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THE ENERGY SECURITY CHALLENGE IN
CENTRAL AND EASTERN EUROPE

DRAFT REPORT*

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* Until this document has been adopted by the Economics and Security Committee, it represents only the views of the Rapporteur.

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I. INTRODUCTION

1. Broadly defined, energy security is a condition linking the capacity of a country to sustain its vital national interests with the availability of energy resources needed to fulfil that fundamental national mission. In general terms, in a country enjoying a high degree of security, the flow of energy will be uninterrupted and affordable. Increasingly, the definition includes broader considerations such as environmental sustainability and the capacity of the system to respond with flexibility to sudden imbalances between energy supply and demand. It also, of course, factors in more traditional security considerations and in this manner, it ought to gauge the resilience of the energy system as a whole in the face of possible external attack from direct military operations or emerging forms of offensive operations such as cyberattacks.

2. The global energy outlook has evolved substantially over the last decade, and the countries of Central and Eastern Europe have been swept up in these changes. It is first important to note that Central and Eastern Europe dependence on Russian gas was a legacy of Cold War industrial and commercial organisation and a pipeline infrastructure that survived both the fall of the Berlin Wall and the integration into Euro-Atlantic institutions of some of the countries of the region. That legacy infrastructure accorded Russian companies a powerful position in those energy markets and a company such as Gazprom was positioned to impose long-term contracts on clients that had few other immediate energy options. Over time, the cost of this dependence grew more apparent particularly in the wake of two Russian-Ukrainian energy disputes in 2006 and 2009 that led to supply disruptions in several European countries. Russia's illegal annexation of Crimea and its aggression in Eastern Ukraine have further exposed this set of vulnerabilities.

3. Those seminal events were a wakeup call for Europe and helped raise awareness of the hazards of overdependence on a single supplier. These supply disruptions did not occur in a political vacuum. They were also related to the emergence of a more assertive Russia with a clear set of grievances about the European security and political order. Russia's energy endowments provided it with a powerful lever to express this dissent. It did not have to use this lever often to demonstrate its potential power. Indeed, Russia has generally been a reliable supplier of energy to the continent, in part, because oil and gas exports are its most important source of income. But this made the events of 2006 and 2009 all the more shocking as they seemed to imply that when Russia was willing to sacrifice its commercial reputation for geopolitical purposes.

4. One of the primary upshots of those Russian generated shocks has been a major European push to diversify energy supplies in order to reduce dependence on Russia. It inspired the European Commission to investigate opaque pricing of Russia's gas monopoly and certainly factored in to the drafting of the EU's Third Energy Package that has sought to liberalise Europe's energy sector, challenge Russia's monopolistic commodity pricing and build resilience and new linkages into the energy infrastructure networks of Europe that would make it easier to move energy in multiple directions should Russia again cut off or threaten to cut off gas. The European Commission has also demanded more transparency, openness and competition in European oil, gas and electricity markets simply because the lack of competition and opaque decision making has given Russia greater leeway to use its energy weapon.

5. Europe now has clarified a set of long-term goals to diversify the sources of gas used on the continent, to expand the use of renewable energy, increase energy efficiency, and to develop a European super grid that would help Europe as a whole tap into solar power from the south and wind power from the north. The latter would require the development of smart grids at local distribution points that would help reduce peaks in electricity demand (White, 2015).

6. Building greater energy security in Europe demands broad multifarious approaches across a range of sectors. The EU's so-called Energy Union incorporates a number of sectors including energy, research and innovation, transport, foreign policy, regional and neighbourhood policy, environment, trade and agriculture in a comprehensive package to ensure a higher degree of European energy security while achieving its climate targets. The EU makes greater inter-connectivity of gas and electricity grids a central goal and sees this as a key vehicle for lowering dependence on Russian gas and encouraging a diversification of energy sources including an important transition into renewables. It also seeks to ensure greater energy efficiency and a fair deal for energy consumers. By 2020 the goal is to reduce greenhouse gas emissions by 20%, increase the share of renewable energy in the energy mix to 20%, bolster efficiency by 20%, and achieve an interconnection level of 10%. By 2030 these figures rise to a 40% reduction of greenhouse gas emission, an increase to 27% of the energy mix from renewable energy, a 30% increase in energy efficiency and an interconnection level of 15%.

7. Progress has been made on many of these fronts. In 2015, for example, renewable use saved an estimated EUR 16 billion in fossil fuel imports and in 2016 statistics demonstrated that while the European economy grew, greenhouse emissions fell except in the transport sector (Third Report on the State of the Energy Union).

8. Energy security in Central and Eastern Europe is thus shaped by a multiplicity of factors, some of which seem distant or not entirely consequential in regional terms. The massive expansion of the oil and gas sectors in North America, for example, is having a profound impact on energy markets in Europe even if, for example, US oil is not shipped directly to Europe. But the so-called fracking revolution has propelled the United States into a new role as the world's "swing producer". This has essentially helped place a ceiling on global oil prices and is also having an impact on gas prices even if Liquefied Natural Gas (LNG) is generally more expensive than shipping natural gas by pipeline. Of course, evolving prices depend on a number of factors, including production efficiency and falling extraction costs. In any case, if oil and gas prices rise quickly, US production, including non-conventional energy like hydro-fracked gas and oil, will also increase and these new markets are helping to check price rises.

9. The US gas and oil sector has indeed made very significant efficiency gains due to technological advances in hydro-fracking and also due to a recent market shake-out when world prices fell. OPEC had expected those price falls to drive many small American producers out of business. A shake-out did occur, but those firms that survived these price falls emerged significantly stronger and more competitive. Highly efficient oil and gas production in the US market means that shale gas and oil are flowing into the market at lower prices than many had originally imagined. The United States has now surpassed Saudi Arabia as the world's largest oil producer and is second only to Russia. US gas production is also soaring. While 15 years ago, the expectation was that US imports of gas would rise inexorably, it is now exporting gas through several LNG terminals originally designed to receive gas and now refitted to export it. Several new ports are under construction and significant exports of LNG from Louisiana and Texas have helped create a gas glut that has exercised strong downward pressure on gas prices around the world. The US entry into this market will have a long-term impact on world markets and has the potential to help weaken Russia's market power in Europe if European and American policy makers chose to support this trend. Low gas prices are also helping it to replace coal as a fuel for powering electricity generation in some European countries and this is consistent with announced carbon reduction goals (Kraussot, 2017).

