UNIVERSITY OF CAMBRIDGE
Electricity Policy Research Group

EU Gas Supply Security: Unfinished Business

EPRG Working Paper 1308

Cambridge Working Paper in Economics 1312

Pierre Noël

Abstract

Four years after the gas supply crisis of January 2009, this paper looks at the market and policy changes that have changed the European gas situation, and their implications in terms of security of supply. Several positive developments are identified, including the byapssing of Ukraine by Gazprom-sponsored pipelines; the acceleration of import diversification in large markets of western Europe; the process of 'commoditisation' of natural gas in north-west Europe. The lack of meaningful progress in market integration between western and eastern-central Europe, however, leaves in place one of the main factors that made the 2009 crisis possible and conferred it its political significance. Overall, the European gas security situation has evolved in a positive direction mainly because of external forces, not EU policies.

Keywords

Natural Gas; European Union; Public Policy; Security of Supply

JEL Classification O13; P28; Q48

Contact Noel@iiss.org
Publication April, 2013
Financial Support

EPRG 1308

European Gas Supply Security: Unfinished Business[1]

Pierre Noël

Hassanal Bolkiah Senior Fellow in Economic and Energy Security, IISS

The European Gas Crisis, Four Years On

The security implications of Europe's natural gas supply situation have been a key theme of the international energy security discourse in the post-cold war era. Dependence on Russian natural gas has been Europe's equivalent of US dependence on Middle East oil: it has been the main point of intersection between energy realities and foreign policy challenges, the issue which has made energy an integral part of foreign and security policy thinking.[2]

The concerns arose from a number of factors: rapid growth in Europe's natural gas consumption until 2005; even more rapid growth of imports as European production declined; Europe's reliance on a very small number of external suppliers; dominance of long-term, bilateral contracts between national, often government-backed gas utilities in Europe and government-controlled foreign suppliers; the asymmetric dependence of central and eastern European countries vis-à-vis Russia; finally – and crucially – Russia's push-back under Vladimir Putin against growing euro-Atlantic influence in the post-Soviet space (including key gas transit country Ukraine), effort to regain influence in central and eastern Europe, and apparent willingness to use energy exports as a tool to achieve these goals.[3] The political situation in Ukraine, especially the high level of corruption in and around the gas

[1] This paper is based on a chapter to appear in Jan H. Kalicki and David L. Goldwyn (eds), *Energy & Security: Foreign Policy Strategies for a World in Transition* (Washington and Baltimore: Wilson Center Press and Johns Hopkins University Press, 2013)

[2] What political scientists would call the *securitisation* of energy. See Ole Wæver, "Securitization and Desecuritization", in Ronnie D. Lipschutz, ed., *On Security* (New York: Columbia University Press, 1995), p. 46–86.

[3] See Andrew Monaghan, "'An Enemy at the Gates' or 'from Victory to Victory'? Russian Foreign Policy," *International Affairs* 4, no. March (2008): 717–733.

industry, including import and transit contracts with Russian and Central Asian suppliers; as well as the very high level of market power Ukraine enjoyed as a transit services supplier; those factors did not receive a lot of attention in Europe[4], even though retrospectively they appear as a major source of gas supply insecurity.

The gas supply crisis of January 2009 was largely perceived as validation of these concerns. Transit of Russian gas through Ukraine was cut off for two full weeks as Kyiv and Moscow failed to agree on the renewal of their gas supply contract. The crisis launched a period during which energy and especially gas security became a central policy theme in Europe, and a focus of nearly every European Council rotating presidency.

As Noël wrote in November 2008, two months before the crisis, the fundamental problem Europe faces is the absence of a pan-European competitive wholesale market for gas.[5] Four years on, risks have gone down significantly with growing LNG availability in western Europe and the coming online of Nord Stream, bypassing the Ukrainian transit corridor. However, a smarter gas market concept for the EU, and national investments and market reforms by central and eastern European countries remain critical to unifying Europe and addressing gas supply security for all Europeans.

Some real progress but policies remain problematic

Dependence on Russian gas is not an issue for the EU *as a whole*. EU gas imports have actually diversified continuously and very significantly ever since the 1980s.[6] The real problem is that the EU has been split between its own East and West. A handful of western European countries overwhelmingly dominated EU gas consumption and imports (including

[4] For an exception, see: Jonathan Stern, *The Future of Russian Gas and Gazprom* (Oxford: Oxford University Press for the Oxford Institute for Energy Studies, 2005), pp. 86 ff.

[5] Pierre Noël, *Beyond Dependence: How to Deal with Russian Gas* (London: European Council on Foreign Relations, 2008).

[6] Russian gas represented 80% of imports in 1980 against 35% today. See Noël, *Beyond Dependence.*

Russian gas) but also enjoyed a relatively high level of supply diversity. The so-called new member states, in contrast, were small gas markets highly dependent on Russia. In the context of President Putin's more assertive foreign policy towards Europe, the bilateral relationships between western European gas companies and Gazprom, supported by governments, were perceived as crimes against European solidarity in the new member states. The gas supply insecurity syndrome of central and Eastern Europe was perceived as anti-Russian paranoia by economic and most political elites in Germany, Italy and France.

