Geopolitical Dynamics in the European Gas Market from an Economic Perspective

Marc Oliver Bettzüge and Harald Hecking

1. Introduction

The landlocked regions in the Caspian region, including Northern Iran, hold abundant and relatively easily accessible gas reserves. According to the latest estimates in the BP Statistical Review of Energy (BP, 2016) Turkmenistan alone holds 17.5 trillion cubic metres of gas reserves, sufficient to cover more than 50 years of current gas imports into the EU.

It therefore does not come as a surprise that the Ukraine gas crisis from 2009[1] as well as the geopolitical tensions between the EU and the Russian Federation have sparked the idea to develop a transit route between those resources of natural gas and the EU, thereby opening up what has been called a 'Southern Corridor', or a 'Third corridor' referring to the transit routes through Belarus and Ukraine as the first and second ones.

For geographical reasons, Turkey would be the key transit country for such a corridor. The only alternative to transit through Turkey would be transit through Russia, and thus not adding to the notion of supply (route) diversification. The debates about developing the Southern Corridor therefore sit at the origin of the idea that Turkey might develop into an 'energy hub' with significant geopolitical imprtance for the EU.

So far, however, and in spite of a lot of political rhetoric and activity, particularly during the second Barroso term,[2] the efforts to develop the Southern Corridor have yielded only limited results.[3] Still, even without

1 See for example European Commission. Commission and Azerbaijan sign strategic gas deal. Bruxelles, 13.1.2011. Available at: http://europa.eu/rapid/press-release_IP-11-30_en.htm?locale=en [16.1.2017].

2 See for example Hecking, Harald/Schulte, Simon/Raszewski, Slawomir/Vatansever, Adnan. Options for Gas Supply Diversification for the EU and Germany in the next two Decades. Ewi Energy Research & Scenarios and European Centre for Energy and Resource Security, 2016, p. 28 ff.

3 See the contribution by Berk, Istemi/Schulte, Simon. Turkey´s role in natural gas – Becoming a transit country? EWI working paper No. 17/01, 2017.

substantial expansion of the Southern Corridor, the EU's security of supply does not seem to have deteriorated over the past couple of years, rather to the contrary.[4] So something is missing in the simple story of EU supply diversification with Caspian gas.

In fact, Turkey's potential role for the EU gas market must be seen in the larger context of the position of Europe relative to many alternative sources of gas, including, increasingly, natural gas arriving at EU shorelines in the form of Liquified Natural Gas (LNG) transported by (flexible) ships rather than (fixed) pipelines. And it must be taken into account that Russia, holding almost twice as much gas reserves than Turkmenistan, has an active interest to sell her gas to the European market. Thus, the concept of 'EU import dependency' needs to be augmented by 'Russian export dependency', generating a perspective of 'EU-Russian gas interdependency'.

In order to shed some light on the bigger picture of Turkey's role for EU gas supply, the following article sketches a comprehensive overview over the geopolitical dynamics in the European gas market. We explicitly restrict our attention to an economic perspective, only, being well aware that further perspectives, in particular political ones, need to be added before arriving at a full picture. Nonetheless, the economic perspective might be helpful to clarify underlying fundamental drivers of, and impediments to, commercial behaviour of states and market actors.

Specifically, we first discuss current trends in EU gas demand and its supply mix (section 2). Then, we look at the specific role of gas transit countries in more detail (section 3). A key accomplishment of the EU is the internal market for energy, in particular natural gas. This has important implications for EU security supply (section 4). We then investigate potential changes to the EU's security supply position in the longer term, taking into account in particular the projected decline of gas production inside the EU (section 5). Finally, we conclude with a specific view towards Turkey and the way the country is embedded in the wider context of EU gas supply (section 6).

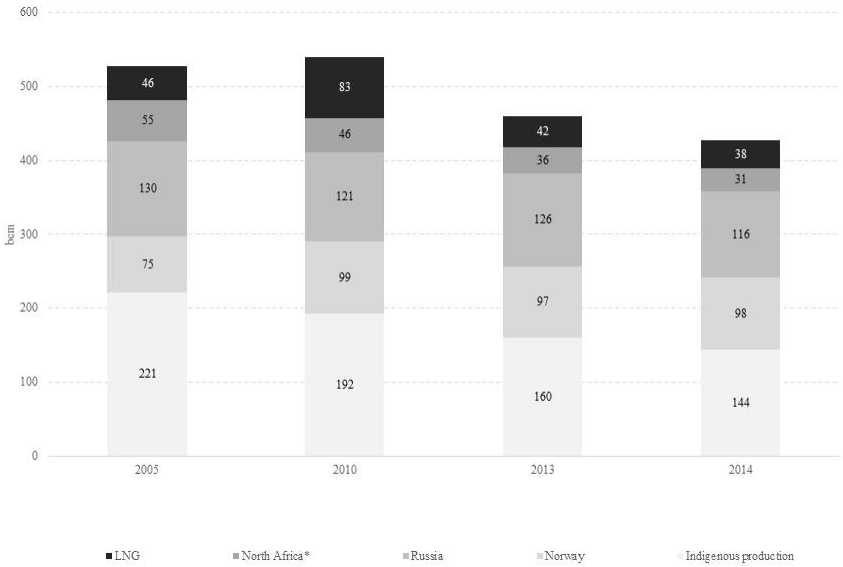
4 Martinez, Miguel/Paletar, Martin/Hecking, Harald. The 2014 Ukrainian crisis: Europe's increased security position. Natural gas network assessment and scenario simulations. Institute of Energy Economics at the University of Cologne, 2015, p. 56 ff.

