National Peculiarities

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Diversifying away from Russian Gas: The Case of Poland

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ABSTRACT. *Commercial and geopolitical realities drive Central and East European (CEE) countries to reduce dependence on Russian gas imports and enhance security of supply. While, in general, these countries are heavily dependent on Russian gas, they have different conditions, varying approaches towards dependence and security of supply, and thus give differing energy policy answers. Diversification is a means of reducing dependence and enhancing security of supply. There are many types of diversification. To understand this complexity and assess CEE countries, we have developed a scheme of different CEE diversification options for Russian gas imports. In this article, we analyse these options and achievements for one specific country, Poland, which seeks a level of diversification that would enable ending Russian gas imports. We find that since the January 2009 Russian–Ukrainian gas crisis, Poland has taken concrete action, and it has finally made huge progress in gas import source diversification. New pipeline and liquefied natural gas capacities could allow Poland to reach its goal, though the existing import portfolio still lacks a supply contract for Norwegian gas imports to be supplied through the yet-to-be-built Danish–Polish Baltic Pipe. Without these amounts, Russian supplies could be necessary, or at least Russian molecule supplies. In contrast, domestic gas production does not seem to provide a grounding for diversification. Albeit energy efficiency and conservation are significant opportunities, reducing total gas consumption is also not possible, mainly due to the movement away from coal. From this point of view, sectoral diversification has limited real relevance, as it can only limit further gas demand growth. With the termination of large-quantity long-term Russian gas supplies, transit di-*

versification will also bear less importance. Nevertheless, it remains to be seen whether the termination of Russian (long-term) gas supplies will actually serve security of supply, as diversification alone does not inevitably lead to achieving this goal.

KEY WORDS: *Poland, Russia, Central and Eastern Europe, natural gas, security of gas supply, gas diversification*

Introduction

The issue of gas imports tends to be very sensitive in Central and Eastern Europe (CEE). This sensitivity has even risen in some respects since the January 2009 Russian–Ukrainian gas crisis, as gas has acquired an increasingly bad image. Many aspects of both the commercial and geopolitical realities have worked against gas, though natural gas is the cleanest fossil fuel and a potential backup source for renewables (pointing to sustainability among the three dimensions of gas security), while also both the EU and national governments have taken measures to increase the security of gas supply (relating to its availability and affordability, i.e., the two other dimensions of gas security). In terms of commercial reality, it is worth mentioning the gas price competitiveness problem between 2011 and 2014 [*Stern* 2017, pp. 3–4], Gazprom's discriminating monopoly pricing [*Stern* 2015, p. 11], and Gazprom's other practices confirmed by the European Commission's Directorate-General for Competition (DG COMP) [Antitrust: Commission Imposes Binding Obligations 2018]. The geopolitical reality is associated with Russia's actions in Ukraine in 2014 and allegations related to the notion of "energy/gas weapon/diplomacy". While, in general, CEE countries are heavily dependent on Russian gas supplies, they have different conditions, varying approaches towards security of supply and dependence, and thus provide differing energy policy answers. Diversification is a means of enhancing security of supply and decreasing dependence. While diversification has become a buzzword in recent times, the concept requires some clarification, as there are many types of diversification, and the degree of complexity of CEE choices is high. To understand this complexity and assess CEE countries, we have developed a scheme of different CEE diversification options for Russian gas imports (*Figure 1*), allowing for cross-country comparisons. In this article, we analyse the possible diversification options and achievements for one specific country, Poland, which has made a passionate, if not obsessive, demand for diversification away from Russian gas, its dominant import source. We argue that decisions on gas diversification (and security of supply) are the consequences of choices made from among different security of supply dimensions (i.e., availability, affordability and sustainability). These choices should be made on the basis of such influencing factors as the following: (1) the energy perspective (the energy market supply/demand and price conditions); (2) the institutional context (the role of the EU); and (3) the government's approach towards dependence and its perceptions and expectations of threat, as well as its relations with Russia. Perceptions are very important when evaluating dependence. Poland has historically had bad relations with Russia, and maintains a securitized energy agenda based on fears of problems with the availability and affordability of Russian gas supplies. Naturally, bilateral relations vary greatly from government to government. However, with Jarosław Kaczyński's opposition Law and Justice (PiS) party winning the parliamentary elections in October 2015 (removing the ruling Civic Platform, PO, from power), the level of an-

ti-Russian sentiment has reached a level that has resulted in an energy policy aiming to eliminate all Russian gas molecules from its economy. Poland argues that this is necessary on grounds of security of gas supply. *Stern* terms this ideological stand as "ideological physicality" [*Jonathan Stern*, email communication, March 15, 2019]. On this agenda, a significant role is granted to the Polish state-owned gas sector enterprises – the natural gas transmission system operator (TSO) Gaz-System and Polish Gas and Oil Company PGNiG. The increasing politicization of the issue of Polish gas imports is also underlined by more intensive political cooperation on energy between the USA and Poland. Autumn 2018 saw a joint statement of the US and Polish presidents, a joint declaration of the energy ministries concerning enhanced cooperation on energy security and a memorandum of understanding on a Polish–US strategic dialogue on energy[1].

The article is structured as follows. Firstly, in *Section 2*, we present our diversification scheme, and then in *Section 3*, we apply it to Poland. Finally, *Section 4* provides a summary and some conclusions.

Methodology

Basically, diversification can be domestic or external. Possible domestic diversification options include increased internal gas production and reduced gas consumption. However, reduced gas consumption can also be achieved as external diversification. Other ways of external diversification comprise gas import source diversification and transit or route diversification. The aforementioned diversification options can be further broken down.

Domestic means of reducing gas demand include energy efficiency, energy conservation and sectoral diversification on the basis of fuels or energy produced domestically. Increasing gas prices affects all three options. Energy efficiency refers to using technologies that require less energy to perform the same function (e.g., using LED light bulbs, home insulation), while energy conservation means changing behaviours in order to use less energy (e.g., turning the lights off when leaving the room) [Energy Efficiency and Conservation 2018]. Sectoral diversification – also called fuel-mix, fuel-type or energy-source diversification – aims at reducing gas demand in a different way. It supports efforts to move away from gas in the energy/electricity/heat balance. In the case of domestic sectoral diversification, gas is substituted by domestically produced primary energy (e.g., domestic coal). In contrast, external sectoral diversification (i.e., sectoral diversification based on imported fuels or energy) not only involves the option of replacing gas with another imported primary energy (e.g., gas is substituted by imported coal or nuclear fuel), but also the possibility of imports of electricity, a secondary energy source, through which gas-powered electricity generation and thus gas consumption could also be reduced. However, if seen in the context of diversification away from Russia, then the sectoral diversification achievement is overshadowed by the fact that, for example, the coal imports are from Russia and the domestic nuclear power plant uses Russian technology or nuclear fuel, and is set up with Russian participation.