The solution is 1) for central and eastern Europe to directly address their short-term gas supply security problem by increasing the resilience of their energy systems to gas supply disruptions through specific measures and 2) at the EU level for Brussels to concentrate fully on reviving its "single gas market" project. The emergence of an integrated, pan-European market would make Russian gas contestable in central Europe, therefore limiting the security risks and political implications of gas import dependence.

The past four years saw two major positive developments. The first is the bypassing of Ukraine by the coming online of Nord Stream in 2011 (and South Stream likely by 2015). It significantly reduces the risk of gas supply disruptions in the EU as Ukraine is no longer able to use Europe as a hostage in its negotiations with Russia. The second development is the transformation of the north-west European gas market through a dynamics of commoditisation, integration and globalisation.

The bypassing of Ukraine benefits the whole of Europe, even though central Europe probably benefits disproportionately because, as the 2009 crisis showed, they are far more exposed than western Europe to the risk of Ukrainian transit disruption. However, the process of commoditisation and globalisation of the gas market has largely escaped Central and Eastern Europe where the contestability of Russian gas has progressed only marginally. Even the prospects for shale gas production now seem much brighter in north-west Europe –

particularly the UK – than in Central Europe, where exploration disappoints and public opposition is strong in some countries. Therefore the split between East and West in terms of gas supply security might have widened since 2008. As far as Ukraine is concerned, Nord Stream has seriously weakened – and South Stream will sever – its de-facto solidarity with the EU, to the benefit of European supply security but with serious financial and geopolitical implications for the country.

It also appears that the few central and eastern European countries that may have a serious short-term supply security issue – that is, a limited ability to meet final energy demand in case of Russian gas disruption – such as Bulgaria or the Baltic States, have not addressed it seriously or systematically. The European Commission, however, has used the crisis to revive a project of Security of Gas Supply Regulation[7] that will not induce any national government to take gas supply security any more seriously than they already do.[8]

Consistent with our 2008 recommendation, the EU has indeed redoubled its policy efforts to build a single gas market. However, there are serious questions regarding the regulatory concepts and policy approach promoted by Brussels under its "single gas market" agenda. What emerges in Europe is a patchwork of tightly regulated, interconnected *national* gas systems governed by ever more detailed and complex rules that Brussels then wants to harmonise.[9] Under certain conditions – such as very large price zones, found in northwest Europe, most with direct access to the international LNG market – this system may mimic the short-term outcome of a genuine integrated market (i.e., price equalisation) but lacks its main

[7] "Regulation (EU) No 994/2010 of 20 October 2010 concerning measures to safeguard security of gas supply", *Official Journal of the European Union*, 21 November 2010.

[8] For a detailed critique of the Regulation, see: Pierre Noël and Sachi Findlater, "On the Draft Regulation on Gas Supply Security", memo to the European Commission (Cambridge: EPRG, University of Cambridge, 2009). Pierre Noël, "Ensuring Success for the EU Regulation on Gas Supply Security", Occasional Paper (Cambridge: EPRG, University of Cambridge, 2010). Pierre Noël, "The EU Regulation on Gas Supply Security (994/2010): a Case Study in EU Energy Policy-Making", Presentation to the EPRG-NERA Winter Seminar (Cambridge: EPRG, University of Cambridge, 2011).

[9] Such harmonization, a task of immense complexity, is at the heart of implementing the so-called EU Third Liberalisation Package.

characteristics and sources of social benefits, especially decentralised investment in infrastructure development and the link between the short-term and long-term provided by deep, liquid futures and financial derivatives markets.

The EU and especially the European Commission should be commended for the renewed emphasis on gas market integration since 2009. However, it is unclear if the "market design" Europe has selected can deliver a pan-European gas market. Most member states of central and eastern Europe seem almost as cut off from northwest Europe at the turn of 2013 as they were four years ago.[10]

Since the gas crisis the European Commission has also wasted a lot of time, energy and ultimately credibility in the pursuit of an external gas supply policy, essentially trying to solve a non-existent problem (access to non-Russian gas) through a non-credible solution (a multi-billion euro merchant pipeline through Europe and Turkey to Central Asia). The external energy policy agenda is even widening and the Commission – here again supported by most member states of central and eastern Europe – has clearly signalled its ambition to scrutinize gas import contracts and ultimately get involved in their negotiation.[11]

The policy recommendations of November 2008 remain largely valid, even if international gas markets and the Gazprom-backed pipelines have actually reduced gas supply security risks in Europe.

