Interdependence and Nord Stream I: Considering a Russian Supply Disruption

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Table of contents

Abstract

Since the fall of the Soviet Union the European Union (EU) attempted increasing cooperation with Russia on every level. Despite good intentions the degree of interdependence achieved was never satisfactory. Russia resisted EU attempts to institutionalize and integrate their economies. However, cooperation did flourish in the energy sector. The EU's dependence on Russian gas rose since the nineties. At the same time, opposition to energy dependence grew. Resistance increased exponentially with the 2004 EU enlargement, in which several Eastern bloc states joined the EU. It is therefore no surprise that when the EU announced support for Nord Stream in 2005 the same opposition vocalized their distrust in Russia. Developments in the EU-Russian relationship, like the Russo-Ukrainian gas disputes, provided credible arguments to the opposition. Still, in 2011 the pipeline was constructed and transported its first natural gas. In this thesis an analysis and comparison of the situation on the EU natural gas market prior to, and after, the construction of Nord Stream is presented. This thesis operationalizes the framework as formulated in *Power and Interdependence* by Keohane & Nye using the concepts interdependence sensitivity and interdependence vulnerability. The EU natural gas network and EU policies will be assessed to indicate the relative degree of accessibility and affordability to natural gas during a Russian supply disruption. Consequently, this thesis determines the effect of Nord Stream on Russia's ability to employ a supply disruption as a coercive measure against the EU.

Introduction

The fall of the Soviet Union signified the beginning of a new era for the European Union (EU). The challenge of this new era was to find a new sustainable way in dealing with the newly created Russian Federation. In the 1990s the EU propagated cooperation, integration, and institutionalization as drivers for change both inside Russia and for the EU-Russian relationship. The goal was to westernize Russian government and society. Initiatives like the Partnership and Cooperation Agreement, the Energy Charter Treaty, and the Energy Dialogue aimed to befriend and integrate Russia.[1] Despite the EU's good intentions, the relationship evolved not as expected. Western notions of democracy, market economy, and liberalization clashed with Russia's desire for autonomy, hegemony, and the ambition to become a superpower.[2]

Western liberal ideology promoting economic interdependence as the key to a peaceful, productive, and viable relationship proved hard to realize. Instead, Russia under Vladimir Putin reverted liberalization policies implemented in the early nineties by nationalizing the energy industry and reinvigorating the power of the state.[3] Indeed, economic relations between the EU and Russia were on the path to complex interdependence, but after Putin's rise to power energy became the dominant force maintaining the relationship.[4] Russia's abundant resources were, and still are, vital for the EU. The EU significantly expanded Russian gas imports increasing dependence.[5] However, not all member states agreed with the course the EU had embarked upon. Protest in opposition to the significance of Russian gas for the EU became more prevalent in the EU institutions. Especially after 2004, when ten new states joined the Union, multiple with fresh memories of Soviet domination branded in collective memory.[6] With increased Russian gas imports, new infrastructure was 'necessary' to transport gas to the EU. The majority

[1] Maxine David and Tatiana Romanova, "Modernisation in EU–Russian Relations: Past, Present, and Future," *European Politics and Society* 16, no. 1 (January 2, 2015): 1–10.
[2] Katrin Böttger, "Interdependence as a Leitmotif in the EU's Russia Policy: A Failure to Live Up to Expectations," in *Post-Crimea Shift in EU-Russia Relations: From Fostering Interdependence to Managing Vulnerabilities*, ed. Kristi Raik and András Rácz, 2019.
[3] Roger Cohen, "The Making of Vladimir Putin," *The New York Times*, March 26, 2022, sec. World, https://www.nytimes.com/2022/03/26/world/europe/vladimir-putin-russia.html.
[4] Amelia Hadfield, "EU–Russia Energy Relations: Aggregation and Aggravation," *Journal of Contemporary European Studies* 16, no. 2 (August 2008): 235–36.
[5] Tom Casier, "The Rise of Energy to the Top of the EU-Russia Agenda: From Interdependence to Dependence?," *Geopolitics* 16, no. 3 (July 2011): 536–52.
[6] Mark Leonard and Nicu Popescu, *A Power Audit of EU-Russia Relations*, Policy Report / European Council on Foreign Relations (London: ECFR, 2009).

of new natural gas pipelines proposed were abandoned. The pipeline that eventually became destined to be the new vessel for the transport of Russian gas to the EU was Nord Stream.

The construction of Nord Stream, a dual pipeline from Russia through the Baltic Sea to Germany, was controversial. Member states argued against Nord Stream on political, economic, security, ethical, and environmental grounds. EU members pointed to the increased power Russia would gain over the EU.[7] Even though the EU already depended on Russian gas for a quarter of their consumption, this dual pipeline would increase dependence and give Russia more leverage.[8] Academia produced similar arguments. Literature on the future effect of Nord Stream was abundant. However, after the construction of Nord Stream, no literature has appeared that analyzes the influence Nord Stream has on power in the EU-Russian gas relationship. Therefore, this thesis aims to contribute to the academic debate by answering the following research question:

To what extent has the opening of Nord Stream affected Russia's ability to employ a supply disruption as a coercive measure against the EU in 2010 and 2017?