10. Although gas is traditionally a segmented local market due to the limits imposed by existing pipeline infrastructure, the emergence of a vibrant and growing LNG business and new port and

pipeline infrastructure both in gas exporting and importing countries has made LNG increasingly a globally arbitrated and more fungible commodity. In other words, gas prices can no longer be set in local markets alone, particularly when new LNG producers develop the capacity to move gas to distant markets. Lithuania's new LNG reception facility in Klaipeda, for example, has helped that country dramatically reduce its dependence on Russian gas and should help weaken Russia's capacity to set prices in that region. The Lithuanian facilities have a total storage capacity of 170,000 m³, one jetty and a gasification capacity of 4 billion cubic metres. For its part, Poland opened the Świnoujście LNG terminal in 2015. Its initial regasification capacity is 5 billion cubic metres per annum, and with the construction of the third tank its capacity is due to expand to 7.5 billion cubic metres per annum, which would help it meet roughly 50% of its annual gas demand. These kinds of projects are clearly of great strategic value to the region and lower Russian market leverage and, by extension, the Kremlin's potential capacity to leverage that economic weight for non-commercial ends.

11. Russia, in turn, has had no choice but to respond to these changes. It is no longer positioned to impose long-term fixed price contracts on its clients. Its clients have other options at hand and while Russian gas remains important and relatively cheap, there are now market forces that compel it to be more accommodating to its clients. As long as Russia's clients have other options, its leverage will be limited. This is precisely why so many Eastern European countries are concerned about the North Stream 2 project (see below). Europe's leverage has also increased with the construction of more two-way pipelines that allow gas to be moved in two directions rather than in a unidirectional fashion. This means that countries on those flexible lines know that they have other options should energy supplies be cut in one direction.

II. VULNERABILITIES

12. Central and Eastern Europe confront two potential energy vulnerabilities: the need for secure provision and inadequate infrastructure to ensure that supply. Often these vulnerabilities are linked, for example, when existing infrastructure configurations translate into undesirable levels of energy dependence on any single supplier, particularly when that supplier is inclined to exploit that leverage diplomatically. Indeed, when considering energy security in Central and Eastern Europe, one must specifically take into account how Russia has deployed its energy endowments as an instrument of national power. Imported Russian gas has undoubtedly sustained domestic consumption in Eastern Europe. But the costs of overreliance on Russian energy is potentially substantial as it leaves those countries vulnerable to political suasion.

13. Concerns about this vulnerability have led to a push for energy supply diversification. Thus, a country such as Lithuania, which until recently met all of its gas needs with imports from Russia, has made a concerted effort to diversify its sources of energy. The LNG facility in Klaipeda allows Lithuania to source gas from suppliers around the world. Although LNG was typically more expensive than Russian gas, the difference in price might be considered a security premium that many countries might judge well worth paying. Moreover, as suggested above, the price of LNG has fallen as the supply grows. Finally, it should be noted that importing LNG from countries like Qatar and the United States does not exclude purchasing energy from Russia. It simply means that there are other options on the table should supply disruptions ever take place.

14. It is also important to consider ownership patterns when assessing the security component of energy use. In many countries, energy firms take on the character of monopolistic or oligopolistic firms with all the problems and inefficiencies those structures generate. These include price setting

behaviour, resistance to innovation, predatory behaviour toward potential competitors and the exercise of untoward and ultimately undemocratic political influence. If national security in the West is about defending democratic values, all of these behaviours might constitute a threat and there are cases where national energy giants promote policies that could be seen as undermining national security interests, although often these positions are advocated as a kind of defence of national security.

15. Gazprom is Russia's largest energy-exporting company. The Russian state had purchased more than 50% of the company's shares by 2005 (BBC, 17 May 2005 and Moore, 2005). Since then, Gazprom has shouldered the dual mission of generating profits for its shareholder and serving the broader strategic interests of the Kremlin. It alone contributes roughly 13% of the state budget. It is thus burdened with functions that transcend Western notions of profit maximization and normal corporate responsibility. Not surprisingly, the two missions are not always easily accommodated, particularly as potential clients and partners need to factor in the potential that Gazprom might be instrumentalised for the Kremlin's purposes. This adds a degree of risk to doing business with that company and other Russian energy firms (Polak, 2017). It is also important to consider that these firms generate huge revenues for the Russian state, which, in turn, can be used to help underwrite an array of state-led activities that are antithetical to Western interest including election interference in Western countries, provocative military deployments, cyberattacks, underwriting the occupation of Crimea and conducting the war in Eastern Ukraine.

16. Indeed, since 2005, Russia has visibly deployed its energy resources to achieve political and strategic ambitions as defined by the Kremlin. Russian energy revenues, for example, directly financed pro-Russian foreign leaders like Viktor Yanukovich in Ukraine and Belorussia's Alexander Lukashenko and help underwrite national election campaigns in both countries in the mid-2000s. Such funding is strategically consequential and obviously generated a kind of political debt to the Kremlin. While Viktor Yanukovich is no longer in power in Ukraine, Alexander Lukashenko continues to dominate Belarusian politics and has essentially made his country a Russian protectorate.

17. Russia has also deployed its energy power in less apparent ways even in Western countries, for example, providing gas preferential rates with the expectation that the political elite in recipient countries will adopt more accommodating positions with regard to Russia even in times of diplomatic tension. This dynamic probably shaped the approach of several Western countries that opposed strong sanctions against Russia following the Crimea invasion (Reuters, 2014). Although Russian gas endowments have proven a particularly powerful source of political and diplomatic leverage, Russia's significant holdings of nuclear fuel might also be seen as a source of potential leverages. It is a primary provider of natural uranium to Finland, Bulgaria, the Czech Republic, Slovakia, and Hungary (Buchan, 2014). It also gains potential leverage through its electrical grid system upon which several Western or Western-oriented countries still rely.