Global LNG transforms Western Europe

The economic organisation of the gas industry in Western Europe has entered a period of rapid and profound change. In 2005, the industry looked fairly similar to 25 years earlier, but by 2015 it will look very different from 2005. The twin processes of commoditisation

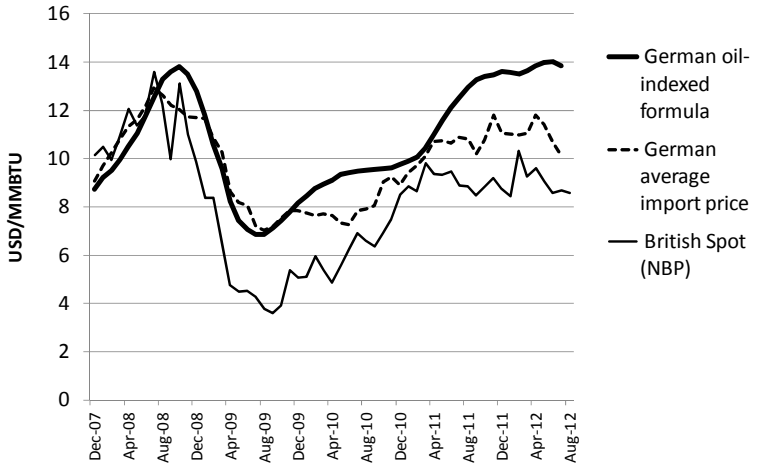
[10] As acknowledged by European regulators themselves (cf. infra).

[11] European Commission, "Communication of the European Commission on Security of Energy Supply and International Cooperation - 'The EU Energy Policy: Engaging with Partners Beyond Our Borders'. (COM(2011) 539 Final)" (Brussels, 2011).

(gas is increasingly traded on short-term markets as opposed to long-term contracts with an oil-indexed price) and globalisation (the European gas system is increasingly integrated with the international LNG market) have important geopolitical implications as they change the nature of the relationship between Gazprom and its largest European clients.

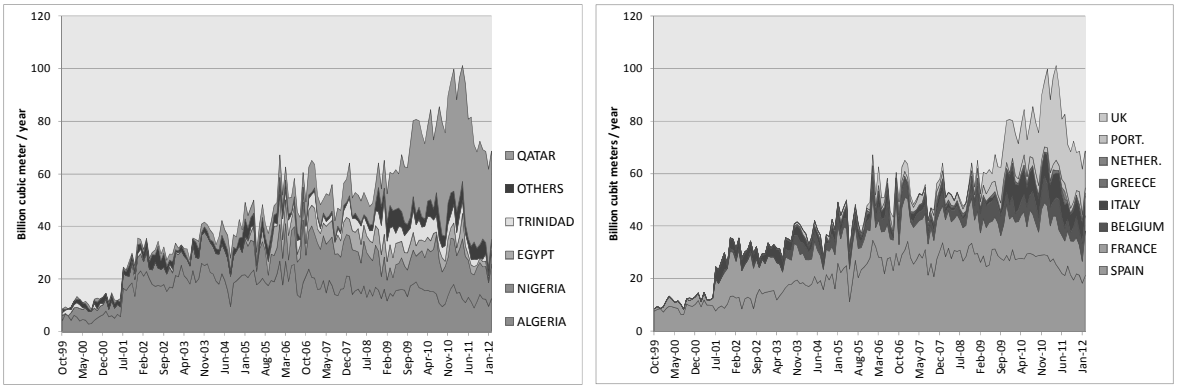
Two developments have triggered the ongoing restructuring. First the spot price for gas – which in North-West Europe has converged with the British spot price, NBP – has been durably below the oil-indexed price of traditional long-term import contracts (see Figure 1). The reasons for that include the economic downturn, the strong rise in oil prices, the rapid growth in global LNG exports, especially from the Middle East, and large new LNG import facilities coming online in the UK, France, the Netherlands and Italy. The LNG import rate into Europe has grown more than 50 bcm/y between 2008 and 2011 (see Figure 2) or more than 10% of total EU consumption, in a context where demand declined by more than 10% and net imports were roughly flat. Second, spot-priced gas has been effectively available to large customers, traders and brokers in North-West European markets. This is because national regulators have become more willing and able to enforce EU rules on pipeline access; the EU competition authorities have obtained from incumbent gas companies the release of "entry capacity" into their home markets; and merchant investments have increased interconnection capacity between the UK and the Continent.

Figure 1. British Spot Price, Oil-Indexed Price and Average German Import Price



Source: Bloomberg; Federal Ministry of Trade (Germany) *Oil-indexed formula from H. Rogers (OIES)*

Figure 2. LNG Imports into Europe (by Exporters and Importers)



Source: Poten Partners Database via Bloomberg

As a result of these developments, importers of oil-indexed gas started losing money and asked for contracts to be renegotiated, moving away (partly or fully) from oil-indexation in favour of spot prices and/or reducing (or abolishing) the minimum volumes that importers have to pay for in a given year.[12] The process of renegotiation was apparently quick with some exporters (especially Norway's Statoil) but long and painful with Gazprom, which defended the old model until all its major clients in Europe (and historic strategic partners)

[12] Jonathan Stern and Howard Rogers, "The Transition to Hub-Based Gas Pricing in Continental Europe" (Oxford: Oxford Institute for Energy Studies, 2011).

had taken it to arbitration. It is unclear whether Gazprom would have lost in the courts but any victory would have been a pyrrhic one: European utilities could always bankrupt their money-losing gas businesses, which is another way of terminating the import contracts.