2. EU Gas Demand and Supply Mix

EU-28 gas demand amounted to 427 bcm in 2014, down from a record high 541 bcm in 2010. The sharp decline in EU gas demand in the past years can partly be explained by temperature effects – 2010 having been an exceptionally cold year throughout Europe – and by the on-going effects of the EU economic crisis following the global financial crisis in 2007 and 2008. Moreover, relatively cheap coal prices and subsidised renewable energies have sharply reduced the role of gas in European electricity production; a trend partially reversed by declining gas prices in 2015 and 2016.

For decades now (see Figure 7), EU gas demand has been met by a mix of domestic production (34% in 2014) and pipeline-based imports from Russia (27%), Norway (23%), and North Africa (7%, foremost Algeria).

Figure 7: Gas Supply Mix of the EU-28, 2005-2014



Source: Hecking et al., Options for Gas Supply Diversification for the EU and Germany in the next two Decades based on Eurogas Statistical Reports 2001, 2006, 2011 and 2015 and IEA Natural Gas Information 2016.

**North Africa contains Libya and Algeria (Exception for 2005: contains only data from Algeria, data for Libya is not available for 2005)*

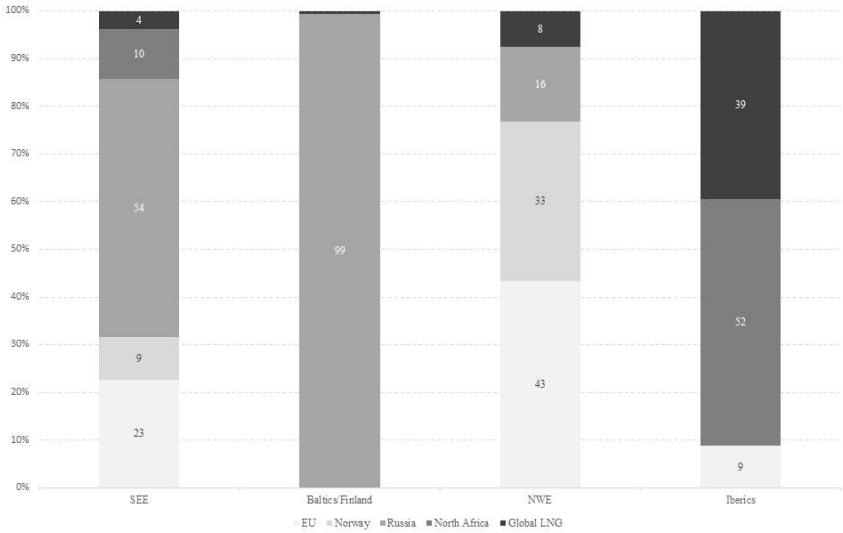
Imports of liquefied natural gas (LNG) foremost from Qatar, Algeria, Nigeria as well as a variety of other countries make up for the remaining 9%. EU domestic production, with the Netherlands and the UK being the EU's major gas producers, has been continuously declining over the last ten years. In fact, EU gas production has decreased by one third between 2005 and 2014. It has been mainly compensated by gas imports from Norway, which increased by roughly one third. Whereas imports from Russia have remained on more or less the same level, imports from North Africa have almost halved between 2005 and 2014 due to the political situation, e.g. in Libya, as well as increased domestic gas demand in Algeria. EU LNG imports have more than halved compared to the year 2010, when LNG prices were rather low and EU gas demand was high due to cold temperatures. Assuming EU indigenous production and LNG supply to behave in a perfectly competitive way, the Herfindahl-Hirschman-Index (HHI) of European gas supply based on original producing countries ranges between the critical values of 1'000 and 1'800, indicating only a moderate level of market concentration.

However, the European gas supply mix varies strongly by region. The market in North-Western-Europe (NWE[5]) is well diversified as it is well-connected to the global LNG market and receives more than 40% of its gas supplies from EU production, mainly the Netherlands, UK, Germany and Denmark. In contrast, the markets in the Baltics and in South-Eastern-Europe (SEE[6]) are characterised by a large market share of Russian gas, for some countries of up to 100 percent. Standard HHI-calculations would therefore point to very high levels of market concentration. Yet a different case is presented by Iberia (Spain, Portugal), which has less access to EU indigenous production than NWE and with imports from Africa and LNG imports from many different suppliers balance each other out, leading to a moderate market concentration with Algeria as dominant supplier with a share of 51% in 2014 (see Figure 8).