To formulate an answer to this question, this thesis employs the following sub questions:

1. How did the EU-Russian relationship evolve from the fall of the Soviet Union until the construction of Nord Stream?
2. To what degree was the EU subject to interdependence sensitivity and vulnerability in 2010 before the construction of Nord Stream
3. To what degree was the EU subject to interdependence sensitivity and vulnerability in 2017 after the construction of Nord Stream.

The first sub question elaborates on the history of the EU-Russian relationship detailing how the EU and Russia arrived at the construction of Nord Stream. Thereafter, chapter 2 and 3 will answer the sub questions facilitating comparison of 2010, the year prior to the construction of Nord Stream, with 2017, the year Nord Stream's capacity became fully utilized. By comparing interdependence sensitivity and vulnerability of 2010 with 2017 Russia's ability to employ a supply disruption against the EU can be determined.

[7] Stefan Bouzarovski and Marcin Konieczny, "Landscapes of Paradox: Public Discourses and Policies in Poland's Relationship With the Nord Stream Pipeline," *Geopolitics* 15, no. 1 (January 29, 2010): 1–21.
[8] European Commission. Directorate General for Energy., *EU Energy in Figures: Statistical Pocketbook 2012*, EU Energy in Figures (Luxembourg: Publications Office of the European Union, 2012); British Petroleum Company, "BP Statistical Review of World Energy 2019" (London: British Petroleum Co., 2019), 34.

Historiography

This thesis belongs to several academic debates which are interlinked but belong to a greater debate on EU-Russian relations. Current developments and events influence the academic debate on EU-Russian relations. The energy trade is the defining issue in the EU-Russian relation of which gas is a significant portion.[9] The strategic interests of both parties were influenced by the trade in natural gas, possibly enabling Russia to employ natural gas supply as a political weapon, but also provided potential for cooperation.[10] In addition, prior to Nord Stream's construction, in politics and in academia, the pipeline resulted in warnings of increased Russian power over the EU.

In the scholarship most authors relied on a neoliberal framework emphasizing cooperation potential in the EU-Russian gas trade. However, since the late 2000s a clear shift can be detected. Fears around the usage of energy as a political weapon became more prolific. The academic debate balanced between a neoliberal and realist paradigm. Dominique Finon exhibits this balance as he determined that the history of international energy markets can be characterized as a clash between the neoliberal paradigm and the neo-realist paradigm.[11] The EU-Russian energy relation is increasingly structured by the politicization of energy relationships which entangles the neo-realist and neoliberal perspectives.[12] While Finon clearly positions himself on the side of neo-realism, describing the world as a balance of diplomatic and military power, versus neoliberalism, emphasizing the potential for decreased conflict through cooperation, the European tendency is to rely on the latter. An important factor in liberalism is dependence. Dependence is a state of being determined or significantly affected by external forces. When two countries experience a situation characterized by reciprocal effects, we can speak of mutual dependence, also termed interdependence.[13] When the reciprocal effects are the same for both countries the situation is one of symmetrical interdependence. On the contrary, when reciprocal effects are not the same for both countries, we are dealing with asymmetrical interdependence.

[9] Gunnar Wiegand, "EU–Russian Relations at a Crossroads," *Irish Studies in International Affairs* 19, no. 1 (January 2008): 9.
[10] Wiegand, 12.
[11] Dominique Finon and Catherine Locatelli, "Russian and European Gas Interdependence: Could Contractual Trade Channel Geopolitics?," *Energy Policy* 36, no. 1 (January 2008): 424.
[12] Finon and Locatelli, 425.
[13] Robert O. Keohane and Joseph S. Nye, *Power and Interdependence*, 3rd ed. (New York: Longman, 2001), 7.

On the neoliberal side, Filipos Proedroue refutes realist claims about the nature of world politics and demonstrates that international politics is still characterized by cooperation.[14] Through using the concept interdependence, and its indicators sensitivity and vulnerability, Proedrou explains the circumstances under which we can expect conflict and cooperation. He concludes that the EU-Russian relationship is cooperative due to both sides being highly vulnerable.[15] Russia does not have alternative markets for its gas and the EU has no alternative sources. Proedrou does not explicitly state that the EU-Russian relationship is symmetrically interdependent but implicitly his reasoning does. However, not all authors who employ interdependence theory by Robert Keohane and Joseph Nye determine the EU-Russian relation and its interdependence to be symmetrical.

Like Proedrou, Tom Casier also refutes that the EU-Russian relationship is primarily about power. Casier states that energy is not 'per definition and by exclusion a geopolitical and strategic asset', and points to the complexity of energy relations.[16] Using the concepts interdependence sensitivity and vulnerability Casier tests the degree of EU energy dependence and the extent to which dependence may create Russian leverage.[17] He ultimately concludes that the core of EU-Russian energy relations is still mostly economic and commercial.[18] In another article Casier explores the security side of the EU-Russian energy relation and concludes that the EU's high degree of energy import dependence has created a security problem.[19] Casier, on the one hand, refutes the neo-realist approach and, on the other hand, demonstrates that in the EU-Russian energy relationship power is still important.