The commoditisation of gas is a self-reinforcing process. As more and more gas is sold and bought on hubs, liquidity increases and prices become more credible, reducing the rationale for oil-indexation and even long-term contracts. Therefore the transition away from long-term oil-indexed contracts is unlikely to be reversed, although there remain important barriers to the emergence of liquid and deep spot and forward markets in north-west Europe.[13]

Shale gas in Western Europe: a still-born revolution?

Interestingly the globalisation of western European gas is raising new security concerns. In the UK a rapid transition is underway from self-sufficiency to large-scale imports, which has made gas supply security one of the main issues in the energy policy discourse for nearly a decade. The market has delivered massive new import capacity, both pipelines from Norway and the Continent and large LNG terminals, which ensure a diversified supply and access to the international market. Studies – including some commissioned by the government[14] – have shown that the level of security of supply enjoyed by the British market remains very high despite the transition to imports. UK politicians, however, are fixated on growing import dependence from a limited number of LNG suppliers (mostly in Africa or the Middle East) and their perception that the UK now requires a higher

[13] These barriers include the continuing regulation of storage (which may actually come back to the UK instead of being abandoned in continental Europe), a lack of political understanding and support for gas market integration, a lack of trust between the British and continental (especially French, German and Belgian) governments on gas matters and, finally, a flawed EU model for gas transport regulation and pricing (that we have already mentioned and on which we will come back later).

[14] See the excellent report by Poyry Economic Consulting, *GB Gas Security of Supply and Options for Improvements. A Report to Department of Energy and Climate Change*, 2010.

level of underground storage, and potential competition with East Asia for supply in a global market with intercontinental LNG arbitrage.

The winners in the UK gas security debate have been shale gas explorers. Since Cuadrilla Resources made what it says is a major discovery in Lancashire in September 2011 the UK has been the most promising country in Europe for shale gas production. Exploration work was suspended after hydraulic fracturing-induced seismic activity was reported but the government allowed companies to resume work in late 2012. The UK enjoys a relatively wide political consensus that, given the right regulatory framework and scrutiny, a new source of indigenous gas production is a good thing for the country. Britain may be the first place in Europe where shale gas is produced commercially. It is too early however to tell whether shale gas will have a discernible impact on UK gas supply; local opposition, running very high in prospective areas, could still derail it just as it is preventing serious exploitation of the UK onshore wind potential.

Elsewhere in western Europe the shale gas potential looks increasingly unlikely to be materialised. A summary of the situation is provided by an IEA report from 2012.[15] The bleak situation in France – where most of western Europe's reserves are located but hydraulic fracturing was banned by a law passed nearly unanimously by the parliament with support from the Sarkozy government – got bleaker since publication of the IEA report as hopes of a re-opening of the issue were dashed early in the Hollande presidency in an energy policy speech by the President[16], and the definite character of the ban confirmed in the first of his bi-annual press conferences.[17]. It would now take extraordinary political developments for

[15] International Energy Agency, *Golden Rules for a Golden Age of Gas. World Energy Outlook Special Report on Unconventional Gas, Paris*, IEA/OECD, 2012, pp. 122-130.

[16] The speech, delivered on 14th September 2012, is available here: http://bit.ly/W8T1zq.

[17] Press Conference by President François Hollande, 13 November 2012,, available here: http://bit.ly/VOfBgm.

shale gas production to take off in France.[18] Other geologically promising countries such as Sweden or Germany have various combinations of: very low level of political support for shale gas; very high level of public opposition; disappointing exploration results. A point often missed by commentators – and completely overlooked by the IEA report – is that it is very difficult to build a political case for shale gas in countries where natural gas consumption is rapidly declining and security of gas supply is not considered a pressing issue. In the short to medium term gas faces a very difficult situation as it is displaced by subsidised renewables and cheap coal in electricity generation, and by electricity and efficiency investment in industrial and residential heating. In the longer term energy policies in Europe are focused on deep decarbonisation of the power and heat sectors, creating a significant challenge for natural gas.

Fundamental alteration of European company relations with Gazprom

The commoditisation and globalisation of the western European gas market is generating a high degree of frustration on the part of Gazprom and Russia. Gazprom has long been – and to some extent still is – in denial about the transformation of the western European gas market[19]. Sergei Komlev, Head of Contracts and Price Formation at Gazprom Exports, has been touring the European conference circuit for more than three years defending the business model that all his large clients were suing Gazprom to reform. The Russian leadership has interpreted the transition away from long-term oil-indexed contracts as an anti-Russian move engineered by the European institutions.

[18] The IEA reports states (p. 126): "In the Golden Age Case, we assumed a reversal of the ban on hydraulic fracturing. Shale gas production rises after 2020 to reach 8 bcm in 2035." Given the politics of shale gas in France this should be considered a highly speculative scenario.

[19] In June 2010 Alexei Miller, the Chairman of Gazprom's Management Committee, was still trying to convince audiences that LNG was no competitive threat to Gazprom; see Alexei Miller, "Natural Gas: Energy of the 21st Century", speech at the 13th Annual General Assembly of the European Business Congress, Cannes, France, 10-11 June 2010.