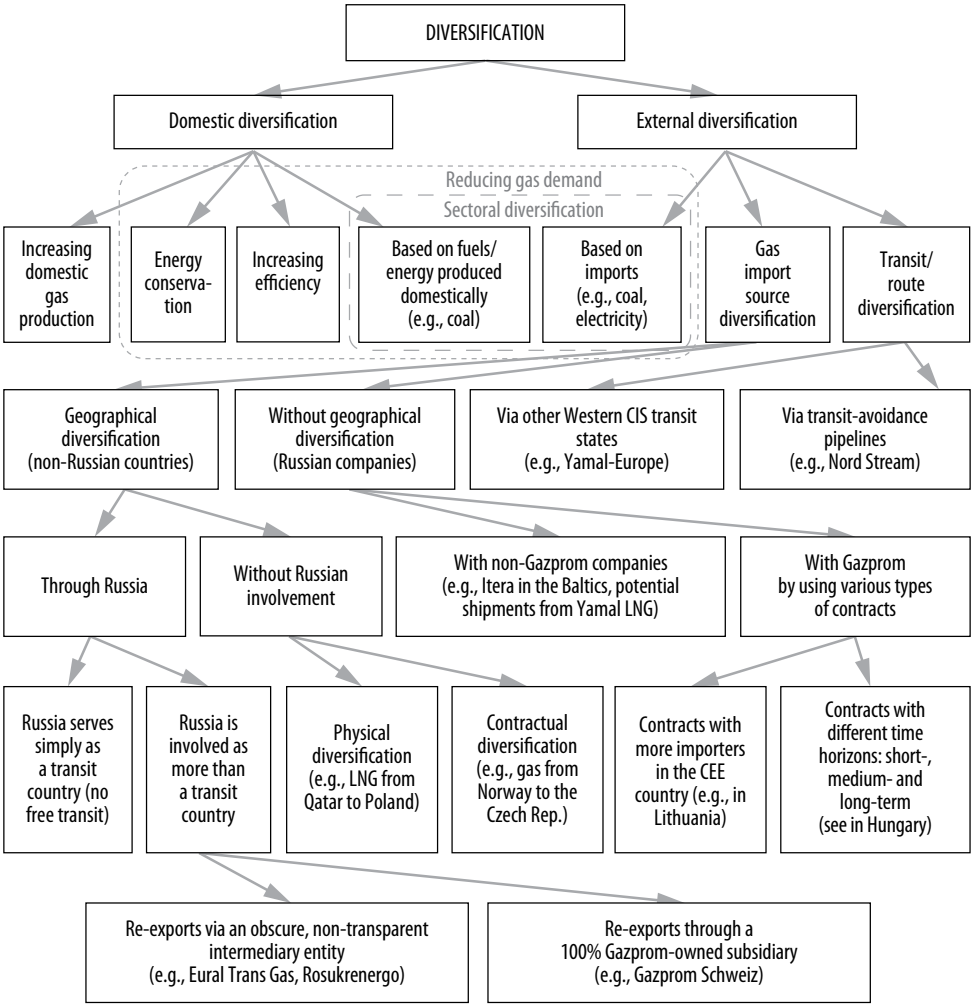
One type of external diversification is gas import source diversification, which may be realized with or without geographical diversification. The former refers to

1 We wish to thank an anonymous reviewer for bringing this issue to our attention.

other countries or regions and the latter to a more diverse contractual relationship with the actual exporting country, i.e., Russia.

Geographical diversification can work not only without but also with Russian involvement. Regarding geographical diversification without Russian involvement, purchasing gas from a non-Russian supplier can occur either through physical or contractual diversification. In the case of contractual diversification, as compared to physical diversification, under normal (i.e., non-emergency) conditions, typically gas of Russian origin is delivered, although physical delivery from a non-Russian seller is in principle also possible. If Russian gas is not physically available, for

Figure 1. Central and East European gas diversification scheme



Source: Own compilation, partly based on Balmaceda [Balmaceda 2008; Balmaceda 2013] and Stern [Stern 2002].

example during a Russian–Ukrainian gas crisis, the contracted volumes will be delivered from other gas sources[2]. This highlights that Russian gas plays an even greater role in CEE.

Physical diversification can also be ensured with Russian involvement. In this case, the transaction is arranged through Russia, either in such a way that Russia serves simply as a transit country or Russia is involved in the transaction as more than a transit country. The first case cannot work because no free transit is provided through Russia. Thus, CEE consumers are also unable to buy gas directly from Central Asia transited through Russia. Direct supplies to Ukraine were stopped at the end of 2005. In order to purchase Central Asian gas, transit diversification avoiding Russia is necessary. The second case for physical diversification with Russian involvement includes two methods. One special method was used until the end of 2008. Certain CEE countries bought gas from Central Asia through intermediary companies at a cheaper price than offered by Gazprom, Russia's state-controlled gas giant. This gas was transited through Russia, and Russians played different roles in the various available obscure ways of conducting these transactions. For example, gas was delivered through the controversial Russian–Ukrainian Rosukrenergo to Slovakia, Poland, Hungary and Romania. The second method is still operational and refers to re-exports through a wholly-owned subsidiary of Gazprom. Gazprom Schweiz AG (formerly ZMB Schweiz AG) re-exports Central Asian gas to CEE [*Weiner* 2016, p. 8][3].

Some sort of gas import source diversification could also be achieved without geographical diversification, either with non-Gazprom Russian sellers or with Gazprom. The first option is quite limited, and restricted to Itera's (former) activities in the Baltic states[4]. This is because, theoretically, buying piped gas from other Russian suppliers is not possible, as Gazprom holds almost exclusive rights to export pipeline gas from Russia. However, Gazprom's almost exclusive rights to export liquefied natural gas (LNG) were partially revoked at the end of 2013[5]. The second option for import source diversification without geographical diversification is when Gazprom has various types of contracts, either with more than one importer in the particular CEE country or with one importer but for different time horizons (short-, medium- and long-term). A few examples of the former can be found, but at most only one example of the latter is known in CEE[6].

Finally, there is transit or route diversification, which is generally supported by both CEE and Russia, but there are various views on how this should be implemented. Possible transit diversification options include other Western CIS[7] transit states

2 The term "contractual diversification" is used similarly to *Stern* [*Stern* 2002], but differently from *Balmaceda* [*Balmaceda* 2008; *Balmaceda* 2013]. According to *Balmaceda* [*Balmaceda* 2008; *Balmaceda* 2013], contractual diversification refers to a variety of contractual relationships, either in terms of companies or types of contracts (short-term, long-term, etc.) without geographical diversification.

3 Naturally, it is impossible to distinguish between the gas molecules originating from Central Asia and those from Russia.

4 Russia's independent gas producer Itera Oil and Gas Company was acquired by Russia's state-controlled Rosneft from Itera Holdings Limited (Cyprus). On the role of Itera, see *Weiner* [*Weiner* 2016, p. 61].

