3
Germany	40.3	Mallnow Waidhaus Greifswald	Belarus-Poland, Poland-Germany AND Grefswald (German coast) AND Greifswald, Czech Republic-Germany	2 0 2
Greece	1.7	Sidirokastron	Ukraine-Moldova, Moldova-Romania, Romania-Bulgaria, Bulgaria-Greece	4
Italy	21.7	Baumgarten	Ukraine-Slovakia, Slovakia-Austria, Austria-Italy	3
Latvia	1	Korneti		0
Lithuania	2.5	Kotlovka	Belarus-Lithuania	1
Netherlands	4.7	Oude Statenzijl	Belarus-Poland, Poland-Germany, Germany-Netherlands	3
Switzerland	0.3	Wallbach	Belarus-Poland, Poland-Germany, Germany-Switzerland OR Grefswald (German coast), Germany-Switzerland OR Greifswald, Czech Republic-Germany, Germany-Switzerland	3 2 3
Turkey	27.3	Malkotlar Samsun	Ukraine-Moldova,Moldova-Romania, Romania-Bulgaria, Bulgaria-Turkey AND Samsun (Turkish coast)	4 0
UK	10	Interconnector BBL	Belarus-Poland, Poland-Germany, Germany-Belgium, Belgium-UK Belarus-Poland, Poland-Germany, Germany-Netherlands, Netherlands-UK	4 4



EASTERN				
Bosnia & Herzegovina	0.2	Zvornik	Ukraine-Hungary, Hungary-Serbia, Serbia-Bosnia & Herzegovina	3
Bulgaria	2.8	Negru Voda (Isaccea)	Ukraine-Moldova, Modlova-Romania, Romania-Bulgaria	3
Czech Republic	0.8	Nord Stream/OPAL	Germany-Czech Republic	1
Hungary	5.4	Beregovo	Ukraine-Hungary	1
FYROM	0.1	Zidilovo	Ukraine-Moldova, Moldova-Romania, Romania-Bulgaria, Bulgaria-FYROM	4
Poland	9.1	Kondratki/Drozdovichi	Belarus-Poland AND Ukraine-Poland	1
Romania	0.5	Isaccea	Ukraine-Moldova, Moldova-Romania	2
Serbia	1.5	Kiskundorozsma	Ukraine-Hungary, Hungary-Serbia	2
Slovakia	4.4	Velke Kapusany	Ukraine-Slovakia	1
Slovenia	0.4	Cersak	Ukraine-Slovakia, Slovakia-Austria, Austria-Slovenia	3

Source: adapted and updated from Yafimava (2013)

*Excluding a Russian border but including a border at which gas is delivered (unless it is a border with Russia).

Table A.3: Russian gas exports to Europe: transit dependence on Ukraine by country (2013-14)

Countries	Exports, 2013 (Total)	Exports, 2014 (Total)	Exports, 2014 (LTSCs)
Countries receiving <u>all</u> their Russian gas imports via Ukraine			
Italy	25.3	21.7	21.7
Austria	5.2	4.2	3.9
Greece	2.6	1.7	1.7
Bulgaria	2.9	2.8	2.8
Hungary	6.0	5.4	5.4
Romania	1.4	0.5	0.3
Slovakia	5.5	4.4	4.4
Czech Republic*	7.9	4.76	4.76
Slovenia	0.5	0.4	0.4
Croatia**	0.2	0.2	0.2
Serbia	2.0	1.5	1.4
FYROM	0.1	0.1	0.1
Bosnia & Herzegovina	0.2	0.2	0.2
Sub-total	59.8	47.86	47.26
Countries receiving <u>some</u> of their Russian gas imports via Ukraine			
France***	8.6	7.6	7.1
Poland	12.9	9.1	9.1
Turkey	26.7	27.3	27.3
Sub-total	48.2	44	43.5

Countries receiving no Russian gas via Ukraine			
Germany****	41	40.3	38.7
Finland	3.5	3.1	3.1
Netherlands	2.9	4.7	3.5
Switzerland	0.4	0.3	0.3
Denmark	0.3	0.4	0.4
Estonia	0.7	0.4	0.4
Latvia	1.1	1.1	1.1
Lithuania	2.4	2.5	2.5
UK	16.6	15.5	10.1
Sub-total	68.9	68.3	60.1
TOTAL	176.9	160.16	150.86
Transit across Ukraine to Europe (including to Moldova and Turkey): 86.1 bcm in 2013 and 62.2 in 2014			

Source: Gazprom Export annual corporate brochure: 2014 results; Gazprom in questions and answers; Gazprom's annual report 2014, Gazprom presentation, June 2015; ERI RAS; Gazprom Export website.

