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THE ENERGY SECURITY CHALLENGE IN CENTRAL AND EASTERN EUROPE

Report

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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 the energy resources needed to fulfil that fundamental 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 must 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. Central and Eastern Europe's dependence on Russian gas was a legacy of Cold War industrial and commercial structures that survived both the fall of the Berlin Wall and the integration of some of the countries of the region into Euro-Atlantic institutions. That infrastructure nevertheless accorded Russian companies a powerful position in those energy markets. Consequently, a company such as Russia's Gazprom was able to impose long-term contracts on clients that had few other immediate energy options. Over time, the cost of this dependence became 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 wake-up call for Europe and have helped raise awareness about the risks of overdependence on a single energy supplier. These supply disruptions were politically inspired. They also reflected the emergence of a more assertive Russia with a clear set of grievances about the existing European security and political order and a willingness to act to upend that order. Russia's energy endowments provided it with a powerful lever to express this dissent. It did not have to use this leverage 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 demonstrate that Russia was willing to sacrifice its immediate 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. Russian aggression, for example, inspired the European Commission to investigate the opaque pricing of Russia's gas monopoly. It also certainly factored into the drafting of the EU's Third Energy Package, which 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. Doing so would make it easier to move energy in multiple directions throughout the continent should Russia again cut off or threaten to cut off energy supplies. The European Commission has also demanded more transparency, openness, and competition in European oil, gas, and electricity markets, not only because the lack of competition and opaque decision making have given Russia leeway to use its energy as a weapon, but also because doing so simply made economic sense.

5. The EU 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, to increase energy efficiency, and to develop a super grid that would help Europe tap into solar power from the south and wind power from the north. Among other things, this 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 diverse approaches across a range of sectors. The EU's Energy Union incorporates a number of sectors including energy, research and innovation, transport, foreign policy, regional and neighbourhood policy, the environment, trade and

agriculture in a comprehensive package to ensure a broad conception of European energy security, including environmental considerations. The EU has made the achievement of greater interconnectivity of gas and electricity grids a central goal and sees this as a key vehicle for lowering dependence on Russian gas and encouraging the 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 ambitiously 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. While the European economy grew in 2016, greenhouse emissions fell, except in the transport sector, suggesting a delinkage between growth and energy use (European Commission, 23 November 2017).

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 and gas are generally 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 lower 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 natural gas shipped by pipeline. Of course, evolving prices depend on a number of factors, including production efficiency and falling extraction costs. 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 hikes.

9. The US gas and oil sector has made significant efficiency gains due to technological advances in hydro-fracking and to a recent market shake-out which drove world prices downward. The Organization of the Petroleum Exporting Countries (OPEC) had expected those price falls to force many small American producers out of business. While a shake-out did occur, those firms that survived the 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. Consequently, 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 weaken Russia's market leverage in Europe if European and American policymakers choose to encourage supply diversification. Low gas prices are also helping it to replace coal as a fuel for electricity generation in some European countries, thereby helping to move Europe towards its announced carbon reduction goals (Kraussoc, 2017). Finally, the growing reliance on LNG will only increase the strategic importance of defending the sea lines of communication.

10. Although gas is traditionally a segmented local market, the emergence of a vibrant and growing LNG business and new port and pipeline infrastructure have made LNG an increasingly globally arbitrated and fungible commodity. In other words, gas prices can no longer be set in local markets alone, particularly as new LNG producers develop the capacity to move gas to distant markets due to the construction of new pipeline networks. Lithuania's new LNG reception facility in Klaipeda, for example, has helped that country dramatically reduce its dependence on Russian gas and should weaken Russia's capacity to set prices in that region. The Lithuanian facilities have a total storage capacity of 170,000 cubic metres, one jetty and a gasification capacity of 4 billion cubic metres. For

its part, Poland opened the Swinoujscie LNG terminal in 2015. Its initial regasification capacity is 5 billion cubic metres per annum, and with the construction of a third tank, its capacity is due to expand to 7.5 billion cubic metres per annum, which would help the country meet roughly 50% of its annual gas demand. These kinds of projects are clearly of great strategic value to the region. They lower Russian market leverage and, by extension, the Kremlin's potential capacity to deploy 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. These clients will increasingly have other options at hand and while Russian gas remains important and relatively cheap, there are now market forces that compel Russia 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 Nord Stream 2 (NS2) project (see below). Europe's leverage will also rise with the construction of more two-way pipelines that allow gas to be moved in two directions rather than in a unidirectional fashion. Countries with access to flexible lines have other import options should energy supplies be cut in one direction.