5 NWE: Belgium, Denmark, France, Germany, Luxemburg, Ireland, Netherlands, Sweden, United Kingdom.

6 SEE: Austria, Bulgaria, Croatia, Czech Republic, Greece, Hungary, Italy, Poland, Romania, Slovakia, Slovenia.

Figure 8: Regional Gas Supply Mix of the EU 28, 2014.



Source: own calculation based on Eurogas Statistical Report 2015 and IEA Natural Gas Information 2016.

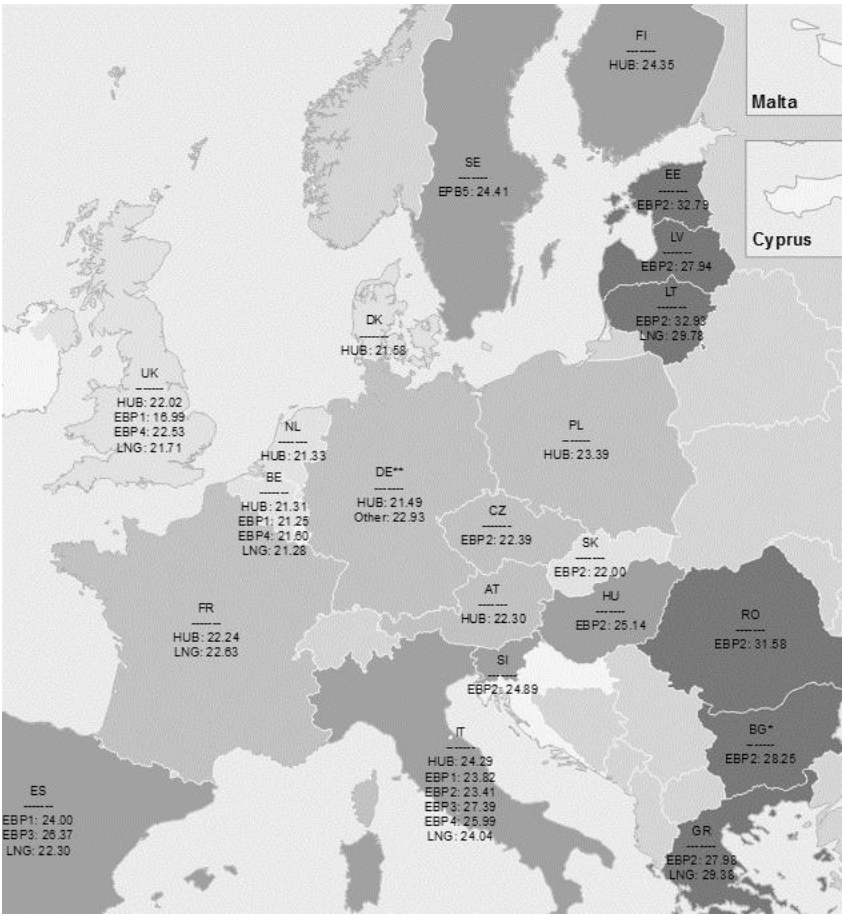
Interpreting the numbers on actual market shares, however, requires more careful analysis. Whether or not high market concentration implies significant supplier bargaining power in a certain region crucially depends on the availability of alternatives, i.e. on potential supply as much as on actual supply. If, e.g., there is no alternative to Russian gas because of missing gas infrastructure, a high market share of Russian gas implies the potential to exploit bargaining power. If there are several alternatives to Russian gas but Russian gas has a high market share because its price is very competitive, a high market share does not necessarily imply the existence or use of market power by Russia as a supplier.

Therefore, price levels and potential competition need to be taken into account, too. Figure 9 below shows wholesale gas prices in the first quarter of 2015. It can be seen that prices differ significantly across the EU, reflecting both differences in market structure and in transportation cost of gas from the different sources to the 28 member states. In fact, markets with many supply alternatives and indigenous production in close vicinity such as UK or BENELUX have the lowest prices. Germany, where most of the gas is imported from suppliers with potential bargaining power, such as Russia or Norway, rather low gas prices as well, because of the

availability of alternatives due to the well-established pipeline interconnections to neighbours as well as liquid market places.

On the other hand, Baltic countries and Finland as well as South East European countries see the highest prices in Europe, even though being located more closely to Russia. But, for many of these countries lack of alternatives, some countries almost fully reliant of Russian gas and have little to no import infrastructure except with Russia.

Figure 9: Countrywise Wholesale Gas Prices (EUR/MWh), Q1 2015.