Øistein Harsem and Dag Harald Claes contribute to this debate by exploring the coercive strategies the EU and Russia can implement.[20] Harsem and Claes emphasize the disparity of reliance on Russian gas among EU members constraining Russia's ability to exercise power. They conclude that it is not in Russia's best interest to use coercive power on all EU member states collectively. Instead, the Russians benefit from a highly differentiated strategy, being able

[14] Filippos Proedrou, "The EU–Russia Energy Approach under the Prism of Interdependence," *European Security* 16, no. 3–4 (September 2007): 39.
[15] Proedrou, 343.
[16] Tom Casier, "Russia's Energy Leverage over the EU: Myth or Reality?," *Perspectives on European Politics and Society* 12, no. 4 (December 2011): 495.
[17] Casier, 493–94.
[18] Casier, 505–6.
[19] Casier, "The Rise of Energy to the Top of the EU-Russia Agenda," 549–50.
[20] Øistein Harsem and Dag Harald Claes, "The Interdependence of European–Russian Energy Relations," *Energy Policy* 59 (August 2013): 784.

to employ power on a bilateral instead of a multilateral basis.[21] Claes & Harsem focus on the differences between EU member states and emphasize that the interdependent relationship is dynamic and subject to change over time.

Andrej Krickovic is also aware of the changing character of the EU-Russian relationship. Krickovic determines the emergence of a security dilemma in the EU-Russian relation. Krickovic states that this energy relation is symmetrically interdependent which, in liberal ideology, would result in less conflict.[22] Krickovic states that this is not the case due to the lack of complex interdependence. Both Russia and the EU want to decrease their dependence to limit their opponents' ability to leverage power over them, but 'they cannot reduce their dependence without also increasing the dependence of the other state – which by extension threatens that other state's security and independence.'[23] The EU and Russia thus find themselves in a security dilemma.

Prior to the construction of Nord Stream academia warned of potential consequences of the dual pipeline. Zeyno Baran warned of Moscow's political involvement in EU energy issues and determined Russian gas 'unreliable' and a 'threat to European security'.[24] Edward Christie described Russia's actions in energy as partly motivated by foreign policy objectives.[25] In addition, Christie warns of a reduction of energy security through Nord Stream.[26] Roderick Kefferpütz casts doubts on Gazprom's ability to satisfy EU gas demand and advocates supply diversification.[27] Even though many authors warned of growing Russian influence over the EU, the amount of literature analyzing the effect of Nord Stream on Russian influence has remained absent. In contrast, the conception of Nord Stream II has garnered extensive academic writing. The plan for Nord Stream II emerged around the construction finalization of Nord Stream. Its

[21] Harsem and Harald Claes, 791.
[22] Andrej Krickovic, "When Interdependence Produces Conflict: EU–Russia Energy Relations as a Security Dilemma," *Contemporary Security Policy* 36, no. 1 (January 2015): 8.
[23] Krickovic, 7.
[24] Zeyno Baran, "EU Energy Security: Time to End Russian Leverage," *The Washington Quarterly* 30, no. 4 (September 2007): 131–34.
[25] Edward Christie, "European Security of Gas Supply - A New Way Forward," in *EU-Russia Gas Connection: Pipes, Politics and Problems*, ed. Ed Kari Liuhto (Pan-European Institute, 2009), 10.
[26] Christie, 20.
[27] Roderick Kefferpütz, "EU-Russian Natural Gas Relations - Pipeline Politics, Mutual Dependency, and the Question of Diversification," in *EU-Russia Gas Connection: Pipes, Politics and Problems*, ed. Ed Kari Liuhto (Pan-European Institute, 2009), 105–7.

pipelines would lay alongside Nord Stream and double capacity. Similar to the first pipeline, this second plan faced serious opposition.[28]

From the historiography on interdependence in the EU-Russian gas relationship and Nord Stream we can conclude that there is consensus on the interdependent character of the EU-Russian relation in the energy field. In addition, excluding Proedrou, most authors determine this relationship to be asymmetrical or, in Krickovic's case, subject to becoming asymmetrical. This is a problem because in asymmetrical interdependence one side is more dependent on the other. Consequently, the dependent side becomes scared that the other will terminate the relationship and incur heavy costs on the dependent side. The dependent side will therefore often seek to minimize its dependence. Moreover, while authors argue the prevalence of neo-realist or neoliberal thought, the energy relationship is complex and has elements of both views. Furthermore, before the construction of Nord Stream academia wrote extensively on the subject. However, after the pipeline's construction no extensive analysis has taken place. This thesis aims to fill this gap in the literature by questioning to what extent Nord Stream influenced EU-Russian energy interdependence and by establishing the consequences of Nord Stream for the EU.