12. One potentially important consequence of these market changes is that if Russia fails to construct a more diversified economy, it will remain vulnerable to falling oil and gas prices. The state budget is highly dependent on foreign exchange earnings generated through energy sales. One would think that this vulnerability would encourage the Kremlin to engage in a degree of economic if not political reform. But that hardly seems likely, given the level of corruption in the state and the resistance to change this engenders. It is unfortunately more likely that low energy prices will encourage Russia to adopt more aggressive postures to compensate for economic weakness and to distract public attention from the fact that Russia's leadership has failed to better prepare the country for rapidly evolving global markets in the 21st century. Europe thus must prepare for an adversarial relationship no matter which way prices move.

II. VULNERABILITIES

13. Central and Eastern Europe confront two potential energy vulnerabilities: the need for secure provision and inadequate infrastructure to ensure that supply. These vulnerabilities are often 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 cost of overreliance on Russian energy is potentially substantial as it leaves those countries vulnerable to political suasion.

14. Concerns about this vulnerability have inspired 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 now allows Lithuania to source gas from suppliers around the world. Although LNG is typically more expensive than Russian gas, the difference in price should 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, importing LNG from countries like Qatar and the United States does not exclude purchasing energy from Russia. It simply means that there are increasingly other options on the table should supply disruptions ever take place – and their very existence is likely to discourage such disruptions.

15. 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. There is a myriad of cases in which national energy giants promote policies that could be seen as undermining national security interests and democratic governance.

16. Gazprom is Russia's largest energy-exporting company. It has been essentially state-owned since 2005, by which time the Russian state had purchased more than 50% of the company's shares (BBC, 2005; Moore, 2005). Since then, Gazprom has shouldered the dual mission of generating profits for its primary shareholder and serving the broader strategic interests of the Kremlin. That company alone underwrites 13% of the state budget. It is thus burdened with functions that transcend Western notions of profit maximisation and normal corporate responsibility. Not surprisingly, the two missions are not always easily accommodated, particularly as clients and partners need to factor in the potential that Gazprom might be instrumentalised for the Kremlin's purposes. This dynamic adds a degree of risk to doing business with Gazprom and other Russian energy firms (Polak, 2017). These firms generate huge revenues for the Russian state, which, in turn, have been used to underwrite an array of state-led activities that are antithetical to Western interests. These include election interference in Western countries, provocative military deployments, cyberattacks, the occupation of Crimea and the conflict in Eastern Ukraine.

17. 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 Alexander Lukashenko in Belarus. They also helped underwrite national election campaigns in both countries in the mid-2000s. Such funding is strategically consequential and has obviously generated a kind of political debt toward the Kremlin. While Viktor Yanukovich is no longer in power in Ukraine, Alexander Lukashenko continues to dominate Belarusian politics and has essentially transformed his country into a Russian protectorate.

18. 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). While Russian gas and oil endowments have proven a particularly powerful source of political and diplomatic leverage, Russia's significant holdings of nuclear fuel can also serve a similar purpose. Russia 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.

19. Possible cyberattacks 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 computer systems designed for efficiency and not for security as such.

20. In 2013, for example, hackers infected an array of renewable energy facilities and undermined critical control systems. In Ukraine, malware struck the 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 been discovered embedded 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 facility 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.

21. It is also important to consider traditional military threats to critical infrastructure including power plants, pipelines, and energy storage facilities. These threats could emanate both from traditional military forces and from terrorist actors who 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 both 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 and has worked on enhancing resilience, preparedness, response and recovery, the exchange of information, training and exercise.

III. NORD STREAM 2



22. Construction of the offshore natural gas 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 when the follow-on Nord Stream 2 project is completed, its capacity will 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 are currently used. 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.

23. Indeed, the controversial Nord Stream 2 project is rife with national security implications, although how affected countries judge the programme varies considerably. The proposed pipeline would run alongside the existing pipeline and would likely be operational by 2020. The cost of the 1,200km (746 mile) pipeline has been estimated at EUR 9.5 billion (USD 10.3 billion) and construction is scheduled to begin in 2018 (Deutsche Welle, 2018).