Source: European Commission, Quarterly Report on European Gas Markets Q1 2015.

How important redundant infrastructure can be for reducing the impact of market concentration can be seen in the case of Lithuania. The construction and completion of the LNG terminal in Klaipeda in 2014 has had little impact on the supply mix of the country. In 2015, LNG imports contributed 17% to the country's demand. However, the mere existence of the terminal and the corresponding potential for LNG imports let to a significant prices decrease by 2016 as it has weakened Russia's bargaining power.[7] This is underlined by comparing Lithuanian wholesale prices from the first quarter of 2015[8] and the third quarter of 2016[9]: Whereas the delta of the Lithuanian pipeline gas import price and the TTF[10] price was above 11 Euro in 2015, it decreased to less than 4 Euro in 2016.

3. Transit Countries

It is well-known that pipeline based infrastructures can suffer from the so-called hold-up problem.[11] As the investment into a pipeline is specific and sunk, producers and consumers face the risk of being extorted after the investment has taken place. In particular, pipeline owners can wield significant bargaining power for this reason. Therefore, from the perspective of the EU as a gas consuming region, it is not only relevant to study the potential market power of suppliers, but also the market power of those transit countries outside of the EU and thus not fully captured by EU regulation.

---

7 See Henderson, James/Mitrova, Tatiana. The Political and Commercial Dynamics of Russia´s Gas Export Strategy. The Oxford Institute for Energy Studies, Paper NG 102, 2015, p. 44 ff.

8 European Commission. Quarterly Report on European Gas Markets. Market Observatory for Energy. DG Energy. Vol. 8, Issue 1, first quarter of 2015, Bruxelles, 2015. Available at: https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_gas_markets_q1_2015.pdf.

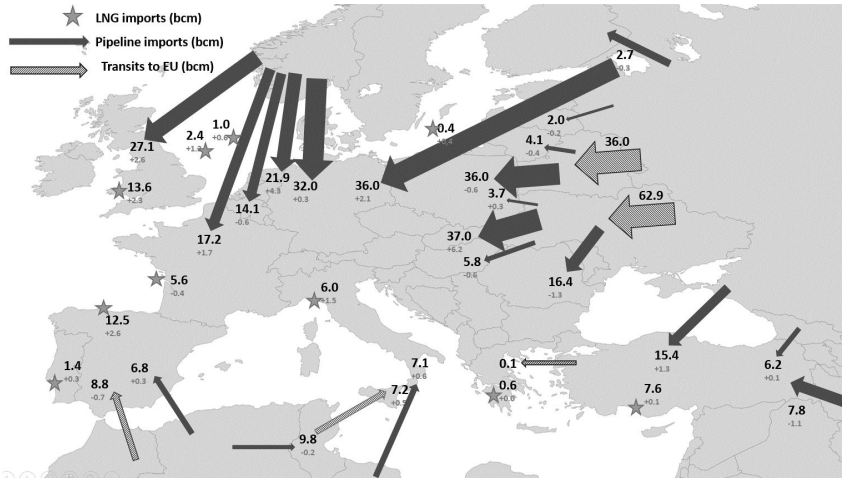
9 European Commission. Quarterly Report on European Gas Markets. Market Observatory for Energy. DG Energy. Vol. 9, Issue 2 & 3, second and third quarter of 2016, Bruxelles, 2016. Available at: https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_gas_markets_q2-q3_2016.pdf.

10 Title Transfer Facility is the most important gas trading hub in Continental Europe.

11 See for example Klein, Benjamin/Crawford, Robert G./Alchian, Armen A. Vertical Integration, Appropriable Rents, and the Competitive Contracting Process. In: Journal of Law and Economics, Vol. 21, No. 2, 1978, pp. 297-326.

Figure 10 indicates the transit flows in Europe. It follows that the most relevant non-EU transit countries for EU gas supply are Belarus and Ukraine. With the exception of Nord Stream, all Russian exports to mainland EU are delivered via those two countries. Tunisia, Morocco and Turkey also are transit countries for EU gas supplies but of very limited significance at present.

Figure 10: Gas Imports by the EU and Turkey in 2015 compared to 2014 (red)