18. Possible cyber-attacks on sophisticated grids moving renewable energy pose another set of challenges, although this is an issue of concern for all energy industries. But as distribution networks grow "smarter" and more sophisticated, as they must do to make renewable energy a viable pillar of Western energy strategy, they will become ever more vulnerable to cyberattacks. Indeed, they may be particularly vulnerable not only as they require highly sophisticated industrial control systems, advanced distribution networks and advanced storage solutions, but also because they pose a direct threat to Russia insofar as they lower its market and diplomatic leverage over the West. Wind farms are linked by highly sophisticated control systems that often tie into a single computer, many of which are designed for efficiency and not for security as such.

19. In 2013, for example, hackers infected an array of renewable energy facilities and undermined critical control systems. In Ukraine malware struck a control system of an electricity distribution network, leaving nearly a quarter of a million customers without power (Ruhle and Trakimavicius, 2017). US officials recently revealed that malware of Russian origin has recently been discovered in a range of US power plants. The FBI characterised the attack as “a multi-stage intrusion campaign by Russian government cyber actors who targeted small commercial facilities’ networks where they staged malware, conducted spear phishing and gained remote access into energy sector networks” (Borger, 2018). These systems need to be built with both efficiency and security in mind otherwise they become vulnerable to attacks with potentially devastating and life-threatening consequences.

20. It is also important to consider traditional military threats to critical infrastructure including power plants, pipelines, and energy storage facilities. These threats could be both from traditional military forces or from terrorist actors that tend to focus on asymmetrical tactics in which single attacks can have wide spread and significant impacts. Although NATO members are responsible for protecting critical infrastructure, cooperation within the Alliance and with partner countries is essential for intelligence sharing about potential threats, crisis response and management, cooperative security training and sorting through collective defence implications. NATO has been dealing with this challenge in its Civil-Military Planning and Support Section and has worked on enhancing resilience, preparedness, response and recovery, the exchange of information, training and exercise

III. NORD STREAM 2



21. Construction of the offshore natural gas Nord Stream pipeline, known today as Nord Stream 1, was started in 2006 and completed in 2011. The 1,222km, line begins in Vyborg in Russia, runs to Greifswald in Germany, and is owned and operated by Nord Stream AG of which Gazprom holds 51% of the shares. It has an annual capacity of 55 billion cubic metres and if the follow-on Nord Stream 2 project is carried out, its capacity would double to 110 billion cubic metres by 2019. As a result of current EU restrictions on Gazprom, however, only 22.5 billion cubic metres of Nord Stream’s capacity is currently used, and this has raised questions about the viability of Nord Stream 2 in addition to strong strategic concerns harboured by a number of NATO member countries.

22. Indeed, the controversial Nord Stream 2 project is an energy project with very apparent national security implications, although how affected countries judge the programme obviously varies considerably. The proposed pipeline would run alongside the existing pipeline and would be

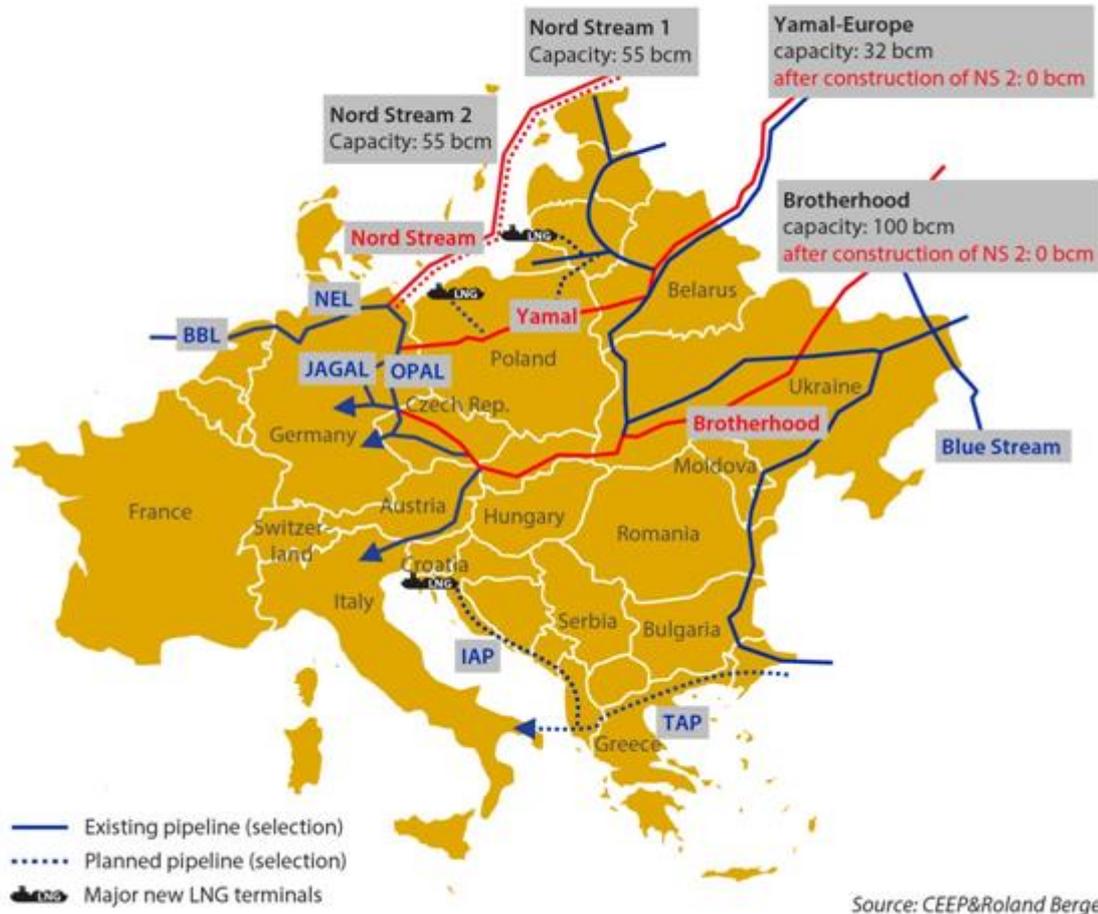
operational by 2020. The cost of the 1,200 km (746 mile) pipeline has been estimated at EUR 9.5 billion (USD 10.3 billion) and construction is scheduled to begin this year (Deutsche Welle, 2018).