5 In theory (!), LNG from Yamal LNG, a non-Gazprom project in Russia, might also reach CEE. (As an anonymous reviewer has noted, the majority ownership of Yamal LNG is held by Novatek, in which Gazprom has an ownership stake.)

6 However, this is not a perfect example. The major Hungarian contract, which was to expire in 2015 but was instead extended, has been divided. Thus, two contracts are effective until 2019 and two until 2021 [20 Years of Reliable Russian Gas Supplies to Panrusgas 2016].

7 The 12 non-Baltic former Soviet republics still tend to be referred to as the countries of the Commonwealth of Independent States (CIS), though, currently, it is a regional organisation consisting of only ten post-Soviet republics, since Georgia and Ukraine are not members of the CIS.

and transit-avoidance undersea pipelines. Russia prefers diversification of its transit routes to Europe via undersea pipelines bypassing Ukraine, mainly in order to reduce risks associated with Russian–Ukrainian disputes.

Results and discussion

Poland is the seventh biggest gas consumer in the EU, with 16.0 billion cubic metres (bcm) consumed in 2016[8]. Gas production amounted to 4.2 bcm, while imports reached 13.9 bcm. Gas exports from Poland increased to 839.3 million cubic metres (mmcm) in 2016 [Report on the Results of Monitoring 2017, p. 29]. However, despite being a notable gas consumer, natural gas plays a minor role in Poland, though its share has grown over time. At end-2016, natural gas constituted 4 per cent of installed electricity generation capacity, whereas hard coal still accounted for 46 per cent, and lignite provided a further 23 per cent [*Szulc* 2017]. In 2016, natural gas was responsible for 4.7 per cent of electricity generation, compared to 0.9 per cent in 2001 and 0.1 per cent in the early 1990s. The share of solid fuels stood at 78.2 per cent in 2016, whilst 14.0 per cent of electricity generation was from renewables [Supply, Transformation and Consumption of Electricity (1) 2018]. Similarly, in 2016, natural gas provided only about 7 per cent of derived heat production. Solid fuels had more than 80 per cent, while less than 5 per cent of the generation of heat was from renewables [Supply, Transformation and Consumption of Electricity (2) 2018]. On the other hand, household gas consumption from the gas supply system constitutes roughly a quarter of Polish total gas consumption [Energy Management and Gas Supply System 2018].

Poland is still highly dependent on Russian gas supplies, but this has been changing recently. In 2016, 74.3 per cent (10.3 bcm) of the total gas imports (13.9 bcm) came from Russia. Supplies from Germany and the Czech Republic represented 18.2 per cent (2.5 bcm) and 0.04 per cent (4.9 mmcm), respectively. Due to the start of commercial LNG deliveries in June 2016, the share of gas from Qatar and Norway was 6.9 per cent (963.6 mmcm) and 0.6 per cent (78.4 mmcm), accordingly [Report on the Results of Monitoring 2017, p. 29][9].

Poland was the first country to receive Soviet gas in the mid-1940s. After the change of the regime, in the 1990s, Russian gas supplies were initially arranged according to the Yamburg and Orenburg agreements. These were replaced by the 1996 Yamal contract up to 2020 to supply Russian gas, which was related to the 1993 intergovernmental agreement and 1995 protocol to build the Polish section of the Yamal–Europe transit gas pipeline running from Russia to Germany across Belarus and Poland. The Yamal–Europe pipeline was commissioned in 1999 (see below). However, due to formerly overestimated gas demand in Poland, the Yamal contract was modified in 2003. It was extended until 2022, while annual import volumes were reduced. In contrast, Poland significantly increased its gas imports from Russia in 2009, after the early 2009 removal of the controversial Russian–Ukrainian intermediary company Rosukrenergo (also, see below). That year, Poland was the only country to increase its imports from

8 We do not have data in bcm for 2017. According to our calculations, gas consumption was close to 17 bcm in 2017 [Report on the Results of Monitoring 2018].

9 In 2017, the geographic distribution of imports was already somewhat different: 65.6 per cent – Russia, 22.5 per cent – Germany, 10.0 per cent – Qatar (LNG), 0.7 per cent – the Czech Republic, 0.6 per cent – the USA (LNG), and 0.6 per cent – Norway (LNG) [Report on the Results of Monitoring 2018].

Gazprom Export, Gazprom's export arm, and – at that – significantly so[10]. In 2010, Poland was Gazprom Export's fourth largest customer outside the former Soviet Union, ahead of France. While other countries worried about the excess gas volumes contracted, Poland was trying to adjust its negative gas balance in 2009–2010. After a short-term contract in 2009, it was only in October 2010 that an annex to the Yamal contract was signed, allowing for an increase in gas purchases. With this step, Gazprom's role in Poland's gas supplies increased. However, the contract was never actually renewed or extended until 2037 [*Weiner* 2013, pp. 7, 18–19]. Furthermore, PGNiG has decided not to extend the Yamal contract with Gazprom when it expires in 2022. Poland is to replace Russian gas mainly with that of Norway via a yet-to-be built pipeline and with LNG via the new LNG terminal.

High gas prices compared to Gazprom's other European buyers have been the subject of continuous disputes in Poland. PGNiG claims that it pays one of the highest prices in Europe for Russian gas [*Elliott, Easton* 2018]. In 2011, PGNiG turned to arbitration, while in 2012, PGNiG secured a deal with Gazprom. Again, in 2015, PGNiG filed a lawsuit against Gazprom over gas prices, which resulted in a partial award in favour of PGNiG in 2018, but Gazprom applied to a Swedish court to challenge the ruling. Poland was one of the Central and East European EU member states in which the European Commission investigated Gazprom's anti-competitive practices. It is broadly known that following inspections at the premises of concerned gas companies in these selected states in 2011, DG COMP opened formal proceedings against Gazprom in 2012 and, finally, issued a Statement of Objections in 2015. All of DG COMP's three main findings (preliminary view) referred to Poland. Firstly, DG COMP found that Gazprom imposed territorial restrictions (export bans, destination clauses and other measures) preventing gas exports. Secondly, these restrictions could have resulted in higher gas prices and allowed Gazprom to pursue an unfair pricing policy. Thirdly, Gazprom might have been leveraging its dominant market position by making gas supplies conditional on obtaining unrelated commitments concerning gas transport infrastructure. In Poland, gas supplies were made dependent on the acceptance of Gazprom reinforcing its control over the Yamal–Europe pipeline [*Stern, Yafimava* 2017, pp. 2–3]. In February 2017, Gazprom proposed commitments to address the European Commission's competition concerns, and in March 2017, the European Commission invited comments from all interested parties on these proposals. Finally, in May 2018, the European Commission adopted a decision imposing a set of binding obligations on Gazprom [Antitrust/Cartel Cases 2018]. Firstly, Gazprom must remove restrictions on customers to re-sell gas cross-border. Secondly, Gazprom has to facilitate gas flows to and from isolated markets by swaps, flexibility, as well as fixed and transparent service fees. Thirdly, Gazprom has to ensure competitive gas prices, reflecting competitive West European price benchmarks. Fourthly, regarding the Yamal–Europe pipeline, the European Commission found that the situation could not be changed through such an antitrust procedure, as gas relations between Russia and Poland are determined by intergovernmental agreements. Moreover, a May 2015 decision by the Polish Energy Regulatory Office did not confirm allegations that Gazprom would have fore-

10 Switzerland took roughly the same amount as in 2008 [*Weiner* 2013, p. 7].

closed the Polish gas market with regard to the Yamal–Europe pipeline, since its owner, Europolgaz, co-owned by Gazprom, was unable to delay or block investment on the pipeline (investment enabling reverse flows from Germany was also implemented) [Antitrust: Commission Imposes Binding Obligations 2018].