24. 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 pipeline violates 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 also allow Russia to bypass Ukraine and ship gas directly to Western Europe, thereby driving a wedge between Western Europe and Ukraine (Rivkin and Zuzul, 2018). This prospect has triggered serious and high-stakes infighting among European states, specifically pitting a number of Central and Eastern European states (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,

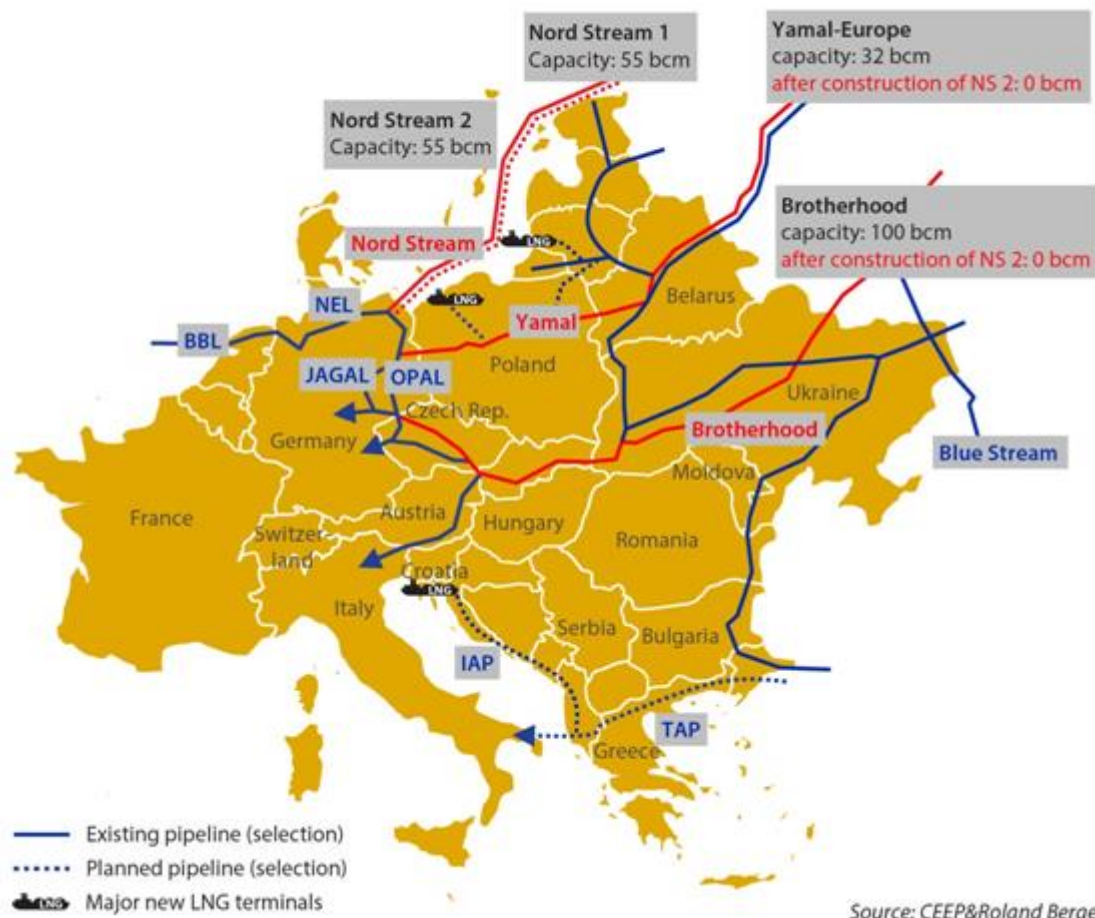
against Germany, which has characterised the arrangement in more economic terms. Poland's authorities responsible for competition policy recently initiated proceedings against six European energy companies, including Gazprom, claiming that they had entered agreements to finance Nord Stream 2 without Poland's consent (The Economist Intelligence Unit, 2018). The fact that the project has fomented such discord among Allied states, however, can already be understood as a win for the Kremlin. 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.

25. Proponents of the project in Germany see it as bolstering national energy security, insofar as it will provide direct access to plentiful and cheap Russian gas while eliminating 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 by concentrating the delivery of up to 80% of imported gas through one pipeline. This has struck a blow to 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.