Concepts and theory

For this thesis, a few concepts are significant. These concepts are firmly rooted in the neoliberal tradition which, broadly speaking, clearly in contrast to realism, argues that cooperation between states will foster peaceful relations and decrease conflict. An important work in this neoliberal tradition is the book *Power and Interdependence* by Robert Keohane and Joseph Nye. In this leading work Keohane & Nye defined concepts which are vital to this research.[29]

In *Power and Interdependence* Keohane & Nye describe interdependence between states. Keohane & Nye define dependence as a state of being determined or significantly affected by external forces. Interdependence means mutual dependence and refers to a situation characterized by reciprocal effects among countries or actors in different countries. These

[28] See for instance: Kai-Olaf Lang and Kirsten Westphal, "Nord Stream 2 – A Political and Economic Contextualisation," 2017, 40; Philipp Hauser, "Does 'More' Equal 'Better'? – Analyzing the Impact of Diversification Strategies on Infrastructure in the European Gas Market," *Energy Policy* 153 (June 2021); Marco Siddi, "Theorising Conflict and Cooperation in EU-Russia Energy Relations: Ideas, Identities and Material Factors in the Nord Stream 2 Debate," *East European Politics* 36, no. 4 (October 1, 2020): 544–63; Finn Roar Aune et al., "The Future of Russian Gas Exports," *Economics of Energy & Environmental Policy* 6, no. 2 (April 1, 2017); Balázs R. Sziklai, László Á. Kóczy, and Dávid Csercsik, "The Impact of Nord Stream 2 on the European Gas Market Bargaining Positions," *Energy Policy* 144 (September 2020): 111692.

[29] Keohane and Nye, *Power and Interdependence*.

effects, which influence the relationship between actors or countries, result from transactions, ranging from the flows of people, information, goods, and capital, across international boundaries. Interdependence can be determined when reciprocal transactions are costly to discontinue. On the contrary, if these transactions lack costly effects when disrupted, there is simply interconnectedness.[30]

In the liberal tradition cooperation, and therefore interdependence, will foster peace. However, Keohane and Nye determine certain situations where interconnectivity does not lead to peace, but instead is a factor in the generation of power. So, when does interdependence lead to the generation of power? Keohane and Nye make a distinction between two dimensions, interdependence sensitivity and interdependence vulnerability. Interdependence sensitivity is defined as the 'liability to costly effects imposed from outside before policies are altered to try to change the situation.' Interdependence vulnerability is defined as the 'liability to suffer costs imposed by external events even after policies have been altered.'[31] This distinction between sensitivity and vulnerability is important for understanding the relationship between power and interdependence. Power is only generated in situations where after changing policies to counter the costly effects of an external change, an actor still encounters costly effects. Due to the power generating characteristic of interdependence vulnerability, it carries a strategic dimension.[32]

Methodology

To demonstrate the liability to costly effects imposed on the EU by a Russian supply disruption after policy changes, two indicators, accessibility, and affordability, will be employed. These indicators take inspiration from works on energy security. In 2009 Kruyt, van Vuuren, de Vries and Groenenberg discerned in general four indicators from the literature on energy security and used broad definitions for these indicators as displayed in figure 1.[33]

The four A's	Definition
Availability	Elements relating to geological existence
Acceptability	Environmental and societal elements
Accessibility	Geopolitical elements
Affordability	Economical elements

Figure 1. the four A's.[34]

[30] Keohane and Nye, 7–8.
[31] Keohane and Nye, 11.
[32] Keohane and Nye, 10–13.
[33] Aleh Cherp and Jessica Jewell, "The Concept of Energy Security: Beyond the Four As," *Energy Policy* 75 (December 2014): 415–21.
[34] Bert Kruyt et al., "Indicators for Energy Security," *Energy Policy* 37, no. 6 (June 2009): 2167.

For this thesis only accessibility and affordability are significant. This thesis omits availability because natural gas availability, the geological existence of said resource, has already been determined. Acceptability is also beyond the scope of this research as environmental and societal elements, like pollution and sustainability, are unimportant determining the effects of a supply disruption and interdependence sensitivity and vulnerability. Accessibility entails factors such as production, transportation, and infrastructure and are therefore vital to assessing the effects of a supply disruption and the ability to compare 2010 with 2017.[35] Affordability entails economic factors such as the price for natural gas and liquified natural gas (LNG) and is therefore an important indicator and tool for comparison.

This thesis will compare the EU natural gas infrastructure and energy policies of 2010 with 2017. 2010 was the year prior to opening of Nord Stream. In 2011 the pipeline was completed and transported its first natural gas. In 2017 the pipeline reached its full capacity. To properly asses the effects of Nord Stream the situation prior to its use will be described. Thereafter, the situation after Nord Stream reached full capacity will be described. Consequently, a comparison can be made between two points in time.