In the early 2010s, many believed that increasing domestic gas production, a means of domestic diversification, would be a real opportunity for Poland. In CEE, only Romania has a substantial gas production, but it is also not negligible in Poland. However, gas production in Poland is declining and approaching 4 billion cubic metres per annum (bcma). It accounts for barely a quarter of the Polish gas consumption [Report on the Results of Monitoring 2017, p. 29; Report on the Results of Monitoring 2018, p. 11]. Thus, the ratio of domestic gas production to consumption is also showing a decreasing trend as a result of the combination of declining production and increasing consumption.

Shale gas was regarded as a genuine prospect in Poland, but the hype of the early 2010s has proved to be an illusion. At that time, the Polish government expected to start commercial production of shale gas in late 2014 or early 2015. In its Golden Rules Case or best-case scenario, the International Energy Agency (IEA) predicted unconventional gas production in the EU would be led by Poland, starting in the mid-2010s [Golden Rules for a Golden Age of Gas 2012]. Poland wanted PGNiG to double its gas production with both conventional and unconventional gas by 2019 [Poland Wants to Double 2012]. In September 2011, Polish Prime Minister Donald Tusk believed Poland would basically be able to switch to using its own gas sources by 2035 [Poland to Start Commercial Shale Gas Production 2011]. However, so far all efforts have failed. Everything started with lower resource assessments than expected. By June 2017, concession holders had drilled 72 exploratory wells [Shale Gas Exploration Status 2017]. The geology showed the shale was not commercial, leading the foreign companies to pull out of the market [*Jonathan Stern*, email communication, March 15, 2019][11]. Regarding unconventional gas, the draft Polish Energy Policy until 2040, published in November 2018, expects progress on coalbed or coal seam methane[12]. It also assumes the use of biogas, particularly in combined heat and power generation [Energy Policy of Poland 2018, p. 10]. Additionally, recent developments in conventional natural gas exploration have positively impacted the domestic resource base [PGNiG: Breakthrough in Natural Gas Exploration 2018].

In Poland, there is room for reducing gas demand either through increasing efficiency or without increasing efficiency (energy conservation). Yet the significance of these ways of introducing domestic diversification tends to be underestimated. The 2017 National Energy Efficiency Action Plan, adopted in early 2018, claims that according to the forecasts of the Polish Ministry of Energy – which are, in fact, the 2013 forecasts of the Polish National Energy Conservation Agency included in the draft Energy Policy until 2050 – the Polish primary energy demand will remain stable at around 102–103 million tonnes of oil equivalent (mtoe) per

11 The difficult geological conditions were accompanied by regulatory challenges and lower oil prices. In 2010, *Gény* [*Gény* 2010] suggested that Polish projects would not be cost competitive with imports over the following decade.

12 Still, the 2009 Polish Energy Policy until 2030 is in effect. The first version of the draft Polish Energy Policy until 2050 was published in August 2014, while the last version dates to August 2015. However, the document was subsequently withdrawn by the new PiS government [Energy Policies of IEA Countries 2017, p. 24].

year until 2020, and then it is expected to decrease by about 15 per cent by 2050 [National Energy Efficiency Action Plan 2017]. At the same time, Poland's indicative national energy efficiency target for its primary energy demand in 2020, pursuant to the 2012 EU Energy Efficiency Directive aimed at helping the EU reach its 20 per cent energy efficiency target by 2020, amounts to 96.4 mtoe. This would require achieving economic development without increasing primary energy consumption (or with decreasing primary energy demand). In contrast, final energy consumption is well below 70 mtoe, while the national indicative target for 2020 is 71.6 mtoe, which leaves room for increases until 2020 [Energy Policies of IEA Countries 2017, pp. 47, 49].

In 2015, Poland's energy intensity was 16 per cent higher than Germany's or the IEA European average[13], but 6 per cent lower than that of Slovakia and 23 per cent lower than that of the Czech Republic [Energy Policies of IEA Countries 2017, pp. 47–48]. The Energy Policy until 2030 predicted a significant reduction in primary energy consumption per unit of GDP from around 89.4 tonne of oil equivalent (toe)/PLN million at 2007 prices in 2006 to approximately 33.0 toe/PLN million at 2007 prices in 2030. Consumption of electricity per GDP was expected to decline from 137.7 MWh/PLN million at 2007 prices in 2006 to 60.6 MWh/PLN million at 2007 prices in 2030. To put these numbers into context, the Energy Policy until 2030 declares that the energy efficiency of the Polish economy will only reach the 2005 EU15 average at the very end of the forecasted period [Forecast of Fuel and Energy Demand 2009, p. 17]. Forecasts prepared by the Polish National Energy Conservation Agency and presented as part of the draft Polish Energy Policy until 2050 indicate that the energy intensity of the Polish economy will decrease by about two-thirds over the period 2010–2050 [Conclusions from the Forecasting Analyses 2015].

In order to implement the 2012 EU Energy Efficiency Directive, Poland decided to choose the standard programme of 1.5 per cent annual final energy savings (compared to the average final energy consumption in the period 2010–2012) by energy distributors or retail energy sales companies from 2014 to 2020 (i.e., a total of 10.5 per cent) [National Energy Efficiency Action Plan 2014]. In May 2016, the Polish Parliament adopted a new Energy Efficiency Act, which replaced the 2011 Energy Efficiency Act. As of 2013, the 2011 Energy Efficiency Act introduced a system of energy efficiency certificates, so-called White Certificates, imposed on companies selling electricity, natural gas or heat to end users in Poland. This scheme is the key energy efficiency support mechanism in Poland [National Energy Efficiency Action Plan 2017]. However, there are many other ways of improving energy efficiency. *Wierzbowski et al.* [*Wierzbowski, Filipiak, Lyzwa* 2017, p. 60] mention the anticipated efficiency increase due to new highly efficient power generating units replacing older assets. It is also possible to reduce electricity grid losses, as current grid losses are above the EU average. In addition, improvements can be made to heat production and distribution. Combined heat and power generation should gradually replace heating boiler technology. District heating modernization or replacement and the better insulation of homes would also contribute to energy efficiency through the limitation of heat losses. Regarding this last aspect, up to 70 per cent of stand-

13 IEA Europe refers to the European member countries of the IEA.

alone houses in Poland (around 3.6 million) are insufficiently insulated [National Energy Efficiency Action Plan 2017]. Finally, the popularity of low-energy buildings and household appliances should also be increased [*Wierzbowski, Filipiak, Lyzwa* 2017, p. 60].