26. Some of these concerns appear to be registering in Germany, where Chancellor Angela Merkel recently acknowledged widespread concerns on the "political" and "strategic" aspects of the Nord Stream 2 gas pipeline. In April she said that the Nord Stream 2 project is not possible without clarification of how Ukraine's transit role can continue, declaring: "From this you can already see that this is not just an economic project, but that, of course, political factors must also be taken into account." At a summit meeting with Russian President Vladimir Putin in May, Chancellor Merkel sought assurances that Russia would continue to export gas through Ukraine's pipelines even after Nord Stream 2 becomes operational. President Putin has indicated that he would be willing to do so if these shipments "make economic sense" – which hardly represents an iron-clad promise. He is clearly leaving himself a great deal of wiggle room on the matter, and it remains to be seen if this will be enough to convince sceptics of Mr Putin's good intentions (Chazan, 2018).

27. The European Commission has also raised specific concerns 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



28. The European 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 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 of the EU 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, 8 November 2017).

29. The European Commission wants a more competitive, open and integrated energy market operating entirely under EU rules that apply to all gas pipelines to and from third countries. Those pipelines should be subject to the same rules and be equally transparent. 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 agreed to grant existing cross-border pipelines certain derogations on existing rules 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. Additionally, because it is not an existing pipeline, it does not appear to qualify for these derogations.

30. Concerns about the NS2 project are not only European. In meetings in Warsaw in January 2018, then US Secretary of State Rex Tillerson characterised the proposed pipeline as a threat to Europe's security interests (Reuters, 2018). US President Donald Trump has echoed these concerns. 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 formally related 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 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. US officials have indicated that the five European energy companies that are financing the Nord Stream 2 project could face sanctions and have offered to make more expensive US LNG available as an alternative energy source (Foy and Buck, 2018). Some supporters of the project have claimed 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. Most market analysts believe that the greatest potential market for US LNG is Asia, not Europe, although the United States will undoubtedly be shipping more to Europe in the future as its own LNG capacity increases (Gawlikowska-Fyk and Wisniewski, 2017). Poland, for example, has agreed to purchase LNG from the United States and will not renew a contract with Gazprom that expires in 2022. US LNG imports to Europe rose 22% in 2017 and are likely to continue growing (Rivkin and Zuzul, 2018).

31. The Nord Stream 2 issue has become particularly delicate in German politics and was the subject of tough discussions in the run-up to the formation of the country's 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 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

32. 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, and the degree of dependence on Russian gas varies considerably throughout the region. Estonia and Romania import relatively little energy 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).

33. 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 poses a particularly acute problem. Three of the four major pipelines in Europe flow east to west: the Brotherhood (Russia-Ukraine-Slovakia-the Czech Republic with subsections from Ukraine to Hungary), Yamal-Europe (Russia-Belarus-Poland-Germany) and Trans-Balkan (Russia-Ukraine-the Republic of Moldova-Romania-Bulgaria) pipelines. Central and Eastern Europe also lack sufficient gas storage facilities beyond those in Ukraine, and there is no important 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 in energy terms, although Lithuania will build a gas link to Poland. Poland has introduced reverse flows on the Yamal pipeline linking it to Germany, which would allow it to bring gas from Germany if needed. It is also championing the Northern Gate project, which should bring 10 billion cubic metres per annum 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 2. 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 Eastring pipeline, which would link it to Hungary, Romania and Bulgaria, which would tie Western gas hubs to the Balkans (CEEP, 2016). In the event of disruptions to the supply of gas 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



34. Energy infrastructure problems are not limited to the gas sector, and some do not directly involve matters related to dependence 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 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 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 significant 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, which tied Estonia into the Finnish grid, the LitPol link between Lithuania and Poland and the NordBalt line between Sweden and Lithuania (Joint Research Centre, 2018). 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 International Energy Agency (IEA) standards. The Lithuanian government fears the plant represents an effort by Moscow 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

would not be able to remove. Russia's Rosatom plans to build 19 new reactors around the world, including in Hungary, Finland, and Turkey (Standish, 2017).



Electrical Connections in the Baltic Region

35. 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 generally been a reliable energy supplier in the region and that 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

36. 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).

37. 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 it can lower energy dependence on energy-supplying countries that are either unstable or actively engaged in efforts to destabilise the international order. Just as the explosive rise of the LNG industry, linked in part to the growth of hydro-fracking 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).

38. As is the case with rising LNG use, however, significant investments are needed to increase the share of renewables in the broader energy mix. A 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 Germany recently achieved a milestone when, for a brief period of time, all of its electricity needs were met by renewable energy (NATO PA, 2018).