To facilitate this comparison the two indicators affordability and accessibility will be operationalized. Accessibility and affordability are influenced by multiple factors, for instance: supply and demand, infrastructure, and policies. If supply is higher than demand the EU will have access to natural gas and prices will decline. This will have a positive effect on accessibility and affordability. Conversely, in a situation where supply is lower than demand, the EU will not have easy access to natural gas and prices will rise. This negatively affects accessibility and affordability. In the context of this thesis, infrastructure and policies in the EU and their effect on accessibility and affordability will be assessed. An example of infrastructure influencing these indicators would be the ability to increase production of natural gas in the short term. If a EU member state is able to increase production in the short-term during a Russian supply disruption the indicators are affected. Short-term increase in production increases accessibility to natural gas. Consequently, the EU affordability will not decline as the EU has no need to substitute the lost gas with gas from a potentially more costly source. Another example would be if the EU had access to other, pricier, sources of gas. Accessibility would increase but affordability would decrease.

[35] Asia Pacific Energy Research Centre, ed., *A Quest for Energy Security in the 21st Century: Resources and Constraints* (Tokyo: Inst. of Energy Economics, Japan, 2007), 21–22.

Primary sources

This thesis will use a range of primary sources to formulate an answer to the main question. This thesis will use information available through the annual statistical review of World Energy by BP, and the annual EU energy in figures statistical pocketbooks by the European commission, available on the website of BP and the Publications office of the EU, respectively, for quantitative data on the European natural gas market. In addition, the website of EUR-Lex, run by the European Union Publications Office, publishes treaties, directives, and regulations produced by the European Parliament, the Council of the European Union, and the Commission of the European Union.[36] Additionally, Gas Infrastructure Europe and the European Network of Transmission System Operators for Gas publish maps detailing information on the European natural gas network. The former published maps on underground gas storage capacity, while the latter published maps on the pipeline infrastructure of the EU.[37] For additional information on pipeline infrastructure, the International Energy Agency publishes since 2011 figures on the flow of natural gas through the pipeline network of the EU.[38] Lastly, the European Commission publishes abundant data on the website of Eurostat.[39]

Different units are used by authors of primary sources. Most reports and literature using data on the natural gas market express natural gas quantities in billion cubic meters (bcm), but other units like million cubic meters (mcm), gigawatt hours (GWh), terajoules (TJ), million tons of oil equivalent (MTOE), and gross caloric value (GCV) are also commonplace. To compare and utilize the quantitative data this thesis used the Gasunie Unit Converter to convert different units to billion cubic meters.[40]

Structure

The structure of chapter 1 will be straightforward. It will trace the development of the EU-Russian relationship from the collapse of the Soviet Union until the construction of Nord Stream with particular focus on energy and interdependence. Chapter 2 will have a similar structure as chapter 3. The chapters will first discuss the natural gas availability and asses the EU natural

[36] "About EUR-Lex - EUR-Lex," accessed June 7, 2022, https://eur-lex.europa.eu/content/welcome/about.html.
[37] Gas Infrastructure Europe, "Storage Map 2018: Existing & Planned Infrastructure," 2018; ENTSOG, "The European Natural Gas Network (Capacities at Cross-Border Points on the Primary Market)," 2010; ENTSOG, "The European Natural Gas Network (Capacities at Cross-Border Points on the Primary Market)," 2017.
[38] International Energy Agency, "Gas Trade Flows" (International Energy Agency, February 2022).
[39] European Commission, "Home - Eurostat," Eurostat, accessed January 29, 2022, https://ec.europa.eu/eurostat/web/main.
[40] "Gasunie Unit Converter," accessed June 7, 2022, https://unit-converter.gasunie.nl/.

gas network and its potential to resist a supply disruption. Thereafter, EU policies influencing the effects of a supply disruption will be evaluated. Lastly, the degree of interdependence sensitivity and vulnerability will be established before a concluding paragraph will present and summarize the findings of that particular chapter. The conclusion will evaluate this thesis and position this research in the literature. Thereafter, recommendations for future research will be provided.

Chapter 1: Nord Stream and the history of energy interdependence

The history of economic interdependence between Russia and the EU originates after the fall of the Soviet-Union. Capitalism triumphed over communism and the 'end of history,'[41] as proclaimed by Fukuyama, resulted in a new challenge for the EU; how to deal with the new Russian federation? Instead of continuing the existing cold war relation, both sides appeared to choose collaboration. Hopes for sustained economic development, both in the EU and Russia, and newfound partnership were high. This new paradigm seemed to be a sustainable modus vivendi as the relationship became increasingly institutionalized. However, as time passed, the conflict between increased multilateralism, propagated by the EU, conflicted with Russia's desire to protect its national sovereignty.[42] The EU-Russian relationship became increasingly focused on energy and economic interdependence fell short of evolving into complex interdependence.