Indeed, the globalisation and commoditisation of western European gas has quickly and profoundly altered the 40 year old relationship between western European gas companies and Gazprom. It will have important political implications as continental European gas importing companies – a powerful pro-Russian lobby with their national governments[20] – can be expected to become more indifferent. Over time, politicians in key countries like Germany, France or Italy may start realising that a "special relationship" with Moscow brings little supply security benefits. If so, it should go some distance in bridging the east-west gap regarding perceptions of Russia and foreign policy approaches towards Moscow. The restructuring of the western European gas industry will illustrate the power of "marketisation" in alleviating the foreign policy liabilities of energy import dependence. Russian gas will certainly remain quantitatively important – its market share could actually increase if Gazprom shifts from a price strategy to a quantity strategy – but, because it is economically contestable, it will become more politically tenable.[21] The big prize for Europe is the commoditisation of gas east of Germany, Switzerland and Italy. Progress here has been limited, however.

In the East not much has changed

In their first Market Monitoring Report, the new European Agency for the Cooperation of Energy Regulators (ACER) and the Council of European Energy Regulators (CEER), after reporting on the positive evolutions in western European gas markets, acknowledge that

> a vast area of the Eastern and South-Eastern EU has no gas hubs and, being mostly landlocked, no LNG. This lack of sufficient diversity in supplies, coupled with little connectivity between national markets (and insufficient backhaul flows

[20] See Rawi Abdelal, "The Profits of Power: Commerce and Realpolitik in Eurasia," *Review of International Political Economy* 2012, 1–36.

[21] Pierre Noël, "A Market Between us: Reducing the Political Cost of Europe 's Dependence on Russian Gas", University of Cambridge, EPRG Working Paper No. 0916 (Cambridge, 2009).

> from the West), makes this region particularly vulnerable to security of supply and market abuse dangers.[22]

The idea that because a place is far away from the coast it has no LNG hence little supply diversity is a stark recognition that there is no "European" gas market.[23] There is very little trade between East and West despite most of central Europe sitting along large pipeline systems carrying Russian gas westward. Before 2009 no one ever mentioned the possibility of such trade. During the gas crisis however the supposedly impossible happened: some gas flew west to east.[24] For most countries of central and eastern Europe, their isolation from western Europe has no physical cause.[25] The "Berlin Wall of Gas", as I had called it, which is the root cause of Europe gas security problem, is a policy and regulatory issue. It has to do with the organisation of the gas transport industry under EU rules; the gas policies of some countries in central Europe; and specific legal arrangements, to which Russia is a party, which govern some large "transit" pipelines.

In terms of European gas transport regulation, what is needed is the ability to contract for, and trade in, point-to-point transport capacity on long-distance pipelines, irrespective of national borders.[26] It may sound trivial to gas experts from North America but it is anathema to EU regulators as it falls foul of the "market design" chosen by the European Commission in the early 2000s and codified by the 2009 3rd Package.

---

[22] ACER and CEER, *Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2011*, p. 122.

[23] Would the US Federal Energy Regulatory Commission write that San Francisco has no access to shale gas, or that because Illinois is landlocked it lacks access to LNG?

[24] Mostly intra-company flows carried out by Gaz de France and E.On to supply their affiliates in central Europe.

[25] The remote and tiny Baltic States are an exception. See Sachi Findlater and Pierre Noël, "Gas Supply Security in the Baltic States: a Qualitative Assessment," *International Journal of Energy Sector Management* 4, no. 2 (2010): 236–255.

[26] See Paul Hunt, "Entry-Exit Transmission Pricing with Notional Hubs. Can It Deliver a Pan-European Wholesale Market in Gas?" (Oxford, 2008); Graham Shuttleworth and J. Makholm, "Foundation for Regulating Pipelines." (Florence, FSR Summer School on Regulation of Energy Utilities, 2011).; David Newbery, "State of the Union: Achieving the Internal Market" (Florence, Conference on "State of the Union: Energy Policy", 2012).

A related, and necessary change, is opening access to three key "transit" pipelines that could make Russian gas contestable deep into central Europe: Yamal-Europe across Poland; the pipeline across Romania, Bulgaria and into Greece and Turkey; the TAG pipeline across Austria into Italy. The current legal arrangements governing these pipelines, which Gazprom has used for years to prevent backhaul transactions from west to east, essentially amount to preventing the resale of Russian gas by west-European importers to companies in central Europe – a practice the EU banned long ago. In 2011 Poland renegotiated, with the help of the European Commission, the intergovernmental agreement with Russia that governs the operation of the "Yamal" pipeline. Although views diverged as to what exactly had been achieved – with the Commission claiming that under the new agreement backhaul transactions would be possible, while Polish officials were less sure – it seems that very little has happened since that would suggest a serious restructuring.[27]

Finally there is a need for deregulation of wholesale gas markets in central European countries. In Poland and Romania – to take two among the largest gas markets in the region – the price of gas is maintained way below the import price via a weighted average of imports from Russia and gas produced locally, the latter being sold at prices close to its cost.[28] Such practices amount to subsidising imports from Russia; they also destroy incentives to bring non-Russian gas in from western Europe.