39. 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, which is helping it achieve serious efficiency gains. During one of these 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 this renewable is 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.

40. The challenge for Central and Eastern Europe lies not so much in the technologies themselves as in the sheer costs of transitioning the economy to best deploy these technologies. Renewable energy cannot simply be run through existing energy infrastructure. It 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.

41. 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 these prices. 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 subsidise 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 very expensive and complex, and it will require critical public/private partnerships and investments to drive the industry forward. The potential security benefits are likely significant.

42. 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, 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. There is, for example, 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

43. Energy markets and the incomes they generate have long been both a source and target of corruption. The 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 for corruption. Those with access to the generation and distribution of energy and related industries are best positioned to monetise this access through corrupt practices or to translate this access into 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.

44. 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 (Aslund, 2010). The problem, of course, is not limited to Central and Eastern Europe, and there are many cases of energy-industry-driven corruption in Western Europe and North America (Kupchinsky, 2009).

45. 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 (Open Democracy Roundtable, 2017). These practices have long made it difficult to subject the energy sector to normal democratic scrutiny, and they have provided Russia with a key source of leverage 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 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 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 even 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

46. 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 a hindrance 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.

47. The Maidan revolution, the Russian occupation of Crimea and Russia's armed aggression against Ukraine have all shaped 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 collectively constituted a shock to Ukraine's energy sector and have led to important changes including price liberalisation. The occupation of Crimea, the conflict in Eastern Ukraine and Russia's militarisation of the northern Black Sea have resulted in the loss of valuable Ukrainian gas fields to Russia. They have also raised risk premia in the region, which some have argued might have been one of Russia's goals in its aggression against Ukraine. This has discouraged investment in Ukraine's gas sector and lowered its potential to provide Europe with an alternative to Russian gas (Barrasso, 2018). As a result, the sector remains

underinvested in, its gas fields are underexploited, and its governance structures are inadequate to the needs of the country.

48. Ukraine also hosts vital pipelines linking Russian gas to European markets. These pipelines have an annual capacity of 145 billion cubic metres and thus carry more gas than both Nord Stream pipelines combined. As mentioned above, new pipelines bypassing Ukraine threaten the Ukrainian transit business, although Ukraine also has substantial gas endowments itself. Gazprom has refused to adhere to both EU regulations and Ukrainian legislation that would apply these rules in a new transit agreement. Russia is also refusing to implement the Stockholm arbitration court's decisions of 2017 and 2018.

49. Tensions with Russia inspired Ukraine to join the Energy Community of Eastern and Southeastern 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 in order to lessen 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 suppliers. 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 remains limited and, again, the conflict with Russia as well as pervasive corruption impose a high-risk premium for foreign companies. Ukraine, however, remains committed to developing its conventional gas capacities. Both the International Monetary Fund (IMF) and the EU have strongly encouraged Ukraine to restructure this behemoth to introduce more competition in what are essentially rigged markets.

50. There has been some good news, however. In July 2018 the Supervisory boards of Naftogaz and Main Gas Pipelines of Ukraine signed a Memorandum of Understanding that committed them to separate the production and transmission portions of Naftogaz—something the EU and the United States have strongly encouraged. This should help open up the Ukrainian market and could lower the risk of corruption in the business.

51. 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 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, as this company is at the centre of an array of murky dealings that undermine public faith in the rule of law.

52. Naftogaz has also been engaged in a long dispute with Gazprom over previous contracts and distribution and transit issues. The ongoing case has held up the restructuring of Naftogaz – or, at the very 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 et al., 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. The problem, of course, is that Russia is not at all likely to abandon its aggressive posture and has made it clear that it has a vested interest in destabilising Ukraine.

53. Ukraine also needs to enhance energy efficiency to increase security. It managed to reduce gas consumption from 50.4 billion cubic metres in 2013 to 33.3 billion cubic metres in 2016, although this reduction was largely linked to the economic crisis and the fact that it has lost control of a large portion of its energy-intensive industrial base in the Donbas region, now controlled by pro-Russian militia groups. After reaching a credit agreement with the IMF, the government significantly reduced

energy subsidies. Higher energy prices have naturally triggered both a reduction of consumption and an added incentive 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 subsidising Russian gas for Ukrainian consumers. More vulnerable citizens now benefit from direct cash support to help pay for energy for home heating and cooking. This is more effective than simply lowering the cost of energy, as doing so reduces incentives to save energy. The government also passed a law requiring 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).