This chapter will provide an answer to the following question: Why did the EU-Russian relationship, with its high hopes for cooperation in the early 90s, fall short of reaching complex interdependence, instead evolving into a relationship based solely on energy? By providing an answer to this question the history of the EU-Russian relationship and Nord Stream will be provided. This chapter will be separated into five parts. The first part starts in 1990 right after the fall of the Soviet Union until around 1999 and concerns institutionalization of EU-Russian relations and expectations. The second part entails approximately 1995-2001 and considers lingering rivalries and the ascent of Vladimir Putin. The third part deliberates on growing interdependence and its opposition from roughly 2000-2004. The fourth part discusses the inception of Nord Stream and immediate resistance around 2005. The fifth part details the Russo-Ukrainian gas disputes and how they intensified resistance against Nord Stream. Afterwards, a concluding paragraph will summarize and formulate an answer to the sub question.

Institutionalization and expectations

After the fall of the Soviet-Union the Russian economy, in its transition to a market economy, was in shambles. Its people mourned the loss of their social security, and the country experienced a large capital drain while large parts of industry were privatized.[43] It was clear the

[41] Francis Fukuyama, *The End of History and the Last Man* (New York: Free press, 1992).
[42] Böttger, "Interdependence as a Leitmotif in the EU's Russia Policy," 56.
[43] Cohen, "The Making of Vladimir Putin."

post-Soviet state required aid in its transition towards a working economy. This aid came largely from the west and was economic, political, social, and humanitarian in nature. In addition, interaction between the West and Russia increased on economic, political, and social issues. Western investment in former Soviet-countries and trade between West and East increased significantly.[44] It seemed that the basis for a fruitful relationship for both sides had been established.

The first attempts at institutionalization of the EU-Russian relationship arrived with the Energy Charter Treaty and the Partnership and Cooperation Agreement (PCA). The EU initiated the Energy Charter Treaty in 1991, an international multilateral agreement for cooperation in the energy industry aiming to establish free energy trade beyond EU borders.[45] The Treaty included provisions on competition, free transit, and investment.[46] The treaty was signed in 1994, and entered into force in 1998, but Russia declined to ratify.[47] Russia did not want to align its legislation with the market rules proposed by the EU, and deemed it a threat to the market position of Gazprom in the EU.[48] Thereafter, another step towards cooperation between Russia and the EU arrived with the Partnership and Cooperation Agreement (PCA). Conceived in 1994, the agreement was eventually ratified in 1997.[49] This agreement aimed to establish constructive relations for the parties involved, allow political dialogue, promote economic relations, improve political and economic freedoms, prepare for a free-trade area, promote human rights, and aid Russia in their democratic process.[50] The document seemed to signify a more positive trajectory for EU-Russian relations.[51]

After ratifying the Partnership and Cooperation Agreement, and refusal to ratify the Energy Charter Treaty by Russia, the EU announced in 1999 their own unilateral strategy regarding

[44] Thomas Carothers, "Western Civil-Society Aid to Eastern Europe and the Former Soviet Union," 1999, 55–57.
[45] Finon and Locatelli, "Russian and European Gas Interdependence," 425.
[46] Peter Van Elsuwege, "The Four Common Spaces: New Impetus to the EU–Russia Strategic Partnership?," in *Law and Practice of EU External Relations*, ed. Alan Dashwood and Marc Maresceau (Cambridge: Cambridge University Press, 2008), 350.
[47] Francis McGowan, "Can the European Union's Market Liberalism Ensure Energy Security in a Time of 'Economic Nationalism'?," *Journal of Contemporary European Research* 4, no. 2 (July 9, 2008): 97; Baran, "EU Energy Security," 131.
[48] Proedrou, "The EU–Russia Energy Approach under the Prism of Interdependence," 427; McGowan, "Can the European Union's Market Liberalism Ensure Energy Security in a Time of 'Economic Nationalism'?," 98.
[49] David and Romanova, "Modernisation in EU–Russian Relations," 1–2.
[50] European Commission, "Agreement on Partnership and Cooperation Establishing a Partnership between the European Communities and Their Member States, of One Part, and the Russian Federation, of the Other Part," 1994.
[51] Hadfield, "EU–Russia Energy Relations," 233–34.

Russia, set out in the Common strategy on Russia.[52] This strategy aimed to progress the concept of 'partnership', as set out in the PCA, beyond rhetoric into reality.[53] The Common Strategy largely reiterated many points discussed in the Partnership and Cooperation Agreement like democracy, market economy, stability, global security, and cooperation.[54] Despite the positive trajectory the EU-Russian relationship seemed to be on, developments with NATO, in Russia, and in the EU signified a shift in the way Russia would deal with the EU.

The turning tide and energy primacy

Around the same time the EU pursued institutionalization, an old rivalry between NATO and the East reemerged. Before 1990, NATO and the Soviet Union were bitter rivals. Clearly, old habits die hard as a 'new' rivalry festered between NATO, of which most EU member states were members, and the newly created Russian Federation. Despite the fall of the Soviet Union, Russian president Boris Yeltsin still opposed NATO and discouraged its enlargement. Instead of creating new institutions inclusive to East and West, NATO remained and even added new member to its ranks. Boris Yeltsin was not fond of these developments.[55] These new members were close to the Russian border, closer than NATO had ever been before. Yeltsin's reservations against NATO, which he voiced on numerous occasions, did not end with his presidency as they were shared by his successor.