Since 2009 there has been so much spot-priced gas looking for a way to reach consumers captive of oil-indexed gas in central and eastern Europe that any significant progress on the above-mentioned issues would have transformed these markets, and with them European gas security landscape. The only market where spot-priced gas has indeed put

[27] Recently the competition authorities of the EU launched proceedings against Gazprom after raiding its offices in various countries of central and eastern Europe. Although little is known about the grievances, contractual practices amounting to resale restrictions (mimicking the defunct "destination clauses") are probably part of what the Commission is after.

[28] Romania also bans the export of locally produced gas, a practice one finds hard to reconcile with the very basic principles of European economic law and the idea of a single market – but Brussels seems to tolerate it.

serious pressure on oil-indexed contracts is the Czech Republic – directly connected to Germany – and to a lesser extent Austria and Slovakia, along the same pipeline system.

The paradox is that the EU and national governments have had big plans for gas market integration and security of supply in central Europe. They have been discussing investments into various pipelines and LNG terminals that are supposed to give the region access to non-Russian gas – such as Nabucco or the Krk terminal in Croatia – or increase interconnection between national markets. Some of these "interconnectors" have been built, for example between Hungary and Romania.[29] However most of these projects, starting with the flagship Nabucco pipeline, have been shelved or abandoned because they were fundamentally not economic. There are continuously new ideas and projects (for the Baltic States, the Danube region, the "North-South Gas Corridor", etc) but they all are more or less conceived on the same flawed model of "*subsidising infrastructure to complete the internal market to ensure security of supply"*. In terms of "completing the market", very serious progress can be made, without building anything, by reforming EU regulatory concepts and national gas policies, as we have seen. In those countries, such as the Baltic States, which are out of reach of a decently functioning European gas market, insuring against the risk of gas supply disruption can be done relatively cheaply without Brussels subsidising uneconomic pipelines.[30]

In the meantime the limited progress in integrating western and Eastern Europe has political implications. First, it contributes to entrench East-central European governments' resistance to the EU climate change policy. Unless gas supply security improves, they will be highly reluctant to let gas displace coal – and the larger economies of East-central Europe such as Poland and the Czech Republic are very coal intensive.[31] Beyond energy policy the

[29] Market participants say that there is little trade actually happening.

[30] See Pierre Noël, Sachi Findlater, and Chi Kong Chyong, "Baltic Gas Security: Divided We Stand?," *Economics of Energy & Environmental Policy* 2, no. 1 (2013).

[31] Both Poland and the Czech Republic have civilian nuclear programs but they will take at least a decade (maybe loser to two) to make a difference, if ever they do.

persistence of gas supply insecurity could fuel resentment vis-à-vis Brussels and western European countries, playing in the hands of nationalist and, in some countries, pro-Russian political forces.

Large-scale unconventional gas production in central Europe would make the European pipeline regulatory failure less critical. However, hopes have been seriously dampened recently by disappointing exploration results, including in Poland. In December 2012 ExxonMobil, the leading foreign participant in the sector, decided to pull out and sold its exploration licences to a local company after concluding that the gas it found could not be exploited economically.[32] In other countries public opposition runs high and Bulgaria (like France) banned hydraulic fracturing. It is certainly too early to write off unconventional gas as a significant source of supply in central and eastern Europe but it is unlikely to make a difference in the coming ten to fifteen years.

The Bypassing of Ukraine

The building by Gazprom and western European energy companies of large sub-sea pipeline systems bypassing the Ukrainian transit corridor is one of the most consequential developments of this decade for European gas. The first line of Nord Stream, linking Russia to Germany under the Baltic Sea, was completed in June 2011. Once the second line is finished, the system will have an annual capacity of 55 bcm, nearly 15% of total European gas consumption and more than a third of Russian exports to Europe. A final investment decision has been taken on the building of South Stream under the Black Sea on 14 November 2012. Once finished its capacity will be 63 bcm per year. Therefore, by 2015 or

[32] Reuters, "Exxon sells shale gas licences to Polish refiner PKN", 7th December 2012. Separately, in March 2012 a report by the Polish Geological Institute estimated the country's reserves to be a tenth of the number published in the widely quoted study sponsored by the DOE's Energy Information Administration in April 2011. See IEA, *Golden Rules*, op. cit., p.123-124.

2017 Gazprom and its partners will have created enough shipping capacity to bypass Ukraine entirely, assuming Russian exports to Europe remain at around 150 bcm per year.[33]

The economics of the bypassing of Ukraine are complex and its political implications are profound. Financial economist Chi-Kong Chyong has shown that Nord Stream is a profitable investment under almost any scenario of European gas consumption.[34] The value of the pipeline system derives mostly from not paying the Ukrainian transit fee, which over three decades more than repays the capital cost. The economics of South Stream are more complex as it only becomes profitable if Ukraine is incapable of credible commitments on gas import prices and transit fees.[35] Gazprom has an incentive to prepare the groundwork for South Stream – which it has been doing for several years – in order to discipline Ukraine. However, if Ukraine becomes convinced that Gazprom will bypass it entirely at any cost, then its winning strategy is to violate its long-term commitments and try to maximise the rent from its transit monopoly before it disappears – therefore triggering the building of South Stream.[36] Again, it fits very well with the sequence of events since the signing of the Ukraine-Russia agreements that put an end to the crisis of January 2009.