54. Ukraine is one of the largest consumers of electricity in Europe. Many of its anthracite-powered plants are in the war zones of the east, but most of its capacity is in thermal power (24.5GW of Ukraine's total power generation of 55.3GW). Nuclear power accounts for 13.8GW, hydro 5.9GW and renewables only 0.9GW. 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 in order to lower this dependence. The country's electricity infrastructure is aging and not up to European standards. Integration with Europe's grid would require huge investments and would result in new pressures to meet European environmental standards.

55. 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 its supply of nuclear fuels in order to become 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, as they are responsible for the loss of as much as 12% of generated electricity—a figure that is more than twice as high as the Organisation for Economic Co-operation and Development (OECD) average (Antonenko et al., 2018). Although the European Bank for Reconstruction and Development (EBRD) has helped finance system upgrades, it is estimated that an investment of about EUR 5.1 billion is still 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).

56. Finally, in 2017 the Ukrainian 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 privatising key energy assets and this inspires a degree of pessimism as to how far the current reform effort can go.

VIII. SOUTHEASTERN EUROPE

57. There are essentially three ways to move energy overland between Asia and Europe: through Russia, through Iran and through Azerbaijan. Given the unique strategic challenges posed by Iran and Russia, the relative strategic importance of Azerbaijan and the South Caucasus has increased because of the region's energy endowment and of several important pipelines linking the Caspian to Europe. Because of the unresolved Nagorno-Karabakh conflict, the corridor is narrowed to 95 kilometres. Currently three critical pipelines pass through this region: the Baku-Tbilisi-Ceyhan pipeline linking Azerbaijan to Turkey, the Baku-Supsa pipeline, which brings Azerbaijani oil to the Black Sea, and the South Caucasus pipeline from Azerbaijan to Turkey, which will soon be part of

the South Caucasus system that will deliver gas from the Caspian to Italy. This corridor is thus both highly valuable and vulnerable. Russia has a clear interest in discouraging the movement of Azerbaijani energy to Europe and it seems very willing to exercise both diplomatic and military leverage in the South Caucasus to further this ambition (Gurbanov, 2018).

58. Southeastern Europe faces many of the same problems as Central and Eastern Europe. It too is relatively dependent on Russian gas, plagued by aging infrastructure and left vulnerable because of a lack of interconnections and two-way pipelines. The Trans-Adriatic Pipeline (TAP), which will bring Azerbaijani gas from the Shah Deniz 2 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 is slated to play a fundamental role in the EU's overall strategy to enhance European energy security. The project has become all the more important now that the Nord Stream 2 project is underway. Chancellor Merkel's recent visit to Azerbaijan provided an opportunity for her to show her dedication to the notion of diversifying European energy supplies despite the Nord Stream 2 project. The Chancellor faced criticism from the Trump administration at the NATO Brussels summit for the Nord Stream project and has suggested that American LNG might be a safer alternative to Russian gas. Germany is the world's largest importer of natural gas, and Russia has the largest endowment of natural gas. That there is an important energy trade between the two is hardly shocking. German authorities maintain that this trade is driven entirely by commercial consideration. The problem lies in how that trade is structured and what it means for Germany's partners, who worry that Russia could put itself in a position to disrupt the flow of energy to the continent (Karasz, 2018). Chancellor Merkel's endorsement of the effort to move Azerbaijani gas from the Shah Deniz 2 fields to Europe was timed to demonstrate that Germany is willing to include broader security concerns in its energy strategy (Chazan, 2018).

59. Completion of the Southern Gas Corridor (SGC) now seems likely and represents an interesting contrast to previous failed efforts to strengthen regional energy links, like the Nabucco project. That said, the SGC does confront public resistance in southern Italy, which will host the terminus for the TAP (Gurbanov, 2018). The SGC includes the Shah Deniz 2 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. South Stream also caused serious security concern in Brussels and in Washington. It is noteworthy that the Trump administration has now extended a specific waiver on US sanctions on Iran and those doing business with Iran to encourage development of the Shah Deniz gas field, something it has not done, by contrast, for BP, which has been working with the National Iranian Oil Company to develop the Rhum natural gas field in the North Sea (Gordon, 2018). In any case, Russia has been very active in the region's energy markets. Russia's Foreign Minister Sergey Lavrov recently noted that his country is not walking away from the Southern European market and hopes that its TurkStream project will move Russian gas to Southern Europe.