In 1999, a previously unknown figure named Vladimir Putin rose to power as prime minister of Russia. After the resignation of Boris Yeltsin in December 1999, Putin solidified his power, ascending to the presidency. In Putin's early years the world did not know what to expect from this political outsider. Putin echoed the west speaking of democracy, market economy, and even proposed to Bill Clinton that Russia join NATO despite his reservations. In 2001 at the Bundestag, Putin addressed German parliament in fluent German, speaking of European peace, democratic rights, and freedom. Putin received a standing ovation.[56] Despite this grand heralding by German parliament the first cracks had already started to show. Putin's Russia was not as she appeared.

When Putin just rose to power, in response to the EU's Common Strategy on Russia, Russia produced its own 'Medium Term Strategy' vis a vis the EU. While similarities existed, like the

[52] European Council, "Common Strategy of the European Union on Russia," 1999.
[53] Hadfield, "EU–Russia Energy Relations," 234.
[54] European Council, "Common Strategy of the European Union on Russia," 7.
[55] Christian Nünlist, "The Road to the Charter of Paris: Historical Narratives and Lessons for the OSCE Today" (OCSE Network, n.d.), 30.
[56] Cohen, "The Making of Vladimir Putin."

development of a market economy in Russia, this document was a telltale sign of Russia's quest for autonomy and denunciation of European values.[57] The document had realist tendencies maintaining primacy of the nation state as the foreign policy actor. It also envisaged Russia as a world power and discussed nationalizing certain sectors of the economy. One of these sectors was energy which acquired a dominant position in the EU-Russian relationship. The role ascribed to the EU was clear; a guarantor of demand for energy, and aid in the modernization of the Russian energy sector.[58]

The large role for energy in the EU-Russian relationship became more evident in October 2000 after the annual EU-Russia summit in Paris, in which both parties announced regular dialogue regarding energy cooperation shifting the established contact based on 'common values', focusing on liberalization of Russia, to 'questions of common interest', focusing on economic benefits.[59] This regular dialogue came to be known as the 'Energy Dialogue'.

Even though the Energy Dialogue established the economic character of the EU-Russian relationship, a month later, the EU produced the Green Paper.[60] The Green Paper explicitly concerned energy security and discussed reducing the risks associated with energy dependence. While energy was previously tied to mutual economic benefits, with Russia being a supplier and the EU catering to demand, the Green Paper shifted energy into the political realm and framed it in terms of dependence and security.[61] This gave the EU-Russian energy relation a new dimension. In addition to establishing a strategy most beneficial to the EU, the institution now had to contemplate the security implications of decisions vis a vis Russia as its main energy supplier.

Interdependence in energy and opposition

The Medium-Term Strategy of the Russian Federation exemplified the differences between the EU and Russia. Despite these differences, the cooperation in the energy field, and interdependence, continued to expand. While in 1995 Russia exported 111bcm of natural gas to the EU, this amount grew to 135bcm in 2005. The energy relation with Russia offered the EU many benefits. In contrast to the Middle East, Russia was more stable meaning natural gas sourced from Russia was less prone to geopolitical disturbances. In addition, Russia is relatively

[57] Böttger, "Interdependence as a Leitmotif in the EU's Russia Policy," 49.
[58] Hadfield, "EU–Russia Energy Relations," 235–36.
[59] Hadfield, 237.
[60] Commission of the European Communities, "Green Paper: Towards a European Strategy for the Security of Energy Supply," 2000.
[61] Casier, "The Rise of Energy to the Top of the EU-Russia Agenda," 538.

close to the EU and has plenty resources suitable for export. For Russia, the energy relation offered the Russian economy a financial boost which was a significant help in its economic growth of the 2000s.[62]

During annual EU-Russia summits, like in Paris, and around the 2004 EU enlargement, the concept of interdependence in the EU-Russian relation was often reiterated.[63] Despite multiple commitments, the degree of interdependence achieved, apart from the energy sector, was disappointing. The amount of goods traded increased since the fall of the Soviet-Union. Right before the global financial crisis in 2008, the EU imported around €250 billion from Russia, and exported around €150 billion to Russia.[64] The EU mainly imported raw materials from Russia, of which primarily natural gas, and exported consumer and investment goods to Russia. Even though the import/export values were high, the EU accounted for a larger part of Russian trade than Russia did for the EU's external trade. Evidently, the EU was a far more important trading partner for Russia, than Russia was for the EU.[65]

Energy primacy in the EU-Russian trade relationship resulted in interdependence only existing in the energy sector.[66] Other trade sectors like food, chemicals, metals, and machinery only make up a small part of total EU imports, while constituting a large part of Russian total exports.[67] Complex interdependence, where interdependence is dispersed along many different dimensions not only focusing trade, has not been achieved in the EU-Russian relationship. In a situation of complex interdependence, it is difficult to ascertain which side is more dependent and where this dependence lies.[68] In the EU-Russian relationship dependence lies in the energy sector. Ascertaining which side is more dependent is beyond the scope of this chapter.