23. The controversial Nord Stream 2 pipeline project has illustrated how energy security calculations are now shaping investment decisions in Europe and how divisive these are becoming. The President of the European Council, Donald Tusk has stated that the pipeline is not in Europe's interest and nine EU member governments have claimed that the proposed pipelines violate EU rules that prohibit gas companies from owning delivery infrastructure. Moreover, they argue, the pipeline would not be made available to other suppliers. That project would allow Russia to bypass Ukraine and ship gas directly to Western Europe. This prospect has triggered serious and high-stakes infighting among European states, specifically sadly pitting a number of Central and Eastern Europe (mainly Poland, Hungary, Romania, Slovakia, Bulgaria, the Czech Republic, and the Baltic states), which perceive this particular project as part of a Russian divide and conquer strategy, and Germany, which has characterised the arrangement more in economic terms. The fact that the project has fomented such discord among Allied states, however, can already be understood as a win for the Kremlin, even though the pipeline has not yet been built. Undermining Western solidarity, of course, remains a primary strategic ambition of the Kremlin, and Russian sponsored energy projects have proven a remarkably effective way for it to achieve these ends.

24. Proponents of the project in Germany sees it as bolstering national energy security insofar as it will provide direct access to plentiful and cheap Russian gas and eliminate the possibility that Russian-Ukrainian tensions might affect its own energy supplies (a significant share of Russian gas is now shipped to Europe across Ukraine). Several Central and Eastern European countries as well as Sweden, Denmark and the European Commission, however, argue that the project diminishes energy security by making the European Union, and particularly its largest gas importer Germany, more dependent on Gazprom for gas supplies and concentrating the delivery of up to 80% of imported gas through one pipeline. It also undermines European solidarity by pitting German energy policy against the security interests of the Baltic and Nordic states and Poland, all of which strongly oppose the project. Ukraine is also naturally opposed to a pipeline that would bypass its own pipeline infrastructure and thus deprive it of a critical source of national economy.

25. The European Commission has also raised serious questions about Nord Stream 2. The European Commission's Vice President for Energy Union, Maros Sefcovic, for example, has argued that "creating a well-diversified and competitive gas market is a priority of the EU's energy security and Energy Union strategy [...] NS2 does not contribute to the Energy Union's objectives. If the pipeline is nevertheless built, the least we have to do is to make sure that it will be operated transparently and in line with the main EU energy market rules" (Global Risk Insights, 2017).

Figure 5. Pipelines in danger of being cut off after the construction of Nord Stream 2



26. The Commission argues that the proposed pipeline violates current European energy rules as outlined in the Third Energy Package. Those rules forbid energy companies from holding majority-shares in both supply and distribution assets. Moreover, competitors must also have access to those pipelines as a way to thwart the emergence of monopolistic and oligopolistic suppliers. German authorities have rejected this interpretation and claim that the proposed project complies with current EU law. In fact, there has been a legal void on rules governing pipelines from outside of the Union, and last year the Commission asked the Council for a mandate to close this loophole. In a subsequent proposed amendment, the Commission called for the equal application of the Third Energy Package's rules to all pipelines, including NS2, so that the following conditions would have to be met: ownership unbundling (requiring pipelines not be owned directly by gas suppliers); non-discriminatory tariffs; third party access; and transparency (European Commission Press Release, 2017).

27. More broadly, the Commission wants a more competitive, open and integrated energy market operating entirely under EU rules with these rules applying to all gas pipelines to and from third countries. Those pipelines should be subject to the same rules and the same degree of transparency. The Commission is seeking to eliminate conflicts of interest between infrastructure operators and gas suppliers, and it wants guarantees that tariff setting will be non-discriminatory. Ideally, Europe would negotiate as a block on gas prices and prevent suppliers from pursuing divide and conquer strategies. However, it also conceded to grant existing cross border pipelines certain derogations from the application on the Directive on a case by case basis, if such derogations are not detrimental

to competition or security of supply. According to many independent observers, however, the proposed Nord Stream 2 project currently does not meet these criteria as it is majority-owned by the supplier Gazprom and because it is not an existing pipeline it does not appear to qualify for these derogations.

28. Concerns about the project are not only European. In meetings in Warsaw this past January, then US Secretary of State Rex Tillerson characterised the proposed pipeline as a threat to Europe's security interest (Reuters, 2018). The United States Congress has also expressed concerns about the Nord Stream 2 project and specifically included pipelines projects in sanctions passed last year. These sanctions were related formally to the Russian invasion of Crimea but they were also doubtlessly shaped by concerns about Russian interference in US elections. The bill signed by President Donald Trump leaves the decision to apply these sanctions to the President and requires that he do so in consultation with European allies. This too constitutes a rather large loophole. In any case, the sanctions, if implemented, would apply to those who invest in the construction of Russian energy pipelines. Some supporters of the project have charged that the US is simply opposing a project that would threaten its own future exports of LNG to Europe. But that hardly appears to have been a factor in US political deliberations and most market analysts believe that the greatest potential market for American LNG is Asia not Europe, although it undoubtedly will be shipping more to Europe in the future as its own LNG capacity increases (Gawlikowska-Fyk and Wiśniewski, 2017). In any case, there is now a vehicle in place for the United States to impose punishing financial sanctions on companies involved with the project. Poland's Prime Minister, Mateusz Morawiecki, recently called on the United States to impose these sanctions.

29. The issue has become particularly delicate in German politics and was the subject of tough discussions in the run up to formation of the new governing coalition there. Some in Germany have cast the issue as pitting those wanting cheap energy against those supporting solidarity with more vulnerable Allies in the Baltic states. Denmark has also decided that it will make approval of any energy pipeline projects contingent not only on standard criteria for such projects, but also based on a national security assessment. Denmark alone would not be able to put a stop to the proposed project although it could block the pipeline from running through its territorial waters.

IV. OLD INFRASTRUCTURE IN CENTRAL AND EASTERN EUROPE

30. It is hard to generalise about Central and Eastern European energy markets as they differ in size and energy mix. Poland and the Czech Republic rely heavily on coal, Hungary uses a high percentage of nuclear power and Slovakia is more balanced. All import significant though varying amounts of gas although the degree of dependence on Russian gas varies considerably throughout the region. Estonia and Romania import very little of their total energy use due to oil and gas reserves while Slovakia and Hungary need to import 60% of their energy. Lithuania is the worst off in this regard as 78% of its domestic demand is met with imports (CEEP, 2016).