60. 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 Macedonia¹, Montenegro and Serbia are indicative of the deep-seated problems in the sector (Prelec, 2014). Corruption cases have covered the entire gamut of industrial 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 tens of millions of euros have been lost as a result of corruption in the energy sector in Southeastern

¹ Turkey recognises the Republic of Macedonia with its constitutional name.

Europe. This is particularly worrying as the European Union has made a priority of helping the region refashion its energy infrastructure to help it meet its energy sustainability goals. By definition, moving to more efficient and sustainable energy markets requires progress in the fight against corruption. Unfortunately, corruption remains one of the most compelling obstacles to successful democratic and market transition throughout this region.

NATO and Energy Security

61. NATO's own role in building energy security has been the subject of some discussion and debate for a number of years. Energy security writ large is generally more a matter of structuring markets than it is about hard defence, so there are obviously other institutions beyond military ones, like the International Energy Agency, that have enormous responsibilities in formulating international efforts to bolster energy security. That said, defending critical infrastructure is very much part of NATO's remit, and providing that security has become all the more challenging given the rise of cyber war techniques. Energy itself is a strategic asset, and it is vital to the functioning of military forces. Defence planners must ensure both that the societies they are defending have access to this vital strategic asset and, of course, that their militaries do as well. Threats to those supplies are diverse and can emanate not only from state actors, but also from sub-state actors such as pirates operating along or near maritime choke points. Terrorist attacks on vital energy assets have also increased sharply in recent years and this has made it essential to harden the defence of these assets. NATO provides an important vehicle for sharing information, intelligence and best practices to lower the risks of such attacks and to cope with them should they occur. The Alliance has also worked to lower fuel costs for its forces while raising environmental awareness in member militaries—work that is also shared with partner countries.

62. Lithuania is now hosting the NATO Energy Security Centre of Excellence to develop and share expertise across the Alliance on all aspects of energy security. In modern, highly integrated economies, attacks mounted even by small groups of terrorists can have a devastating economic, social and even political impact. Critical energy infrastructure is thus a favourite target for those seeking to inflict massive costs on societies through the conduct of low-cost terrorist operations. It is also worth noting here that energy disputes have long been a source of international tensions and have been factors in previous wars.

63. At the 2008 NATO Bucharest Summit, Allied heads of state and government gave NATO a mandate to work on energy security matters. Again, this posed a challenge for an organisation largely focused on traditional military matters. The Alliance, however, has subsequently structured its work on energy security in three areas: raising strategic awareness of those energy matters with direct security implications, protecting critical energy infrastructure and enhancing energy efficiency in the military (Grubliauskas, 2014). NATO relies on other institutions, such as the International Energy Agency, to enhance its own situational awareness, but it has become something of an intelligence clearinghouse on energy-related matters and their links to hard security. NATO also consults with its partners on energy security issues as diverse as resource competition, climate change and the ways these shape the broader security landscape.

IX. CONCLUSION

64. Diversification and assurance of energy supply are key to energy security for Europe and North America alike. But these pose a particular challenge for Eastern and Central Europe, which has long relied heavily on Russian gas and oil, leaving the region vulnerable to Russian suasion. The development of new interconnections, north-south links, two-way pipelines and LNG reception facilities will help 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 internationally and is priced globally. Building even more hubs and reception ports in Europe will only enhance security. As US LNG production increases, it could strongly contribute to Europe's energy security both by

supporting the construction of LNG import capacity and pipelines and by increasing gas exports to the continent. Both would expand the list of gas suppliers to Europe, thus making European and international gas markets more fungible and competitive while reinforcing transatlantic energy links (Collins and Mikulska, 2018).