The diversification scheme indicates that a further option for reducing gas demand lies in sectoral diversification, either domestic or external. Nonetheless, because of the low share of natural gas in the energy/electricity/heat mix, but also due to energy market perspectives and environmental and climate directions, it is not a realistic goal to reduce gas consumption by sectoral diversification. Rather, it is only possible to limit the increase in gas demand. In this sense, sectoral diversification has limited relevance in Poland. Naturally, substitution of gas with coal cannot be taken into account, since the opposite scenario might be the main factor leading to an increase in gas demand. For this reason, among others, the intention exists to further raise the country's gasification level. The growing presence of renewables in the grid also requires more gas, allowing for more flexible balancing. Some increase will also be seen due to the use of gas in transport. In contrast, the situation is different in the case of domestic and imported biomass in electricity and heat production, which can be considered forms of domestic and external sectoral gas diversification, respectively. Likewise, nuclear energy and growing electricity imports can also act as external sectoral gas diversification. However, in all these cases, the question is which energy source would be substituted. Poland used to be a net electricity exporter, but, for the first time in 2014, and then in 2016 and 2017 (but not in 2015), it imported more electricity than it exported [Supply, Transformation and Consumption of Electricity (1) 2018]. Although the role of gas could witness an increase in electricity and heat production, it is questionable to what extent this will occur. The Polish Energy Policy until 2030 assumes that gas consumption will grow by 40 per cent from 14.5 bcm in 2006 to 17.1 bcm in 2020 (this is close to the actual figure for 2017) and 20.2 bcm in 2030, and the share of natural gas in net electricity production will rise from 3.1 per cent in 2006 to a still very low 6.6 per cent in 2030 [Forecast of Fuel and Energy Demand 2009, p. 15]. In contrast, the 2013 forecasts of the Polish National Energy Conservation Agency, presented as part of the draft Energy Policy until 2050, show a smaller increase in gas demand for the period up to 2050 (from 12.8 mtoe in 2010 to 15.2 mtoe in 2020 and 2030 and 15.5 mtoe in 2050) [Conclusions from the Forecasting Analyses 2015, p. 5]. *Honoré* [*Honoré* 2018] highlights that the role of renewables has increased much faster than that of gas in recent years, and believes that it is unlikely that natural gas will profit in the 2020s.

Geographical gas import source diversification implies both contractual relations for sale and purchase and the construction of the appropriate infrastructure. In Poland, a minimum level of diversification is required by legislation. In 2000, the maximum share of imported gas from one country of origin relative to the total volume of imported gas was set for each year until 2020: 88 per cent in 2001–2002, 78 per cent in 2003–2004, 72 per cent in 2005–2009, 70 per cent in 2010–2014, 59 per cent in 2015–2018 and 49 per cent in 2019–2020 [Journal of Laws of 2000]. The regulation applied to all wholesalers buying gas from abroad. However, these requirements raised doubts as to their compliance with EU law. In 2017, a new regulation was published to specify the maximum percentage share of gas imported from one country. Accordingly, it cannot exceed 70 per cent in 2017–2022 and 33 per cent in 2023–2026. The regulation contains a formula for calculating this share, and makes it possible for there to

Figure 2. Cross-border pipeline gas and LNG import capacity into Poland

1) Effective April 2016, the existing cross-border connections at Lasów, Gubin and Kamminke were replaced with a single point called GCP Gaz-System/Ontras (its capacity is 1.6 bcma).
2) The Yamal–Europe gas pipeline cross-border entry point.
3) The Yamal–Europe gas pipeline cross-border exit point and also entry point for physical and virtual reverse flows. There are some uncertainties about the volume of physical and virtual reverse flow capacity. A 2015 Gaz-System press release suggests that 8.2 bcma of virtual reverse flow capacity is available at Mallnow, including 5.5 bcma of firm capacity and 2.7 bcma of interruptible capacity [New Opportunities for Importing Natural Gas 2015], while data from the Energy Regulatory Office of Poland (URE) for 2017 indicate 6.1 bcma of firm capacity [Report on the Activities 2018, p. 148]. Nevertheless, for a selected day, Gaz-System's Information Exchange System for available daily transmission capacity shows similar firm technical capacity to what URE presents above, but it also offers very high total daily interruptible capacity (almost double of the firm technical capacity) [Information Exchange System 2019].
4) Yamal–Europe gas pipeline exit points (located) in Poland. The aggregation of these two physical points is called Point of Interconnection (PWP). Virtual (and also physical) reverse flow capacity can be limited by the PWP capacity [*Peters* 2018, p. 22], but currently this is not a constraint.

Note: According to our collected data, all the border crossings are indicated on the map (including pipelines of local significance; either for transmission or distribution). In parentheses, import capacity is indicated in bcma where data are available [Report on the Activities 2018, pp. 147–148; New Integrated Annual Report Gaz-System Group 2018, pp. 24–25].
Source: Own compilation.
Blank map: http://www.youreuropemap.com/

be exemptions from the obligation (e.g., for the LNG terminal in Świnoujście). It is notable that intra-EU purchases and supplies originating from the states of the European Free Trade Association (EFTA) and Switzerland are not defined as imports [The Minimum Level of Diversification 2017]. Until recently, Poland has mostly just talked about diversifying away from Russian gas supplies. Instead of costly investments in infrastructure and contractual relations, Poland has tended to emphasize solidarity as a means of concealing its own responsibility, while – as *Bartuška* [*Bartuška* 2008, p. 57] has aptly formulated – there can be no supply security without a willingness to pay for it. However, the question is how and at what cost security is achieved.

Poland required not only new cross-border infrastructure but also significant enhancement of its domestic pipeline network. Finally, in the 2010s, notable steps have been made to achieve diversification. Since 2016, Poland has been able to import non-Russian gas not only by pipeline but also as LNG. Via pipeline, Poland can buy gas from the east, west and south, but capacities are very limited at the southern and western borders. Some of the cross-border pipelines aim only to meet local needs and gas is not introduced into the transmission grid. Poland can physically receive gas through the following channels:

(1) from the east through Belarus (through two entry points from the Gazprom Transgaz Belarus network and two exit points from the Yamal–Europe gas pipeline) and from/through Ukraine (through two entry points);
(2) from the west from/through Germany (through four entry points); and
(3) from the south from/through the Czech Republic (through three entry points) (*Figure 2*).