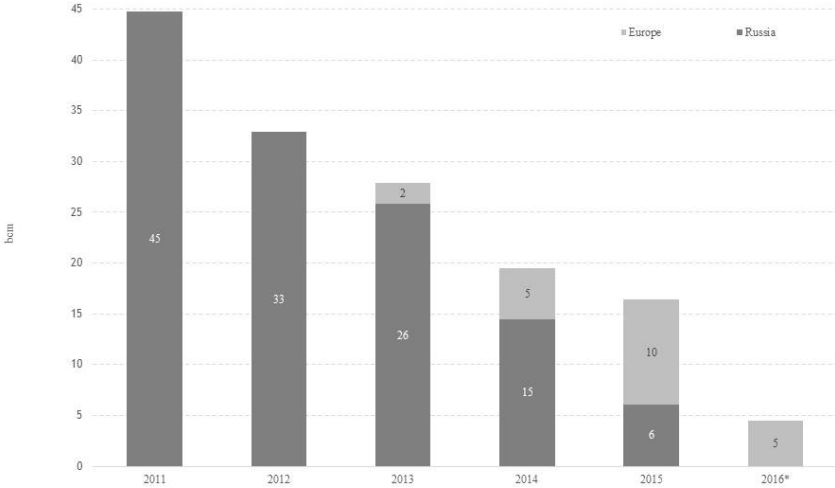


Source: Hecking et al., Options for Gas Supply Diversification for the EU and Germany in the next two Decades based on IEA Natural Gas Information 2016.

Between Belarus and Ukraine, the latter has posed significantly more pressing challenges to the EU in the past decade. On the one hand, this is due to the significantly higher transit volumes, with almost two thirds of Russian gas supplies to the EU flowing through Ukraine. On the other hand, the political instability in Ukraine as well as the on-going tensions between Russia and Ukraine have required significant attention from the perspective of EU supply security.[12]

12 European Commission. Gas stress test: Cooperation is key to cope with supply interruption. Bruxelles, 2014. Available at: http://europa.eu/rapid/press-release_IP-14-1162_en.htm [16.1.2017].

Figure 11: Origin of Ukrainian Gas Imports.



Source: Naftogaz. Natural Gas Supplies to Ukraine 2008-2016. 10.1.2017. Available at: http://naftogaz-europe.com/article/en/NaturalGasSuppliestoUkraine *[16.1.2017].*

**2016 comprises Q1-Q3*

In fact, in the past five years Ukrainian-Russian gas relations seem to have moved from strategic equilibrium to disequilibrium. In 2010, all Ukrainian gas imports came from Russia, thereby making up for the major part of Ukrainian gas needs, with the rest being supplied by a small share of indigenous production (see Figure 11). Russia, in turn, was dependent from Ukraine as its major gas export routes to the valuable European markets crossed this country's territory. Hence, both countries mutually depended on each other, and after the short spell of the transit disruption in January 2009 relatively quickly reached agreement on a new contractual settlement for gas transits.[13]

In 2016, however, this equilibrium has all but disappeared. On the one hand, Ukraine has halved gas consumption since 2007, partially because of the severe structural changes to its industrial base. Moreover, after the 2009 crisis new West-to-East interconnection capacities from the EU have

13 Pirani, Simon/Stern, Jonathan/Yafimava, Katja. The Russo-Ukrainian gas dispute of January 2009: a comprehensive assessment.The Oxford Institute for Energy Studies, NG 27, p. 31 ff.

been added, foremost Slovakia. In combination, these two developments mean that Ukraine has not imported any gas at all from Russia since the end of 2015.[14]

Whereas Ukraine has become more or less independent from Russia regarding gas supplies, Russia in turn remains dependent from Ukraine concerning its gas exports to Europe.

Although the completion of Nord Stream 1 in 2011 has added a direct link between Russia and the EU with an annual volume of 55 bcm (assuming a full use of OPAL on-shore capacities), Russia is still heavily dependent on using the Ukrainian transit capacity for its exports into the EU. Still, even combining the capacities of Nord Stream 1 and the Yamal-Pipeline system through Belarus would still require Russia to transport roughly 30 bcm through Ukraine at current export levels, and potentially even more if additional Russian gas supply is to replace some of the decline in EU indigenous production which are projected for the years to come.

Hence, while Ukraine basically has lost its dependence on Russia in terms of gas supply, Russia in contrast is currently still dependent on Ukraine as a transit country. Given the expiration of the current long-term shipping contract between Russia and Ukraine at the end of 2019, GAZPROM now is in a strategic disadvantage regarding the negotiation of a new shipping contract. This new imbalance leads to predictable implications: Ukraine being able to leverage its new-found relative power by imposing excessive transit fees,[15] Russia trying to break free by developing additional export infrastructure into the EU such as Nord Stream 2, South Stream, or, indirectly, TurkStream, all of them bypassing Ukraine. From these projects, Nord Stream 2 seems commercially the most viable option and likely to be built. However, completing Nord Stream 2 with the proposed capacity of an additional 55 bcm would basically remove the position of Ukraine as a transit country for Russian gas, including the significant transit income forming a cornerstone of Ukraine's state budget. Thus, Nord Stream 2 could contribute to a further destabilization of

14 Naftogaz. Naftogaz open letter: a year without gas imports from Russia. 25.11.2016. Available at: http://www.naftogaz.com/www/3/nakweben.nsf/0/371FE97DD813E51FC225807600517667?OpenDocument&year=2016&month=11&nt=News& [16.1.2017].