31. Deficiencies in Central and Eastern Europe's energy infrastructure have exacerbated strategic energy vulnerabilities in Europe. The lack of interconnecting links, north-south connections and two-way pipelines has been a particularly acute problem. Three of the four major pipelines in Europe flow East to West: Brotherhood (Russia-Ukraine-Slovakia-the Czech Republic with subsections from Ukraine to Hungary), Yamal-Europe (Russia-Belarus-Poland-Germany) and Trans-Balkan pipeline (Russia-Ukraine-the Republic of Moldova-Romania-Bulgaria). Central and Eastern Europe also lack sufficient gas storage facilities beyond those in Ukraine and there is no important gas hub for trading gas—something that further inhibits competition. Although a number of steps have been taken to

address the challenge in recent years, problems persist. There are, for example, no connecting lines between Poland and Slovakia or Poland and Lithuania, and several connections still flow in only one direction such as the pipelines between Croatia and Hungary or Romania and Hungary (CEEP, 2016). The Baltic states remain relatively isolated although Lithuania will build a gas link to Poland. Poland has introduced reverse flows on the Yamal pipeline linking it to Germany that would allow it to bring gas from Germany if needed. It is also championing the Northern Gate project that would bring 10 BCMA of Norwegian gas to Poland and other Central European and Baltic countries by 2022 if it goes ahead (Gotev, 2016). This would provide a secure alternative to Russian gas from Nord Stream. The Czechs and Slovaks have also introduced reverse flows on the Brotherhood pipeline while Hungary has built new connections with Croatia, Romania and Slovakia. Slovakia is pushing for the so-called Eastwing pipeline to link it to Hungary, Romania and Bulgaria, which would link Western gas hubs to the Balkans (CEEP, 2016). In the event of disruptions to gas supplied from Russia, two-way pipelines would add far greater resilience to the system by allowing partner countries to ship gas to countries undergoing supply shocks.

Figure 4. Gas pipelines in the CEE region



32. Energy infrastructure problems are not limited to the gas sector and some do not directly involve matters related to dependency on Russia. A number of electricity grids in Central and Eastern Europe are old and outdated, cannot cope with renewable energy and suffer uncontrolled loop flows. The Baltic region, for example, is still linked to the IPS/UPS electrical power grid power system inherited from the Soviet Union (CEEP, 2016). This has led to a problem of overcharging during times of high electricity usage, which heightens the risk of blackouts as far away as in Poland and

the Czech Republic. There are plans to make this system synchronous with the Continental European system (European Network of Transmission System Operators for Electricity, ENTSO-E) although investments will be needed to make this link-up feasible. Full integration is a priority for the Baltic states, which are not comfortable relying on the IPS/UPS system that includes both the Russian and Belarusian electricity grids. Partial remedies were achieved through Estlink 1 and 2 that linked Estonia to the Finnish grid, the LitPol link between Lithuania and Poland and the Nord Balt line between Sweden and Lithuania (Joint Research Centre). Lithuania is also deeply concerned about a huge nuclear power plant the Russians are building in Belarus 50 km from Vilnius that fails to meet basic IEA standards and that the Lithuanian government fears represents an effort by the Russians to dominate the region's electrical market for both economic and strategic purposes. Alexander Lukashenko essentially confirmed this when he referred to the nuclear plant as “a fishbone in the throats of the European Union and the Baltic states” that they wouldn't be able to remove. Russia's Rosatom plans to build 19 new reactors around the world, including in Hungary, Finland, and Turkey (Standish).



Electrical Connections in the Baltic Region

33. Latvia used its Presidency of the European Union to advocate for more grid connections and to build a genuine single European energy market. The goal was to make energy suppliers more secure and member countries less dependent on Russia. In practical terms this meant setting a goal to integrate the Baltics into the European Network by 2025. It is worth noting that Russia has been a reliable energy supplier in the region and the costs of leaving the IPS/UPS system, in which Russia controls frequencies and balances the grid, will cost billions of euros. The links between Lithuania and Poland, and Sweden and Lithuania provide some resilience but do not resolve the fundamental electricity vulnerabilities of the region (White, 2015).

V. ADAPTING TO THE NEW CLIMATE AGENDA

34. The climate change agenda offers both challenges and opportunities to Central and Eastern European countries. Global climate change represents a key strategic challenge to Europe and concern about this man-made phenomenon is already shaping interactions among allies and trading partners (Raines and Tomlinson, 2016). Although there are areas in which immediate energy security ambitions are clashing with longer term climate goals—the use of domestically produced brown coal comes to mind here—there are also areas of overlap (Buchan, 2014).

35. The growing share of renewables in the overall energy mix provides an illustration of the latter case. Indeed, one of the most attractive elements of emerging renewable energy technologies is not only that renewable energy is relatively clean, but also that these energy sources can lower energy dependence on energy-supplying countries that are either unstable or actively engaged in efforts to destabilise the international order. Just as with the explosive rise of the LNG industry, linked in part to growth of hydrofracking in North America, has created a new globally fungible energy commodity capable of undercutting Russia's oligopolistic control of Central and Eastern European gas markets, so too is an ever more efficient renewable energy industry contributing to energy security in Europe. Over the past decade, renewable energy has risen from 15% to 30% of the electricity mix in the EU (Ruhle and Trakimavicius, 2017).

36. As is the case with rising LNG use, however, significant investments are needed to increase the share of renewables in the broader energy mix. Change in traditional mindsets is also required as there remains a great deal of scepticism about these technologies even as profits in the industry begin to soar. Germany and Denmark have both made large investments in renewable energy, and recently Germany achieved a milestone when, for a brief period of time, all of its electricity needs were met by renewable energy (NATO PA Mission Report Abu Dhabi [020 JOINT 18 E]).