Until the January 2009 Russian–Ukrainian gas crisis, only one interconnection worth mentioning had been built to receive gas from the non-eastern direction. This German–Polish interconnection with an entry point at Lasów has been used to import gas from Germany (still ongoing) and Norway (in the past). Recently, Poland's import possibilities from the non-eastern directions have been increased due to (1) a new interconnector with the Czech Republic (called STORK); (2) virtual reverse flow services on the Yamal–Europe gas pipeline; (3) capacity expansion at Lasów; and (4) the first LNG terminal. Without taking into account the virtual reverse flow service, more than 6 bcma of capacity has been added. These three (No. 1, 3 and 4) provide a total of 7 bcma of cross-border entry capacity into Poland (*Table 1*), compared to the almost 17 bcm of gas demand in 2017. However, if virtual reverse flow is also added to the above capacity, total non-eastern cross-border capacity will be much higher. Therefore, it is worth comparing the sum of the latter capacity and domestic gas production with annual gas demand.

Further pipeline plans or projects include (1) the Baltic Pipe, an interconnection between Denmark and Poland for transporting Norwegian gas; new (2) Polish–Ukrainian and (3) Polish–Czech (STORK II) interconnections; and the first (4) Polish–Slovakian and (5) Polish–Lithuanian (GIPL) interconnections. The main geographical source diversification project aiming to end Russian gas imports by 2022 is the Northern Gate project that includes the Baltic Pipe and the LNG terminal in Świnoujście. While the LNG plan has finally been realised, the Baltic Pipe still has to be constructed. Although the final investment decision was made in end-November 2018, and the project has strong Polish commitments, several issues still need to be elucidated. One such issue is the Norwegian resource

Table 1. New cross-border pipeline gas and LNG import capacity in Poland since the January 2009 Russian–Ukrainian gas crisis

	Capacity (bcma)	Year of putting into operational
Pipeline gas		
Czech–Polish interconnection (STORK)	0.5	2011
Virtual reverse flow service on the Yamal–Europe gas pipeline	8.2 (5.5 + 2.7)*	2011–2016
Capacity expansion of the German–Polish interconnection at Lasów	1.5 (from 0.9)	2012
LNG		
LNG terminal in Świnoujście	5 (3.7 mtpa)	2016**

Mtpa – million tonnes per annum. 1 mt of LNG = 1.36 bcm of natural gas.
* See Note 3) for Figure 2.
** Commercial supplies.
Source: Own compilation based on data from Gaz-System.

base, which is to fill the 10 bcma capacity of the pipeline [*Koblańska* 2018; *Elliott* 2018]. However, in addition to diversifying away from Russian gas, there are two other main reasons for this project. Firstly, it is related to Poland's presence on the Norwegian Continental Shelf, with plans to produce 2.5 bcm of gas (compared to about 550 mmcm in 2017) [*Borkowska* 2019]. Secondly, the pipeline might serve regional cooperation due to excess capacity and surplus supplies. Poland may perhaps become a gateway for gas supplies to neighbouring countries, such as Slovakia, the Czech Republic and possibly Ukraine [*Gawlikowska-Fyk, Godzimirski* 2017, p. 5; Baltic Pipe 2018]. In January 2018, PGNiG signed 15-year gas transmission contracts for the Baltic Pipe for 2022–2037. However, it has not made public how much of the pipeline's capacity it has booked. Previously, PGNiG said it would book almost all of it [UPDATE 1-Poland's PGNiG 2017][14].

Future LNG plans/projects include not only the expansion of the regasification capacity of the existing plant from 5 bcma to 7.5 bcma[15] and the construction of a second quay (enabling trans-shipment, bunkering and developing inland waterway navigation), but also a floating storage and regasification unit (FSRU) in the Gdańsk Bay (*Table 2*). Only with the launch of the Baltic Pipe would Poland be able to import 17 bcma of non-Russian gas, which is roughly equal to the 2017 gas demand. The virtual reverse flow on Yamal is added on top of the 17 bcma of capacity. Additionally, even this would be supplemented by (some of) the above-mentioned projects. As of early 2019, among these seven plans/projects, the Baltic Pipe and three other projects, the Polish–Slovakian and the Polish–Lithuanian interconnections, as well

14 *Stern* claims that all capacity has been booked by PGNiG [*Jonathan Stern*, email communication, March 15, 2019].
15 The draft Polish Energy Policy until 2040 aims at extending the capacity to 10 bcma by 2030 [Energy Policy of Poland 2018, p. 24].

as the LNG terminal expansion have final investment decisions.

The above projects have typically been supported by, or eligible for financial support from, the EU (e.g., as part of the European Energy Program for Recovery, the Connecting Europe Facility or other types of EU financial support). Further, both the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB) provided a loan to the Polish LNG terminal. Different types of financial support mechanisms also constitute an important part of the (EU) institutional context.

Nonetheless, as *Stern* argues, the problem is that interconnectors allow gas importers to get hold of non-Russian gas, while the question appears whether non-Russian gas will even be available (interview with Jonathan Stern in [*Simon* 2018]). Poland has been supplied by Germany and the Czech Republic since the 1990s[16]. The 1990s saw a stream of diversification announcements about bringing pipeline gas from Netherlands, Norway and Denmark. But despite negotiations and even at times signed contracts, only a small contract was implemented with Norway on the supply of a mere 0.5 bcma of gas for the period between 2000 and 2006 [*Stern* 2005, p. 116]. Russian gas was cheaper than Norwegian [PGNiG Signs Framework Deal 2006]. In 2018, PGNiG claimed that the cost of Norwegian gas would not be higher than the gas sold to Poland by Gazprom [*Elliott, Easton* 2018]. However, this expectation is difficult to meet. Rather, Poland will probably pay a very high price for

Table 2. Plans/projects to increase cross-border pipeline gas and LNG import capacity in Poland

	Entry capacity (bcma)	Exit capacity (bcma)	Status	Year of expected commissioning
Pipeline gas				
Polish–Ukrainian interconnection	5	5	non-FID	2022
Polish–Czech interconnection II (STORK II)	6.5	5	non-FID	2022
Polish–Slovakian interconnection	5.7	4.7	FID	2021
Polish–Lithuanian interconnection (GIPL)	1.7	2.4	FID	2021
Baltic Pipe (Danish–Polish interconnection)	10	3	FID	2022
LNG				
Expansion of the regasification capacity of LNG terminal in Świnoujście	7.5 (10*)		FID (non-FID)	2022 (2030*)
FSRU LNG in the Gdańsk Bay	4.1–8.1		non-FID	2021

FID – final investment decision.
* According to the draft Polish Energy Policy until 2040 [Energy Policy of Poland 2018, p. 24].
Source: Own compilation based on data from Gaz-System.

16 Import diversification is reflected as German (since 1993) and Czech imports (since 2012) in the IEA and Eurostat statistics [*Weiner* 2016, pp. 17–18].

Norwegian gas, partly because Norway is aware that Poland has no alternative to importing through the Baltic Pipe, and also partly because of the very expensive new infrastructure. Therefore, according to *Stern*, the obvious solution would be not to build the Baltic Pipe and simply to import gas through the Dutch/German network, but that would mean no guarantee that they would not actually be receiving Russian molecules, which would be against "ideological physicality" [*Jonathan Stern*, email communication, March 15, 2019].