15 Hecking et al., Options for Gas Supply Diversification for the EU and Germany in the next Two Decades, pp. XIII ff.

Ukraine which is not in the interest of the EU. Therefore, the authorization of the Nord Stream 2-project as well as potential compensating measures towards Ukraine score high on the current energy political agenda.[16]

Given the strategic disequilibrium described above, taking into account the fact that Nord Stream is better positioned geographically for transporting gas from the Russian developments in the arctic, and considering the poor state of the Ukrainian transit system, it must be conjectured that Nord Stream 2 will most likely go ahead as planned. In addition, measures may be identified that protect Ukrainian interests for a limited amount of time, for example by fixing some minimum transit volume through Ukraine for a certain period of time.

4. EU Internal Market and Security of Supply

After the Ukrainian crisis in 2009, which came somewhat as a shock to policymakers throughout the EU, the EU's position relative to its suppliers of natural gas has steadily improved over the last years – in spite of a decline in indigenous production by almost 30 percent since 2010. Analyses conducted in the wake of the 2014 Ukrainian crisis indicate that the EU would be able to keep up its gas supply for several months – and with only moderate price increases – even if Russian gas supplies to the EU were fully curtailed.[17] In fact, a Russian gas embargo would be truly effective only if it lasted longer than a winter or summer season, thereby infringing on the EU's timely replenishment of its substantial underground storage capacities. As Russia herself critically depends on the revenues of her gas exports, it does not seem very likely that she would engage in such an embargo adventure.

Key prerequisite for achieving the enormous degree of resilience with respect to EU gas supply were significant additions to the physical gas infrastructure, improving especially the physical interconnection between

16 For a detailed discussion see e.g. Hecking et al., Options for Gas Supply Diversification for the EU and Germany in the next Two Decades, pp. XIII ff.

17 Martinez et al., The 2014 Ukrainian crisis: Europe's increased security position, pp. 11 ff. or Hecking, Harald/John, Christopher/Weiser, Florian. An Embargo of Russian Gas and Security of Supply in Europe. In: Zeitschrift für Energiewirtschaft, 2015, Vol. 39, No. 1, pp. 39-73. Few exceptions to this general statement hold for some regions in SEE, see below.

the various national markets. Particularly, new interconnectors from West to East have been constructed, and bidirectional flows have been enabled throughout SEE as well as between SEE and Turkey. Also, new gas storage facilities have been completed especially in Eastern Europe. Similar, new LNG facilities (e.g. Poland, Lithuania) add to the robust security of supply for the EU. It has to be noted, however, that low current gas demand and, as a consequence, a rather low utilization level of the EU's LNG import capacity (currently around 25%) are a big part of the explaining the limited vulnerability of the EU in terms of gas supply. Increasing gas demand or reduced indigenous production would bite away some of this resilience as long as no new import infrastructure from other suppliers than Russia were added.

On top of building physical infrastructure in the EU, the implementation if the 3rd energy package materializing in the gas target model and a set of network codes has provided additional support for further integrating EU gas markets and thus reducing dependence on single suppliers in certain national or regional markets. The emergence of liquid trading markets improves price signals and the allocation of gas across the EU and enables market entry of alternative suppliers, thus increasing potential competition in all of the member states.

Although significant process has been made, several countries in the Baltics and in SEE are not yet well integrated in the EU internal market. Therefore, they are still exposed to bargaining power, and, potentially, to threats of supply disruption.[18] In order to improve upon their situation, further additions to infrastructure connections are certainly needed, especially in West-East-direction within SEE. Moreover, the regulatory framework needs to be improved such that liquid trading hubs emerge in these regions. Finally, even if new interconnection capacities would be built, it is questionable if the current entry-exit system of fixed-cost representing network tariffs supports increased competition on Baltic and SEE gas markets. E.g., LNG imports from Western Europe are charged with significant additional transport costs to reach markets in Central Europe due to the entry-exit "pancaking". Hecking (2015) therefore discusses a reform of the tariff system for gas transport in order to foster competition.

18 Martinez et al., The 2014 Ukrainian crisis: Europe's increased security position, pp. 11 ff. or Hecking et al., An Embargo of Russian Gas and Security of Supply in Europe p. pp. 39-73.