65. But there are also reasons for concern. The construction of the Nord Stream 2 pipeline makes little geopolitical sense for Eastern Europe and could leave it more vulnerable to energy blackmail. The project is now underway but continues to foment discord between Eastern and Western Europe and there are concerns in Brussels that Russia will be tempted to exercise price discretion to reward or penalise countries over which it seeks to exercise influence (BBC Monitoring, 2018.) That pipeline, now under construction, will likely deepen Europe's reliance on Russian gas, give Russia new sources of leverage over western democracies, further weaken Ukraine, and provide additional income to a Russian government that is increasingly intent on destabilising Europe and undermining democratic institutions on both sides of the Atlantic through both traditional military and non-military means. Efforts are needed now to mitigate the worst potential impact of the project and particularly to ensure that Ukraine is not left to its own devices. Fortunately, LNG is now poised to compete with Russian gas in several markets. Its falling price and growing availability, along with the growth of renewable energy, have reduced Russia's price-setting leverage on the continent and could help mitigate the impact of Nord Stream 2. LNG will invariably remain more expensive than Russian gas piped into the continent, but security has its costs and this so-called externality needs to be more systematically factored into energy pricing and energy decision making. Efforts such as the proposed Three Seas Initiative to link up LNG infrastructure between ocean terminals in Poland and Croatia make good strategic sense. The Three Seas Initiative seeks to unite 12 countries in the region between the Baltic, Adriatic and Black Seas through energy infrastructure. Finding new ways of bringing energy from the Caspian to Europe should remain a priority.

66. Although improved infrastructure is key to bolstering Central and Eastern European security, so too are enhancements in the regulatory environment. Linked-up international approaches are needed, such as the construction of a genuine European Energy Union. The Union could negotiate gas and oil contracts as a block, collectively plan for new infrastructure, work out responses to potential supply emergencies, and foster regional cooperation efforts. Ensuring open market competition and transparency is also an essential component of developing genuinely secure energy markets. Making Central and Eastern Europe more energy efficient can help lower dependence on imports from unstable or threatening regions. Infrastructure investment is also needed in the electricity sector, 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.

67. Fossil fuel subsidies persist in much of Central and Eastern Europe. Not only is this a burden on national budgets, it also slows the process of energy transition to a more efficient use of carbon fuel and an increasing use of cleaner and more strategically secure renewables. Subsidising carbon-based fuels use is often designed expressly to protect vested interests in the status quo. Such subsidies invariably slow the emergence of new energy sectors that promise to generate jobs in the future and build greater energy security.

68. Energy control and grid management systems are becoming ever more sophisticated and efficient, but they are also increasingly vulnerable to cyber or other attacks. These systems need to be made more secure, and perhaps even 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 can play a role in helping to coordinate efforts among Allies and partners to defend this critical infrastructure.

69. 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 to do so will almost invariably result in corruption, and when the scale of this mounts, it will pose a clear threat to democratic governance, economic health and national and regional security. The breakup of energy monopolies will help open energy markets and, by extension, render them more secure, resilient, and capable of serving national economic and security interests. Doing so can attract investment from the private sector, which, for apparent reasons, must be a partner in building a more secure energy future for the continent.

70. 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 critical conditions for attracting investment. Along these lines, it has made no sense to exempt a company like Gazprom from European rules that prohibit gas companies from owning the very pipelines that move gas to markets. These rules also prohibit pipeline companies from limiting access to those pipelines. Fortunately, under Article 9 of the EU's antitrust regulation, the European Union has recently imposed a set of rules on Gazprom that should help limit anti-competitive behaviour. These include:

- No more contractual barriers to the free flow of gas. Gazprom has to remove any restrictions to cross-border gas resale that are placed on customers.
- An obligation to facilitate gas flows to and from isolated markets. Gazprom will enable gas flows to and from parts of Central and Eastern Europe that are still isolated from other member states due to the lack of interconnectors, namely the Baltic States and Bulgaria.
- Structured process to ensure competitive gas prices. Relevant Gazprom customers are given an effective tool to make sure their gas price reflects the price level in competitive Western European gas markets, especially at liquid gas hubs.
- No leveraging of dominance in gas supply. Gazprom cannot act on any advantages concerning gas infrastructure, which it may have obtained from customers by having leveraged its market position in gas supply.

The Commission claims that these obligations will essentially address its competition concerns and achieve its objectives of enabling the free flow of gas in Central and Eastern Europe at competitive prices (European Commission, 2018). But vigilance on these matters remains essential.

71. Gazprom's monopoly over the gas sector in several European countries is equally unacceptable. With international support, these countries need to muster the political will to diversify their energy base and generalise the rules of the game so that the playing field is even. Codes of conduct are also needed to exercise more control over former state officials and politicians who move quickly from positions as regulators to that of lobbyists for Russian and other energy firms. Ultimately, parliaments have an essential role to play in ensuring that energy markets are diversified, open and transparent. 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.

72. NATO's efforts both to factor energy security considerations into its strategic vision and to defend critical energy infrastructure from physical and cyberattacks make eminent sense. This awareness is essential in the maritime sector, as ever more LNG is transported via ships.

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