As noted, Poland began receiving commercial LNG deliveries in June 2016. PGNiG has five long-term and one mid-term LNG supply contracts and it also buys gas on the spot market[17]:

- A long-term contract with Qatar's Qatargas was signed in 2009 for the supply of 1 mtpa of LNG for 20 years to be delivered as of 2014. The contract was amended in 2014 and 2015 to divert LNG supplies destined for Poland to other clients in 2015 and the first half of 2016 because of delays in the LNG facility's operation start-up time. However, in 2017, an agreement was reached to double volumes to 2 mtpa.
- In November 2017, a mid-term LNG supply contract was signed with the UK-based Centrica to receive nine LNG shipments which were to be sourced from the US Sabine Pass LNG Terminal between 2018 and 2022.
- In October 2018, long-term contracts were signed with two subsidiaries of Venture Global LNG, Venture Global Calcasieu Pass and Venture Global Plaquemines LNG, each for the purchase of 1 mtpa of LNG from the USA over 20 years. The initiation of the commercial operation of the two US LNG facilities from which the gas is to be supplied is expected in 2022 and 2023, respectively.
- In November 2018, a long-term contract was signed with Cheniere Marketing International for LNG supplies from the USA, with a total volume of 0.52 mt between 2019 and 2022, and 29 mt between 2023 and 2042. Starting from 2023, PGNiG will purchase about 1.45 mtpa of LNG.
- In December 2018, another 20-year contract was concluded for the purchase of 2 mtpa of LNG from US Port Arthur LNG, a Sempra Energy subsidiary, scheduled to start flowing in 2023 from an LNG facility currently in development.

Consequently, until 2018, the LNG portfolio consisted of long-term LNG supplies from Qatargas, mid-term LNG supplies from Centrica and spot purchases from Norway, the USA and Qatar. As of 2019, this will be supplemented by long-term LNG supplies from Cheniere. Long-term LNG deliveries from the two Venture Global LNG subsidiaries would enter the portfolio in 2022 and 2023, respectively, while Port Arthur LNG would be added in 2023. PGNiG data suggest that LNG purchases would equal around 3.5 bcm of natural gas following regasification in 2022, around 8 bcm in 2023, and roughly 10.5 bcma from 2024. Such LNG amounts cannot not be regasified, as the regasification capacity of the LNG facility will be expanded to only 7.5 bcma by 2022, and 10 bcma capacity might be reached only by 2030. However, PGNiG does not intend to unload such quantities either. The contracts with Qatargas, Centrica and Cheniere as well as the spot deliveries are on a delivered ex-ship (DES) ba-

17 All the following contractual data are derived from PGNiG's website.

sis, while the contracts with Venture Global Calcasieu Pass, Venture Global Plaquemines LNG and Port Arthur LNG should be carried out under free-on-board (FOB) terms. This means that whereas DES deliveries are dedicated to the Polish market, the FOB formula gives the opportunity for trade, which PGNiG will enact [Fiftieth LNG Cargo Arriving to Poland 2019].

Yet, as emphasized, availability is only one dimension of security of supply. There are serious questions about the price or affordability dimension of LNG supplies. "PGNiG agreed a contract with Qatar for one of the highest prices seen in any gas contract anywhere in the world" [*Jonathan Stern*, email communication, January 14, 2013]. A 2009 source stated that LNG supplies from Qatar might be 30-50 per cent more expensive than Russian gas [Gas Firm PGNiG Has Contract 2009], while another source from 2013, with precise numbers, suggested more than 50 per cent higher prices [*Vukmanovic, Barteczko* 2013]. However, low(er) oil prices experienced since the mid-2010s have contributed to a decrease in Qatari LNG prices. In 2015, a Polish expert even went as far as saying that Qatari LNG could be competitive when comparing with Russian gas import prices [*Denková* 2015]. Similarly, price-competitiveness problems are also encountered in US LNG imports due to opportunities to sell US LNG at higher prices in other markets outside Europe [*Koblańska* 2018]. Nevertheless, PGNiG has argued that the contract with Cheniere would most probably be over 20 per cent cheaper than pipeline gas from Russia [*Elliott, Easton* 2018]. The problem is that we do not know how this figure should be interpreted.

A further important problem regarding affordability is the lack of a competitive gas market in Poland because of the dominant market player belonging to the state, PGNiG. For competitive gas prices, Poland has to allow for many sellers and buyers, i.e., to open its gas market to competition (interview with Jonathan Stern in [*Koblańska* 2018]). *Peters* [*Peters* 2018] claims that like the Czech Republic, Poland could achieve price convergence with the North-West European traded markets, but instead it maintains barriers to free cross-border trade and free trade at the Polish wholesale market (the Polish gas hub, the Virtual Point Gaz-System or VPGS). In such a situation, security will come at a very high cost [*Jonathan Stern*, email communication, March 15, 2019]. Therefore, based on the current cross-border capacities and the benefits of integrated traded markets, *Peters* [*Peters* 2018], in agreement with *Stern*, questions the commercial sense of both the Baltic Pipe and the LNG terminal expansion. Using virtual reverse flow capacity on Yamal–Europe and adding capacity at interconnections can be achieved at a fraction of the cost [*Jonathan Stern*, email communication, April 3, 2019].

A certain type of diversification was achieved from the east by introducing gas imports from Ukraine's Naftogaz and from Central Asia through intermediary companies. Naftogaz was selling a very small quantity of gas to satisfy local needs under a long-term gas supply contract, signed in 2004 for the period until 2020, but Ukraine permanently suspended deliveries in 2010. Intermediary companies first included Eural Trans Gas, which was registered and operated in Hungary as an offshore business entity, and then the Swiss-based Russian–Ukrainian Rosukrenergo, which functioned until end-2008[18]. Contrary to the listed intermediaries, Gazprom's Gaz-

18 In fact, these were trilateral contracts. PGNiG, Naftogaz and Eural signed a contract in October 2003, while the contract between PGNiG, Naftogaz and Rosukrenergo was concluded in February 2005.

prom Schweiz, which re-exports Central Asian gas to CEE, is not present in Poland.