For Ukraine the implications will be very serious. Naftogaz will be deprived of billions of dollars in annual revenue and the value of its gas transit infrastructure brought to nearly zero. Ukraine is by far the largest of Gazprom's export markets that is entirely captive. Until 2006 its transit monopoly acted as an effective check against Russia's market power. That is now gone. Ukrainian politicians may be tempted to try and escape high gas prices by making foreign policy choices that would compromise their stated goal of anchoring the country to

[33] See Chi-Kong Chyong, "Gazprom's Bypass Strategy and Russo-Ukrainian Gas Bargaining: South Stream Case Study", presentation, (Cambridge: University of Cambridge, EPRG, 2012), p. 5.

[34] Chi-Kong Chyong, Pierre Noël, and David M Reiner, "The Economics of the Nord Stream Pipeline System" University of Cambridge, EPRG Working Papers No. 1026, (Cambridge, 2010).

[35] Chyong, "Gazprom 's Bypass Strategy and Russo-Ukrainian Gas Bargaining: South Stream Case Study."

[36] Ibid.

Europe, starting with joining the Moscow-led Eurasian Customs Union, potentially accepting a creeping integration into what President Medvedev once declared Russia's "zone of special interests". Sustained high gas prices would continue to reduce consumption, which is painful and politically costly. Over time it will create alternative supply options as well. The most promising are the development of its important conventional and unconventional (including shale) gas potential; imports from western Europe using existing (and increasingly underutilised) infrastructure[37]; and LNG imports on the Black Sea. All of these options require serious institutional reforms of the energy industry – notably to allow meaningful, long-term involvement of foreign investors – that have proved elusive for 20 years.[38]

The bypassing of Ukraine boosts Gazprom's bottom line at Naftogaz's expense and dramatically reduces Russia-Europe gas transit risks. It also removes Ukraine's ability to take Europe hostage in its gas bargaining with Moscow – a shared interest of the EU and Russia. However Russia and the EU may not have the same preferences regarding the political future of Ukraine. In that respect the bypassing pipelines will force Ukraine's ruling elite to make a stark choice. If they are serious about their euro-Atlantic choice (or more basically their choice to be a viable, sovereign and democratic country) they will have to implement profound and very difficult institutional and political reforms that would – among many other benefits – allow Ukraine to move away from its perverse gas relationship with Russia and become a modern energy economy. Europe (and others) can help and the structural weakening of Ukraine will make real conditionality possible. Over the past decade the EU has been very naïve in its engagement of Ukraine and Kyiv has been expert at making the

[37] In 2012 several transactions have been realised. See Reuters, "Ukraine Starts to Import Some Gas from Western Europe," *Reuters Energy News Roundup* (London, November 6, 2012).

[38] Edward Chow and Jonathan Elkind, "Where East Meets West: European Gas and Ukrainian Reality", *The Washington Quarterly* 32:1, January 2009.

best of this naiveté.[39] This game is now over. Gazprom's bypassing project is truly a "game changer".

Summary and Conclusions

Since the European gas supply crisis of January 2009, the diversification of gas supply in Western Europe has accelerated. Rapid and profound change in the economic organisation of the industry has followed, with short-term markets playing a much bigger role. Russian gas is now contestable everywhere in north-west Europe, including northern Germany. Large importers of Russian gas have lost their captive customer base in their home markets and therefore are loosening and "marketising" their relationship with Gazprom. Finally the bypassing of Ukraine removes the single biggest risk of gas supply disruption to EU countries.

On the other hand there has been little progress in integrating western and eastern Europe by reforming the regulation and operation of the large existing long distance gas pipeline infrastructure. The model promoted by Brussels for "completing the internal market" is the longest and most complex possible route to a destination that could be approached, if not reached, quickly through alternative simpler regulatory reforms. Similarly Brussels has failed to incentivise member states to invest in increasing the resilience of their energy systems to gas supply disruptions. The new Regulation on Gas Supply Security, despite its extreme complexity and apparent sophistication, will not be more effective than the Directive it replaced. Improvements to EU gas supply security have been delivered mostly "from the outside". If only they could be met by comparable progress "from the inside" Europe's gas security problem could become history. We are not there yet.

[39] See Marine Confavreux Zimmermann, "Securing Gas Transit? Co-operation Between the European Commission and Ukraine" MPhil Dissertation, Department of Politics and International Studies (University of Cambridge, 2012).