37. A joint Dutch and German project to support renewable capacities through cross-border auctions reveals how sophisticated this market is becoming and the degree to which it is now subject to normal market price setting that is helping it to register serious efficiency gains. During one of the cross-border auctions for photovoltaic (PV) solar energy tenders, for example, PV tenders sold for record low prices. Wind power prices are also falling rapidly and growing increasingly competitive with traditional fuels for generating electricity. But serious bottlenecks remain including the enduring problem of intermittency—in other words—coping with those periods when there is little wind or sun to power generators. Until that problem is resolved, and it likely will not be anytime soon, traditional energy sources will be required to backstop electricity networks. This obviously comes at a cost as it demands that legacy systems remain on line even if the returns on investment in these systems plunge due to plentiful and ever cheaper renewables.

38. The challenge for Central and Eastern Europe is not so much technological as it is the sheer costs of transitioning the economy to deploy these technologies. Renewable energy cannot simply be run through existing energy infrastructure and requires significant investment in new and smarter grids to move energy from windmills and solar farms to regions where insufficient power is being generated at any given moment. Even off-grid solutions, including home-generated power, require investment and regulatory reform. There are clear financial roadblocks to transitioning to these major systems as well as strong political resistance from legacy energy firms and national monopolies that stand to lose from this kind of paradigmatic change.

39. That said, if diversification is understood to contribute to energy security by reducing dependence on any single supplier, renewables will represent a key and ever more important element of that solution. Even if renewable energy prices are higher than carbon-based fuels—and their price is rapidly falling—there is nonetheless a security premium embedded in that price. In other words, there are environmental and security benefits linked to the use of these energy sources over carbon-based fuels that are not fully reflected in their price. This is one reason many governments have elected to subsidize renewable energy use and they have done so to facilitate the transition from so called 19th century carbon-based energy to 21st century renewables. This is no small undertaking. The transition will be both very expensive and complex and will require critical public/private partnerships and investments to drive the industry forward. The potential security benefits are likely significant.

40. One could argue that there are also security benefits linked to the use of domestically produced coal, and this is an argument heard in several Central and Eastern European countries that currently produce coal and rely on its use. This is undoubtedly true insofar as domestic coal use can reduce dependence on Russian gas or Middle Eastern oil. But coal's future is problematic given its rather dire environmental consequences. Although it will continue to be used, short of a breakthrough in dealing with the carbon emissions problem of coal use, its real costs may be prohibitively high for it to endure as a viable energy option for much of the region. This, however, is not a view shared in all EU countries and there is dissent from Poland, which is well-endowed with brown coal, the use of which it sees as critical to its own energy security.

VI. CORRUPTION, ENERGY AND THE ENERGY SECURITY CHALLENGE

41. Energy markets and the incomes they generate have long been both a source and target of corruption. Significant rents generated by the industry, the persistence of politically protected monopolies and oligopolies in the sector and the important role played by states create a welter of opportunities for those who would use those levers for self-dealing or for broader political purposes—all to the great disadvantage of energy consumers and public well-being. As a general rule, the less transparency and competition in the sector, the more opportunities there will be for corruption. Those with access to the generation and distribution of energy and related industries are best positioned to monetize this access through corrupt practices and can also translate this access to broader political leverage (Ruth, 2002). Given the size and importance of the energy sector, when it is corrupted or used for influence peddling, it can have broad systemic implications with significant spill-over effects on the international system.

42. There are myriad cases of corruption in Eastern and Central European states linked to the energy sector. Not surprisingly many of these involve Russian companies and so-called middle men controlling prices and access to energy commodities (Åslund, 2010). The problem, of course, is not limited to Central and Eastern Europe and there are ample cases of energy industry driven corruption in Western Europe and North America for that matter (Kupchinsky, 2009).

43. The corruption-energy nexus is particularly threatening to weak states and to those transitioning to democratic and market norms (Dempsey, 2013). Weak states are more vulnerable to penetration by external actors with significant resources and driven by a focused agenda. There have been myriad instances of corrupt relations between Gazprom and local oligarchs in Europe who have essentially been paid kickbacks in exchange for supporting favourable energy deals with Russian firms. These practices long made it difficult to subject the energy sector to normal democratic scrutiny, and they provided a key source of leverage to Russia in the domestic affairs of a number of European states. Moreover, this kind of corruption undermines open competition and limits investments in countries that need to attract foreign capital and stand to benefit from more open competition. Corruption has also slowed the evolution of the energy sector in many countries, reduced competitiveness and raised costs to consumers and energy dependent business alike. Bribery and kickbacks also undermine the rule of law and public faith in democratic institutions and practices. There are countless incidents of Russian interference in the energy sectors of Ukraine, Lithuania, Hungary, Poland, Slovakia, Bulgaria and in the Western Balkans (Dempsey, 2013). There are important cases of conflict of interest and ethical matters in which politically linked Westerners earn millions by pushing projects that actually weaken Western security. The risk here is that such lobbying, which has been apparent in some of NATO's leading countries, subverts the integrity of the democratic process and undermines faith in political systems that are so easily penetrated by

actors whose intention is actually to undermine Western security and increase the vulnerability of Alliance members and partners (BBC, 2017).

VII. THE UKRAINE CASE

44. Energy corruption in Ukraine has been strategically consequential and terribly detrimental to the country and its citizens. Ukraine's energy sector is rife with vulnerabilities. It is one of Europe's least energy efficient countries and is two to three times as energy intensive as neighbouring Poland and Slovakia. Although part of the problem relates to the legacy structures and practices of the Soviet Union, poor governance, political instability, corruption and conflict with Russia have all complicated efforts to address these structural problems. The energy sector accounts for 12.6% of GNP, but its costs are very high, and this engenders a misallocation of resources that would be far better invested in other industries. In this sense, the energy sector in Ukraine is as much an albatross as it is a generator of economic activity. It is in dire need of reform but political instability, a very poor regulatory system, corruption, war and isolation have all complicated that country's energy transition—although some important reforms have been undertaken.

45. The Maidan Revolution, the Russian occupation of Crimea and the War in Eastern Ukraine are all factors in the country's energy profile. After the Crimean invasion, Russia ended discounts on gas sold to Ukraine, which had once been used to compensate Ukraine for the use of the Russian naval base in Sevastopol. It also ended coal deliveries from Donbas, which is now occupied by pro-Russian militia. These changes constituted a shock to Ukraine's energy sector and have led to important changes including price liberalisation. But there are real gaps between what needs to happen and what has transpired. At a time when international support is essential, the poor governance climate in Ukraine has driven away large international energy companies that might have helped it develop its domestic gas industry which has the potential to meet all the country's gas needs. As a result, the sector remains underinvested, its gas fields are underexploited and its governance structures inadequate to the needs of the country.