*There is a lack of clarity as to whether the Gazprom-RWE Transgaz contract is still in force; ** Gazprom's exports to Croatia are assumed at the level of 2013; ***It is understood that a new contract with delivery via Nord Stream 1 was concluded whereas some contracts with delivery via the Ukrainian corridor did not continue to expiry thus suggesting a decrease in volumes transited across Ukraine en-route to France; **** Originally around 30 bcm of Germany's ACQ was contracted with delivery either via Nord Stream 1 or Yamal Europe whereas around 20 bcm was contracted with delivery via the Ukrainian corridor; it is understood that the latter arrangement has been changed and Russian gas exports to Germany do not transit Ukraine anymore.

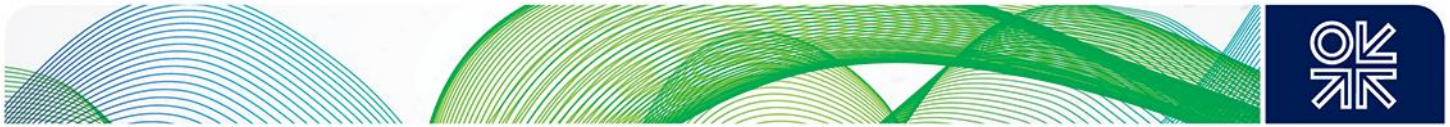


Table A.4: Russian gas exports to Europe: scenarios of export capacity in 2020, bcm

	Export capacity, 2014	Export capacity, 2020: scenarios														
		A	A*	B	C	D	E	F	G	H	I	J	K	L	M	N
To Finland	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Belarus	43.4	43.4	43.4	43.4	43.4	43.4	43.4	43.4	58.4	58.4	43.4	43.4	43.4	43.4	43.4	43.4
Yamal	33	33	33	33	33	33	33	33	48	48	33	33	33	33	33	33
*Northern Lights**	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Ukraine	120	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blue Stream	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
Nord Stream**	38	38	55	38	55	82.5	82.5	110	55	110	110	110	82.5	110	82.5	55
Turkish Stream		0	0	15.75	31.5	15.75	31.5	31.5	31.5	0	0	15.75	0	0	15.75	0
South Stream		0	0	0	0	0	0	0	0	0	0	0	15.75	15.75	15.75	31.5
Total with Ukraine	222.4															
Total without Ukraine	102.4	102.4	119.4	118.15	150.9	162.65	178.4	205.9	165.9	189.4	174.4	190.15	162.65	190.15	178.4	150.9
Residual transit at ToP 70% (126 bcm)		23.6	6.6	7.85	0	0	0	0	0	0	0	0	0	0	0	0
Residual transit at ToP 85% (153 bcm)		50.6	33.6	34.85	2.1	0	0	0	0	0	0	0	0	0	0	2.1
Residual transit at Gazprom's exports to Europe of 130 bcm		27.6	10.6	11.85	0	0	0	0	0	0	0	0	0	0	0	0
Residual transit at Gazprom's exports to Europe of 180 bcm		77.6	60.6	61.85	29.1	17.35	1.6	0	14.1	0	5.6	0	17.35	0	1.6	29.1

Source: Gazprom Export, ENTSOG, Pirani & Henderson (2014), author's calculations

* Northern Lights capacity is assumed at its combined capacity towards Lithuania and Poland (10.4 bcm) rather than at its technical level (15 bcm)

** Nord Stream technical capacity is 55 bcm (with forward connection to NEL (20 bcm) and OPAL (36 bcm)) but as Gazprom's usage of OPAL is capped at 18 bcm, Nord Stream capacity is assumed at 38 bcm in 2014 as well as in those scenarios which do not envisage construction of onshore extensions in Europe (i.e. A and B). It is assumed at 55 bcm in all scenarios which envisaged construction of onshore extensions in Europe. The logic behind these assumptions is that Gazprom is very unlikely to embark on construction of new pipelines requiring onshore extensions in Europe if the OPAL cap is not lifted.