Dependence on Russian gas remains an acute political problem in countries such as the Baltic States, where it is perceived as the last vestige of the pre-independence era. However, economic calculations show that these countries could buy high levels of insurance against risks of supply disruption at reasonable cost.[40] In central Europe, governments should stop regulating wholesale gas markets and lobby Brussels to amend the Gas Target Model in a way that would allow point-to-point capacity trading on long-distance pipelines. Meanwhile, they should seriously assess their short-term resilience to gas supply disruptions and implement cost-effective measures to improve it.[41] In Ukraine, it is for the country's ruling elite to decide whether they want to address their dependence on Russian gas through institutional and legal reform of the energy sector, or through creeping, de-facto re-integration into Moscow's political orbit. Being bypassed as a transit corridor, they can no longer address it by blackmailing Gazprom and taking Europe hostage.

That said, EU natural gas consumption peaked in 2005 and is now declining everywhere in Europe. In the large markets of western Europe that account for the bulk of demand and imports, Russian exports have been severely hit by the combination of growing LNG availability and declining consumption. For most of Europe, dependence on Russian gas is unlikely to be an important determinant of the Continent's economic and security situation in the coming years.

[40] Noël, Findlater, and Chyong, "Baltic Gas Security: Divided We Stand?". The Baltic States could also move away from Russian gas altogether through a single buyer for LNG, but that would violate EU law; see P Noel, "Singapore, Helsinki or Brussels: Policy Approaches to Baltic Gas Security", presentation to the EPRG-CEEPR Annual Conference, Helinki, July 2012 (available here: http://bit.ly/13eZPBx).

[41] We had tried to do this for Bulgaria: Florent Silve and P Noel, "Cost Curves for Gas Supply Security: the Case of Bulgaria", EPRG Working Paper No. 1031, 2010.

Abdelal, Rawi. “The Profits of Power: Commerce and Realpolitik in Eurasia.” *Review of International Political Economy* no. April (April 3, 2012): 1–36.

ACER, and CEER. *Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2011*. Ljubljana/Brussels, 2012.

Chyong, Chi-Kong. “Gazprom’s Bypass Strategy and Russo-Ukrainian Gas Bargaining: South Stream Case Study.” Cambridge: University of Cambridge, EPRG, 2012.

Chyong, Chi-Kong, Pierre Noël, and David M Reiner. “The Economics of the Nord Stream Pipeline System.” EPRG Working Paper, Cambridge, 2010.

Confavreux Zimmermann, Marine. “Securing Gas Transit? Co-operation Between the European Commission and Ukraine.” University of Cambridge, Department of Politics and International Studies, dissertation for the MPhil in International Relations, 2012.

European Commission. Communication of the European Commission on Security of Energy Supply and International Cooperation - ‘The EU Energy Policy: Engaging with Partners Beyond Our Borders’. (COM(2011) 539 Final). Brussels, 2011.

Findlater, Sachi, and Pierre Noël. “Gas Supply Security in the Baltic States: a Qualitative Assessment.” *International Journal of Energy Sector Management* 4, no. 2 (2010): 236–255.

Hunt, Paul. “Entry-Exit Transmission Pricing with Notional Hubs. Can It Deliver a Pan-European Wholesale Market in Gas?” Oxford, OIES, 2008.

Monaghan, Andrew. “‘An Enemy at the Gates’ or ‘from Victory to Victory’? Russian Foreign Policy.” *International Affairs* 4, no. March (2008): 717–733.

Newbery, David. “State of the Union: Achieving the Internal Market.” Presentation to the conference on “State of the Union: Energy Policy”, Florence, 2012.

Noël, Pierre. “A Market Between Us : Reducing the Political Cost of Europe ’ s Dependence on Russian Gas.” University of Cambridge, EPRG Working Paper, 2009.

———. *Beyond Dependence: How to Deal with Russian Gas*. London, ECFR, 2008.

———. “Ensuring Success for the EU Regulation on Gas Supply Security.” Cambridge: EPRG, University of Cambridge, 2010.

———. “The EU Regulation on Gas Supply Security (994/2010): a Case Study in EU Energy Policy-Making.” Presentation to the EPRG Winter Seminar, Cambridge, 2011.

Noël, Pierre, and Sachi Findlater. “On the Draft Regulation on Gas Supply Security.” Cambridge: EPRG, University of Cambridge, 2009.

Noël, Pierre, Sachi Findlater, and Chi Kong Chyong. “Baltic Gas Security: Divided We Stand?” *Economics of Energy & Environmental Policy* 2, no. 1 (2013).

Poyry Economic Consulting. *GB Gas Security of Supply and Options for Improvements. A Report to Department of Energy and Climate Change*, London, 2010.

Reuters. "Ukraine Starts to Import Some Gas from Western Europe." London, November 6, 2012.

Shuttleworth, Graham. "Foundation for Regulating Pipelines. United States and Europe: Two Different Regulatory Worlds." Florence, FSR Summer School on Regulation of Energy Utilities, 2011.

Stern, Jonathan. *The Future of Russian Gas and Gazprom*. Oxford: Oxford University Press for the Oxford Institute for Energy Studies, 2005.

Stern, Jonathan, and Howard Rogers. "The Transition to Hub-Based Gas Pricing in Continental Europe." Oxford, OIES, 2011.