46. Ukraine's gas sector accounts for 30% of primary energy consumption and it is the country's most important energy business. It hosts vital pipelines linking Russian gas to European markets. As mentioned above new pipelines bypassing Ukraine threaten this business particularly, although Ukraine also has gas endowment itself. But poor regulation created opportunities for corruption in which oligarchs essentially purchased compliance from corrupt politicians. In this environment, reforming the antiquated gas industry in the country proved very difficult. Disputes with Russia in 2006 and 2009 led Russia to cut shipment through Ukraine's pipelines—a standoff that had severe consequences for several other European countries.

47. That dispute inspired Ukraine to join the Energy Community of East and South East European countries working to adopt the EU's energy market legislation—although this has proven particularly daunting in Ukraine's case given the power of those vested in the status quo. It also began to push for reverse flows of gas from Poland, Slovakia and Hungary to reduce its dependence on Russian gas. Whereas in 2013 Russia was the only supplier of gas imported into Ukraine, today Ukraine imports no gas from Russia. The introduction of reverse flow pipelines from Slovakia in 2014 allowed Ukraine to import gas from other supplies and production of its own gas rose and now meets three-fifths of national consumption. The country has a relatively large shale gas endowment but its capacity to exploit those reserves is very limited and the war with Russia imposes a high-risk premium for foreign companies. Ukraine is focusing on developing its conventional gas capacities. Both the IMF and the EU have strongly encouraged Ukraine to restructure this behemoth to introduce

a modicum of competition in what are essentially rigged markets. Political resistance to these changes has been fierce as Naftogaz has become something of a cash cow for parts of the political class and oligarchs with a vested interest in the status quo. Currently, this state-owned company simply does not meet international standards of transparency, efficiency and accountability. It contains within it myriad conflicts of interest that impede reform and ultimately inflict heavy costs on Ukrainian taxpayers and energy consumers. But the political system at large also pays a price given the degree to which this company is at the centre of an array of murky dealings that undermine public faith in the rule of law.

48. Naftogaz has also been engaged in a long dispute with the Russian state firm Gazprom over previous contracts and distribution and transit issues. The ongoing case has held up restructuring Naftogaz or at least it has provided a convenient excuse to delay these reforms. Russia clearly sees the Nord Stream 2 project as a way to circumnavigate this legal dispute while, in the larger sense, punishing Ukraine for its broader resistance to Russia's regional ambitions. If Nord Stream 2 is built, Ukraine stands to lose EUR 2 billion a year in transit revenues (Antonenko and Nitsovych, 2018). Ukraine thus has an interest in settling the dispute with Russia and reforming its energy industry governance structures so that it operates in a significantly more transparent and honest fashion and in a manner that fully meets European governance standards.

49. Ukraine has managed to reduce gas consumption from 50.4 bcm in 2013 to 33.3 bcm in 2016 although this reduction is largely linked to the economic crisis and the fact that it has lost control of a large portion of its industrial base in the Donbas region now controlled by pro-Russian militia groups. After an agreement with the IMF, the government has also significantly reduced energy subsidies. Significantly higher prices have naturally triggered both a reduction of consumption and efforts to increase energy savings both at the household and municipal levels. It has also led to a degree of government savings as the state-owned gas company, Naftogaz, was subsidizing Russian gas for Ukrainian consumers. More vulnerable citizens have benefitted from direct cash support to help pay for energy for home heating and cooking. This is not the most effective support system in terms of encouraging energy savings. The government, at least, has passed a law that will require all households to have heat and hot water meters which will provide critical information to consumers seeking to save money and energy. It will also embark on a building modernisation programme to introduce greater energy efficiency in the country's building stock. All of this is essential but not sufficient as the government still spends more on wasted energy than on efficiency measures (Antonenko et. al., 2018).

50. Ukraine is one of the largest consumers of electricity in Europe. Many of its plants using anthracite coal are in the war zones of the East but most of its capacity is in thermal power (24.5 Gw of Ukraine's total power generation of 55.3 Gw). Nuclear power accounts for 13.8 Gw, hydro 5.9 Gw and renewables only 0.9 Gw. Problems of pricing, security, access to raw materials and low investment plague the industry. Coal-burning plants long relied on anthracite coal from the eastern regions of Donetsk and Luhansk, but shipments of that coal have stopped, and Ukraine has relied on imports from Russia. The government now intends to convert anthracite burning plants to lower grade bituminous coal use to lower this dependence.

51. The country's electricity infrastructure is aging and not up to European standards. Integration with Europe's grid would require huge investments and demands for the country to meet European environmental standards.

52. Ukraine's current stock of power generating plants will soon have to be replaced. The government intends to expand the number of nuclear power plants in the country and is seeking to

diversify supplies of nuclear fuels to make it less dependent on Russian sources. It also has ambitions to raise the share of renewable energy in the national energy mix to 11% by 2020. But this will demand large investments at a time when the budget is extremely tight. Ukraine's transmission lines are among the least reliable in Europe and are responsible for the loss of as much as 12% of generated electricity—a figure that is more than twice as high as the OECD average (Antonenko et al., 2018). Although the European Bank for Reconstruction and Development (EBRD) has helped finance system upgrades, it is estimated that some EUR 5.1 billion more investment is needed. This will be essential if Ukraine is ever to integrate into the European grid as the government has indicated it hopes to do by 2035 (Logatskiy, 2017).

53. In 2017 the government adopted a new Electricity Market Law that will be operative in 2019. It will introduce more open competition in electricity markets including the freedom to buy and sell electricity, greater choice for consumers and third-party access to the grids. The goal has been to break up existing monopoly and monopsony power through greater competition. This is clearly a move in the right direction but there is strong entrenched resistance to such reforms even though Ukraine's system is in deep crisis and riddled with debt. The government continues to resist the idea of privatisation of key energy assets and this leads to a degree of pessimism as to how far the current reform effort can go.