Table A.5: Entry points for Russian gas exports to Europe

ENTSOG codification	Entry points for Russian gas exports to Europe (cross border interconnection points with third countries)	Border A / Border B	Capacity, GWh/d	Capacity, bcm
Other than via Ukraine				
211	Imatra	Russia/Finland	249	7.8
225	Narva	Russia/Estonia	31.2	1
223	Varska	Russia/Estonia	41	1.3
212	Korneti	Russia/Latvia	200	6.3
213	Kotlovka	Belarus/Lithuania	324	10.2
214	Teterovka	Belarus/Poland	7.2	0.2
215	Kondratki (Yamal)	Belarus/Poland	1024	32.3
216	Vysokoye	Belarus/Poland	166	5.2
224	Greifswald (Nord Stream entry point)	Russia/Germany	1742	55
	Samsun (Blue Stream entry point)	Russia/Turkey	506	16
Via Ukraine				
217	Drozdovichi	Ukraine/Poland	133.4	4.2
218	Uzhgorod	Ukraine/Slovakia	2288	72.2
219	Beregovo	Ukraine/Hungary	600.3	19
221	Isaccea	Ukraine/Romania	755.3	23.8

Source: based on data adapted from ENTSOG – The European natural gas network (capacities at cross-border points on the primary market (map and dataset), May 2015.

Table A.6: European interconnection points (selected)

ENTSOG codification	Existing interconnection points	Border A / Border B	Capacity, GWh/d	Capacity, bcm
38	Mallnow	Poland/Germany	931	29.4
38	Mallnow	Germany/Poland	165.4	5.2
39	Lasow	Germany/Poland	48.2	
40	Brandow-Stegal	Czech/Germany	5.5	0.2
40	Obernhau – Hora Sv Katerini	Germany/Czech	319.7	10.1
41	Hora Sv Katerini-Sayda	Czech/Germany	198.3	6.3
41	Hora Sv Katerini-Sayda	Germany/Czech	60.3	1.9
42	Brandow OPAL	Germany/Czech	1062	33.5
43	Waidhaus	Czech/Germany	903.7	28.5
22	Mandelshaim	Germany/France	581	18.3
21	Oberkappel	Austria/Germany	159.9	5
21	Oberkappel	Germany/Austria	199.5	6.3
23	Uberackern	Austria/Germany	61.3	1.9
23	Uberackern	Austria/Germany	181.3	5.7
23	Uberackern	Germany/Austria	114	3.6
28	Wallbach	Germany/Swiss	582	18.4
31	Rodersdorf	France/Swiss	223	7
27	Passo Gries	Swiss/Italy	620.6	19.6
68	Jura	France/Swiss	41	1.3
45	Lanzhot	Czech/Slovakia	696.6	22
45	Lanzhot	Slovakia/Czech	520	16.4
60	Lab	Slovakia/Austria	175	5.5
60	Lab	Austria/Slovakia	175	5.5
46	Baumgarten	Austria/Slovakia	247.5	7.8
46	Baumgarten	Slovakia/Austria	1539.2	48.6
26	Tarvisio	Austria/Italy	1142.5	36.1
26	Tarvisio	Italy/Austria	192.2	6.1
29	Sempeter	Italy/Slovenia	28	0.9
29	Gorizia	Slovenia/Italy	21.4	0.7
25	Cersak	Austria/Slovenia	112.5	3.6
44	Cieczyn	Czech/Poland	28	0.9
75	Balassagyarmat	Slovakia/Hungary	126.9	4
75	Velke Zlievce	Hungary/Slovakia	50.8	1.6
47	Mosonmagyarovar	Austria/Hungary	129	4
30	Rogatec	Slovenia/Hungary	53	1.7
58	Dravaszerdahely	Hungary/Croatia	76	2.4

48	Kiskundorozsma	Hungary/Serbia	140	4.4
57	Csanadpalota	Hungary/Romania	51.1	1.6
57	Csanadpalota	Romania/Hungary	2.6	0.1
53	Negru Voda	Romania/Bulgaria	151	4.8
53	Negru Voda	Romania/Bulgaria	603	19
52	Strandhza-Malkoclar	Bulgaria/Turkey	468	14.8
51	Kulata-Sidirokastron	Bulgaria/Greece	108	3.4
51	Kulata-Sidirokastron	Greece/Bulgaria	10	0.3
50	Zidilovo	Bulgaria/FYROM	26.7	0.8

Source: based on data adapted from ENTSOG – The European natural gas network (capacities at cross-border points on the primary market (map and dataset), May 2015.

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