5. Long-Term Outlook

Generally, Europe is geopolitically well-positioned as a gas consuming region. On top of still disposing of some significant indigenous gas resources, especially if taking unconventional resources such as shale gas into account, it is geographically close to several large gas reserves in Russia, Norway, the Caspian, the Middle East, and in Africa. Moreover, abundant shorelines imply that Europe can easily be integrated into the North Atlantic LNG trade. Hence, Europe can assume to be able to reliable source gas from a variety of sources and at relatively low cost for the foreseeable future, even if it will probably a persistent cost disadvantage with North America even with increasing LNG exports from the U.S. since shipping gas over the Atlantic incurs substantial transportation cost, and since pipeline gas is more expensive upon arriving in the EU than the US shale gas is within North America.[19]

However, the relatively favourable geographic position of the EU does not translate into a continuously stable and secure gas supply by itself. The snapshot of abundant import capacities relative to demand which render the European gas markets so resilient against external disruptions at present, cannot simply be projected into the future, especially as EU gas production will likely decline significantly over the next one or two decades, and gas demand might start to rise again with the EU economies rebounding and with increased efforts to reduce greenhouse gas emissions from oil and coal. Also, a decision by the French or other EU governments to rapidly reduce their exposure to nuclear energy, thus following the German example, would imply significant additional gas imports relative to current levels.[20]

In order to better understand the dynamics of the EU gas market, especially with a view towards changes in the supply mix and security of supply, long-term scenarios based on detailed numerical simulations can serve

19 See for example Henderson/Mitrova, The Political and Commercial Dynamics of Russia´s Gas Export Strategy, p. 44.

20 As an example, in late 2016, a series of outages in French nuclear facilities caused gas-fired power plants' generation to surge resulting in increased gas demand and imports. See for example ICIS. French nuclear crunch causes European CCGT gas demand surge. 1.11.2016. Available at: http://www.icis.com/resources/news/2016/11/01/10049689/french-nuclear-crunch-causes-european-ccgt-gas-demand-surge/ [16.1.2017].

to analyse potential developments.[21] Such simulation analyses do in deed suggest that in deed EU indigenous production will decrease; in the simulation cited here from 144 bcm in 2014 to around 85 bcm by the year 2035. This would represent a relatively sharp decline at an annual rate approximately –2.5%. Assuming a slight increase of demand (from 427 bcm in 2014 to roughly 473 bcm in 2035), this means that gas imports into the EU would have to increase from 283 bcm (2014) to around 388 bcm (2035), i.e. by more than a third. The challenge for securing such levels of imports is further compounded by the fact that Norwegian gas supply is projected to decrease by roughly 30-40 bcm since Norway is assumed not to be able to replace declining fields currently operationally with new fields in the Arctic on a cost competitive basis. Hence, the EU is projected to have to import roughly an additional 130-140 bcm from sources outside Europe.

While the model indicates no general difficulty for the EU to find such additional import volumes – given its advantageous geographical position described above[22] – it is highly uncertain at this point, how these volumes will be split among potential suppliers.

According to the numerical analysis, the key source of uncertainty about the future supply mix seems to be the role of Russia. At one extreme of the range of potential developments, Russia would not increase its supply to the EU at all, either because it strategically withholds gas volumes in order to drive up EU prices,[23] or because the EU shuns additional import infrastructure from Russia and Russia still decides not to use Ukrainian transit anymore.[24] In such a scenario, strongest increases in non-Euro-

21 The following analysis is taken from Hecking et al. (2016) who apply the global gas market model COLUMBUS developed by Hecking, Hecking/Panke, Timo. COLUMBUS – A global gas market model. Institute of Energy Economics at the University of Cologne, 2012 and applied earlier e.g. in Growitsch, Christian/Hecking, Harald/Panke, Timo. Supply disruptions and regional price effects in a spatial oligopoly – an application to the global gas market. EWI working paper No. 13/08, 2013.

22 See above, section 4.

23 The price effect of such behaviour would be relatively marginal, see Hecking et al., Options for Gas Supply Diversification for the EU and Germany in the next Two Decades, pp. 95 ff.

24 See above, section 3.

pean imports would stem from U.S. LNG (+59 bcm), other LNG (+63 bcm), as well as from the Southern Corridor (+32 bcm).[25]

By contrast, Russia would also be able to increase her exports to the EU by almost 50% up to more than 150 bcm. In this case, Russia would have to behave competitively, i.e. maximize export volumes to the EU market, and the corresponding import infrastructure needs to be available.[26] In particular, Nord Stream 2 would have to be built and would clearly be economical from the Russian perspective in such a scenario.[27] Then, the other suppliers would contribute less to meeting the growing EU import needs; most pronounced for US and other non-Qatari LNG, which thus appears to be the marginal supplier balancing alternative Russian supply side behaviour.

Note the important implication for the EU: Not allowing Nord Stream 2 (or alternative additional import infrastructure from Russia) to be constructed would restrict Russian gas exports to a level which would correspond to strategic behaviour by Russia with the corresponding price effects. This underlines the fact that Nord Stream 2 or any other such project does add further redundancy to the EU's import infrastructure thereby improving its strategic position relative to all suppliers.

In the context of this book, it is particularly interesting to note that the Southern Corridor, involving Turkey, is suggested to be developed in any scenario, but only at a relatively modest level. In the scenario results, combined LNG imports into Europe increase by 3-4 times as much as imports via the Southern Corridor, indicating the substantial economic (and political) challenges for infrastructure projects linking Caspian and Iranian gas supplies with the EU. In contrast, expanding LNG production, transport,

---

25 Note that across the range of scenario assumptions, pipeline supplies from North Africa are projected to decline by almost a half due to increasing domestic demand.