VIII. SOUTH EASTERN EUROPE

54. South Eastern Europe faces many of the same problems as Central and Eastern Europe. It too is relatively dependent on Russian gas, is plagued by aging infrastructure and a lack of interconnections and two-way pipelines. The Trans-Adriatic Pipeline (TAP), which will bring Azeri gas from its Shah Deniz II field to Southern Europe, is part of a proposed grand Southern Gas Corridor (SGC) which is seen as one potential remedy to the rigidly structured gas markets of the region. The SGC includes the Shah Deniz II gas field in Azerbaijan, the South Caucasus Pipeline extension (Azerbaijan-Georgia), the Trans-Anatolian Pipeline through Turkey (TANAP) and the TAP. This broad project is seen as a far better option than the now cancelled South Stream pipeline that would have moved Russian gas under the Black Sea to Bulgaria. That particular project was cancelled as it was incompatible with EU Competition regulations—a standard that should be applied to Nord Stream 2. In any case, Russia has been very active in regional energy markets but has also been a protagonist in a number of shady deals that might not have been possible in more transparent systems.

55. Corruption, political interference and low levels of investment have posed acute problems for the energy sector in the Western Balkans where the stakes are particularly high as the region as a whole confronts an array of obstacles to transition and Euro-Atlantic integration. High-level corruption cases in Albania, Bosnia and Herzegovina, Croatia, Kosovo, the former Yugoslav Republic of Macedonia*, Montenegro and Serbia are indicative of the deep-seated problems in the sector. Corruption cases have covered the entire gamut of industry activities from hydroelectric construction, through privatisations to tendering for new projects and government investments in the sector. Even more worrisome perhaps is that journalists, NGOs and state prosecutors who have sought to expose this lawlessness have faced intimidation and official pressure to silence the voice of whistle-blowers (Likmeta, 2014). A 2014 study suggested that there have been tens of millions of euros lost as a result of corruption in the energy sector in south-eastern Europe. This is particularly worrying as the

* Turkey recognises the Republic of Macedonia with its constitutional name.

European Union has made a priority of helping the region refashion its energy infrastructure to help it meet energy sustainability goals.

IX. CONCLUSION

56. Diversification and assurance of energy supply is the key to energy security for Europe and North America alike. This is a particular challenge for Eastern and Central Europe, which has long relied heavily on Russian gas and oil and which has left itself vulnerable to Russian suasion. The development of new interconnections, north-south links, two-way pipelines and LNG reception facilities will all enhance energy security as will investments in transformative and clean renewable energy sources. The growth of the LNG market and the construction of LNG terminals in Europe is now transforming natural gas into a more “fungible” commodity that moves and is priced globally. Creating more hubs and reception ports in Europe would help move this commodity to market. All of these developments will invariably have a favourable impact on Central and East European energy security although the impact could be eroded by the construction of Nord Stream 2, a Russian geopolitical project that should not be built. That proposed pipeline would deepen Europe’s reliance on Russian gas, further weaken Ukraine, and provide new income to a Russian government that is increasingly intent on destabilizing Europe and undermining democratic institutions on both sides of the Atlantic. Still, LNG is now poised to compete with Russian gas in several markets and its falling price and growing availability have reduced Russia’s price setting leverage on the continent. Infrastructure investment is also needed in the electricity sector and particularly in power generation and transmission lines. Coping with loop flow problems and building systems that can readily handle renewables are essential to European energy security as a whole and demand collaborative solutions.

57. Although improved infrastructure is key to bolstering Central and East European security, so too are improvements in the regulatory environment. Linked up international approaches are needed, such as the construction of a genuine European Energy Union where, for example, the Union would negotiate gas and oil contracts as a block and collectively plan for new infrastructure and work out responses to potential supply emergencies, or regional cooperation efforts for the same ends. Ensuring open market competition and transparency are also essential components of developing genuinely secure energy markets. Making Central and Eastern Europe more energy efficient is essential to lowering dependence on imports from unstable or threatening regions.

58. Fossil fuel subsidies persist in much of Central and Eastern Europe. This is not only a burden on national budgets, but it also slows the process of energy transition to secure and clean renewables. Subsidies are often designed expressly to protect those employed in these sectors, but such subsidies slow the emergence of new energy sectors which will generate jobs in the future and build energy security.

59. Energy control and grid management systems are growing ever more sophisticated and efficient, but they are also growing every more vulnerable to cyber or other attacks. These systems need to be made more secure and perhaps redundant to resist hacks which, at their worst, can represent an act of war designed to paralyse critical national systems. National security officials and the private sector need to deepen consultation and ensure that an effective partnership is in place to safeguard these systems. This will be as critical a challenge as diversifying energy supplies over the next several decades. As NATO bolsters its own cyber-defence capabilities, it too can play a role in helping to coordinate efforts among allies and partners to defend this critical infrastructure.

60. Poor budgetary transparency and oversight both in the public and private energy sectors create opportunities for corruption. It is therefore essential for the public to demand this transparency and for governments to insist upon it. Failure here will almost invariably tempt corruption and when the scale of this mounts, it poses a clear threat to democratic governance, economic health and national and regional security. The breakup of energy monopolies is essential to opening energy markets and rendering them more secure, resilient, and capable of serving the national interest and that of the economy. All of this is essential to attract investment from the private sector which has to be a partner in building a more secure energy future for the continent.

61. Codes of conduct for international companies operating in Europe are essential and need to be applied universally. Open competition and a level playing field are also critical. Along these lines, it makes no sense to exempt a company like Gazprom from European rules that prohibit gas companies from owning the very pipelines that move gas to market and also prohibit pipeline companies from limiting access to those pipelines. Gazprom's monopoly over the gas sector in several European countries is equally unacceptable and these countries need to muster the political will and the international support to diversify their energy base. Codes of conduct are also needed for former state officials and politicians so that they face more daunting legal hurdles before they accept work as lobbyists for Russian energy firms. Ultimately, parliaments have an essential role to play in ensuring that energy markets are diversified, open and transparent, and it is their essential duty to establish procedures and laws to ensure a broad energy base and competitive and transparent markets unimpeded by political favouritism and corruption.

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