The final type of diversification is transit or route diversification. As indicated, Poland imports its Russian gas via diversified import routes. Poland would have had the possibility of further diversifying its transit options through the trans-Baltic Sea Nord Stream gas pipeline (between Russia and Germany) but it did not ask for that opportunity. The German government invited Poland to the Nord Stream project, but Warsaw refused. Wingas – then a Russian–German joint venture, now a wholly owned subsidiary of Gazprom – also offered to link the Polish gas grid to the OPAL gas pipeline, a European onshore connecting pipeline of Nord Stream, but Poland did not accept [*Cameron* 2007, p. 3]. Poland has shown strong opposition to Nord Stream. It argued unsuccessfully in favour of other plans, and projected catastrophic consequences. Likewise, Poland has also tried to block Nord Stream 2. Instead of building Nord Stream, Poland first supported Yamal–Europe 2 and then the idea of the Amber pipeline, with the latter planned as crossing EU countries, from Russia through Latvia, Lithuania and Poland to Germany[19]. However, Russia's goal was to circumvent (unreliable) transit states. Above all, Poland attacked Nord Stream on the grounds of its environmental consequences (a potential ecological disaster) [EP Rapporteur 2008]. Former Polish Defence Minister Radek Sikorski and others complained that Germany had not consulted with Poland before the decision was made on the pipeline, and considered the project to be President Putin's most outrageous attempt to divide the EU leading to economic and geopolitical disaster. They regarded Nord Stream as economically absurd, referring to the costs of constructing and financing the pipeline, future tariffs and Gazprom's growing dominance [*Cameron* 2007, p. 3]. They feared that with the construction of Nord Stream, Gazprom would turn off the gas tap to Poland without violating West European (German) interests. Fears were also expressed not only because of Poland becoming more vulnerable to blackmailing, but also due to a potential transit revenue drop[20]. While Gazprom's growing dominance could be a problem, and Nord Stream 2 could bring further negative consequences, the above accusations have so far not been confirmed.

Gas transit via Ukraine will continue to be necessary in sizeable volumes until Nord Stream 2 and the trans-Black Sea TurkStream (between Russia and Turkey) are launched. However, thanks to Nord Stream 2 and its European onshore connecting pipeline EUGAL, gas transit via the Ukrainian–Slovakian cross-border point is expected to fall considerably, while gas transit via Poland through the Yamal–Europe pipeline is likely to continue. On the other hand, the launch of TurkStream's first line will result in a substantial decline in gas transit via the Ukrainian–Romanian cross-border point due to the diversion of gas destined for Turkey to the Black Sea corridor away from Ukraine, Moldova, Romania and Bulgaria. Nonetheless, even though Ukraine will perform a smaller role, it will not be completely eliminated and it will remain an important player. The major issue is the commercial viability of maintaining a large gas transmission system with multiple exit points for

19 Previously, another plan was called Amber, a joint plan involving Poland's PGNiG, Denmark's DONG (now Ørsted) and Lithuania's Lietuvos Dujos (later merged into Lithuania's Energijos Skirstymo Operatorius), which would have delivered gas to Lithuania through Poland. However, other plans also exist that have been referred to as Amber.

20 In January 2008, Russian Foreign Minister Sergei Lavrov tried to assure Poland that Russia would not reduce transit through Poland [Nord Stream Will not Reduce 2008].

the delivery of relatively small annual volumes [*Sharples* 2018]. Currently, the majority of the spare capacity for Russian piped gas exports to Europe comes via Ukraine, and, as *Henderson* and *Sharples* [*Henderson, Sharples* 2018, p. 26] argue, the EU wants to protect the Ukrainian transit route not only for commercial but also for political reasons.

Summary and conclusions

The issue of gas is very sensitive in Poland, despite the small share of gas in the energy/electricity/heat mix. This sensitivity is derived from Russia's dominant role in gas imports, the still insufficient level of geographical diversification, and perceptions of Russia as a security risk. These geopolitical considerations have a crucial role in determining the Polish energy policy. Since the January 2009 Russian–Ukrainian gas crisis, Poland has taken action to diversify its gas supplies, and after many years of only speaking about diversification and solidarity, it has finally achieved results.

Whilst gas import source diversification has made huge progress, increasing domestic gas production and reducing total gas demand cannot be added to the diversification results. Domestic natural gas production seems not to provide a grounding for diversification, despite recent exploration results. Shale gas expectations have not been met. With shale gas, Poland aimed to eliminate dependence on Gazprom. Climate incentives (i.e., the need to replace coal) were not considered. After this option was discarded, there is some hope for coalbed methane, also an unconventional gas. In addition, biogas (biomethane) is supposed to play some role. Regarding reduced gas demand, albeit energy efficiency and energy conservation are significant opportunities, total gas consumption will increase mainly because of the movement away from coal. Similarly, sectoral diversification can only limit further gas demand growth. On the other hand, gas will be increasingly utilised as a flexible backup for renewable electricity and a certain increase is also expected in the use of gas in transport. Here, geopolitical factors again come into play when Poland raises fears of foreign technological reliance regarding renewables production [*Heinrich, Kusznir, Lis, Pleines, Smith Stegen, Szulecki* 2016, p. 2] and Russia could not be assigned a role in the case of nuclear energy.

Geopolitical aspects would lead Poland towards not prolonging its long-term gas supply contract with Russia. This decision comes in spite of the facts that (1) Russian gas is and will remain very important to Europe, (2) the role of gas is expected to increase in Poland, and (3) the institutional context given by the EU (the Third Energy Package, the antitrust procedure and other measures) increase security of supply through both the availability and affordability dimensions. Inevitably, new pipeline and LNG capacities, as well as further capacities planned to be commissioned by 2021 and 2022, could allow Poland to reach import source diversification and to import large amounts of non-Russian gas. Efforts are also under way to expand domestic gas pipelines and storage facilities, as the domestic network needs to be prepared for non-eastern imports. Recently, piped gas supplies from Germany and the Czech Republic have been supplemented with a large portfolio of LNG supplies, and Polish upstream activity abroad will be added to these supply sources. However, this portfolio still lacks a supply contract for Norwegian gas imports to be supplied through the Baltic Pipe. It is expected that sooner or later there will be (a) supply contract(s), but price can be a weak point in these negotiations. Without these amounts, Russian supplies could be necessary, though gas traded at European hubs will also be

available, possibly also with Russian molecules, and surely with such in the case of using virtual reverse flow through Yamal–Europe. Further, there could be difficulties with keeping the deadlines of the various diversification projects. However, the end of Russian long-term contract gas does not mean the definite end of Russian gas purchases, but the bargaining position could be worse when contracting for shorter terms and smaller amounts. The question arises whether the termination of Russian long-term gas supplies and even the elimination of all Russian gas molecules would really serve security of supply, as diversification alone does not inevitably lead to achieving this goal. The answer depends on the actual prioritisation of different dimensions of security of supply, taking into account various influencing factors. Poland has chosen potential higher gas prices backed by a solid availability dimension against the suspected high risk related to the availability and affordability of Russian gas supplies. Besides the energy perspective, the institutional context given by the EU and the geopolitical factor play very important roles among the influencing factors. In the past, energy market factors proved to be stronger, primarily due to prioritizing the affordability dimension, but recently, signs of a shift have started to appear due to "ideological physicality". However, the overemphasised role of the geopolitical factor may lead to suboptimal energy policy decisions. Poland likely could have achieved security of gas supply at least cost if it had accepted European traded market developments and had ignored where the molecules of gas originate from.

Finally, with the termination of large-quantity long-term Russian gas supplies, transit diversification will bear little relevance in the case of Poland. However, non-eastern cross-border pipeline capacities, either old or new, might also provide diversification to importing Russian gas, as opposed to questions regarding long-term import possibilities through the Ukrainian corridor.

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