26 This would require either Nord Stream 2, a comparable new project, or the use of a refurbished Ukrainian transport infrastructure.

27 See Hecking et al., Options for Gas Supply Diversification for the EU and Germany in the next Two Decades. If Russia will not increase its exports to the EU, the simulation results would cast some doubts on the economic viability of Nord Stream 2. However, the model does not fully capture the reinvestment needs into the Ukrainian system, and the effects of Ukrainian strategic behaviour. Moreover, inner-Russian aspects such as the geographic location of new exploration is not included. Hence, Nord Stream 2 might be economical for Russia even with no or limited extension of Russian exports to the EU. See above, section 3.

and regasification in Europe appears to be economically (and politically) a much more viable, and thus likely, option. That a limited role will remain for the Southern Corridor can mostly be explained by providing additional supplies to those markets in South East Europe, which cannot so easily (and cheaply) be integrated into the global LNG market. When total gas demand in South Eastern Europe amounts to 30 and 35 bcm/a in 2035, 10 bcm from Southern Gas Corridor can make a substantial difference concerning competition in that region – while still being relatively insignificant on the overall European level.

In summary, economic analysis suggests that the capacity to import LNG volumes will be the crucial driver for EU's gas supply diversification rather than developing the Southern Gas Corridor. In terms of volumes LNG has a larger potential for the EU than gas from the landlocked gas reservoirs east of Turkey. Moreover, current LNG import capacities in the EU amount to over 200 bcm, many of them are well interconnected with the main centres of gas demand thanks to the vast gas infrastructure, and LNG can be purchased from global markets at price signals becoming more and more global. Also, the LNG supply side is expected to become less and less concentrated with many new players entering the market and large liquefaction capacities coming online in the next years such as in the US, Australia, Russia, and, potentially, Iran, now that the sanctions have been lifted. Hence, even although global price signals are not entirely risk-free[28] the development of a globally integrated market for LNG and the integration of Europe into this market is in the best interest of the EU. Potentially, the gas market might evolve as the oil market where liquid global markets provide such strong price signals that pipeline-based oil deliveries into the EU from Russia are necessarily be priced accordingly. Consequently, there is much less talk about an import dependency from Russia in oil than in gas, although the volumes are much bigger, and the shares not much different.[29]

28 Regional price crises can e.g. spill-over to the EU as seen in 2011, when global LNG prices soared in the aftermath of Fukushima, when Japan tremendously increased its LNG demand.

29 EUROSTAT (2016) puts the share of Russian oil imports into the EU at 30.6% (2014) and of Russian gas exports at 37.5% (2014). Total oil imports into the EU are roughly twice as large comparing their energy content.

6. Summary

An economic analysis of the EU's security of supply of natural gas needs to go beyond quantifying total share of imports and market shares of certain suppliers. While these data allow for a first grasp of the situation and for easy communication, they might also be gravely misleading. In fact, in turns out that potential competition is as important as actual, observed market results in assessing the relative bargaining powers of the parties, and thus the stakes for a producing country to abuse its supplier status for political means. This observation holds for the oil market, where using 'oil as a weapon' (to repeat a popular phrase) has gone out of fashion after its relatively unsuccessful first use during the 1973 Yom Kippur war. And, as has been discussed in this article, it is also true when assessing the EU market for natural gas.

Currently, the EU has access to substantial redundant infrastructure, in particular with respect to underutilized LNG and storage capacities. Therefore, the EU could withstand even prolonged supply disruptions by individual supplier countries with relative ease, except for some regions in the Baltics and SEE which are not yet fully integrated into the EU internal market. Going forward, utilization of infrastructure might tighten again with indigenous production in the EU falling and EU gas demand potentially rising. Scenario simulations indicate that expanding LNG import infrastructure would then be the first choice in restoring desired levels of supply security.

Also, contrary to public perception, Nord Stream 2 would actually support EU security of supply by adding even more redundant infrastructure and removing the hold-up-risk from Ukraine. However, the negative impacts of Nord Stream 2 on Ukraine as well as some inner EU-transit countries make for a heated debate where security of supply arguments are often evoked but not always with consistent logic.

The Southern Corridor through Turkey will become an additional route connecting gas supplies mainly in the Caspian and maybe Iran. It will likely be important for Turkey herself, depending on the speed of her economic development and the corresponding increase in energy demand, and as an additional transit route for South Eastern Europe, providing an alternative to the potentially decreasing volumes flowing through Ukraine and to the relatively long West-East transit route from the liquid NWE gas markets. From the perspective of total gas demand in the EU, however, the potential role of the Southern Corridor should not be overstated as its volumes will probably small relative to other sources of gas supply to Europe, in particular from LNG.