Between the EU's member states clear discord existed in their stance on Russia. On the one hand Germany, employing a clear strategy welcoming Russia termed 'Ostpolitik', and on the other hand, primarily Eastern bloc states who joined with the 2004 EU enlargement, that emphasized the growing Russian influence over the EU.

[62] Proedrou, "The EU–Russia Energy Approach under the Prism of Interdependence," 334.
[63] European Council, "EU Council Press Release: Joint Statement on the EU Enlargement and EU-Russia Relations," 2004.
[64] Heli Simola, "Limited Interdependence in EU-Russia Trade," in *Post-Crimea Shift in EU-Russia Relations: From Fostering Interdependence to Managing Vulnerabilities*, ed. Kristi Raik and András Rácz, 2019.
[65] Simola, 125–26.
[66] Krickovic, "When Interdependence Produces Conflict," 5–6.
[67] Simola, "Limited Interdependence in EU-Russia Trade," 132.
[68] Krickovic, "When Interdependence Produces Conflict," 20.

Germany's 'Ostpolitik' existed since the 1970s and aimed to attain peaceful coexistence between the west and the eastern bloc. Germany's strategy was to foster economic relations and reach interdependence, discouraging the Soviet Union to initiate a military confrontation.[69] After the fall of the Soviet Union, Ostpolitik took a similar direction albeit with a different goal. Since the 1990s Germany's new goal, and assumption, was that Russia would become a democracy, would respect the rule of law, and become a market economy. Germany insisted that these western values would go hand in hand with social and political change in Russia.[70] Germany arranged a partnership for modernization clarifying its intent to cooperate with Russia and tie it closely to the west.[71] Besides integration with Russia, Germany had another goal. The goal to increase renewables and diversify the energy mix. This German goal was termed the 'Energiewende'. The 'Energiewende' can be traced back to the 1970s with the rise of environmental and nuclear movements. Resulting from the Chernobyl nuclear accident, the anti-nuclear movement expanded further and calls for diversifying the energy mix and expanding renewable energy intensified in the 1990s.[72] Around the same time, the EU assumed a leadership position in fighting climate change at the Kyoto Protocol negotiations in 1997.[73] Incidentally, European and German goals lined up, and both could benefit from Russian natural gas in its transition to renewable energy. Consequently, Germany pushed for cooperation in the energy sector and proposed additional pipeline infrastructure between Russia and the EU. This is where Nord Stream, previously known as the North-European gas pipeline, makes its entrance.[74]

Nord Stream

The idea for Nord Stream originated as early as 1993.[75] The company North Transgas Oy was founded by Russian Gazprom and Finnish Neste to realize the project,. The first feasibility study carried out by Neste in 1998 established that a pipeline in the Baltic Sea would be possible. Two years later the EU validated the project professing its support. Quickly, German

[69] Stefan Meister, "From Ostpolitik to EU-Russia Interdependence: Germany's Perspective," in *From Ostpolitik to EURussia Interdependence: Germany's Perspective*, ed. Kristi Raik and András Rácz, 2019, 25–26.
[70] Meister, 25.
[71] Meister, 31–32.
[72] David Jacobs, "The German Energiewende – History, Targets, Policies and Challenges," *Renewable Energy Law and Policy Review* 3, no. 4 (2022): 223–33.
[73] Sebastian Oberthür and Claire Roche Kelly, "EU Leadership in International Climate Policy: Achievements and Challenges," *The International Spectator* 43, no. 3 (September 2008): 36.
[74] Tatiana Romanova, "The Political Economy of EU-Russian Energy Relations," in *Political Economy of Energy in Europe Forces of Integration and Fragmentation*, ed. Gunnar Fermann, 2010, 139.
[75] Proedrou, "The EU–Russia Energy Approach under the Prism of Interdependence," 335.

energy companies took interest and E.ON Ruhrgas and BASF/Wintershall joined the project. Neste had fulfilled its role and withdrew from the project.[76] The project entered the public eye in April 2005 named the North-European gas pipeline after a Russian-German agreement to construct the pipeline. Its name was swiftly changed to Nord Stream. Germany's chancellor in 2005, Gerhard Schröder, was a staunch ally of Vladimir Putin and vehemently supported the construction of Nord Stream stating 'We need energy, Russia needs money, we have money, Russia has energy: it's clear that our interests are coming closer together.'[77] Based in Zug, Switzerland, the pipelines ownership, under the company Nord Stream AG, was initially split among 3 energy companies; 51% owned by Russian Gazprom, and 24.5% each owned by Germany's Wintershall and E.ON.[78] The pipeline was to transport gas from the Yuzhno-Russkoye gas field in Russia, across the Baltic sea floor, to Germany. As soon as the pipeline was announced in 2005 its opponents formulated arguments against the pipeline.

[76] Ulf Balzer, "European Energy Security and Nord Stream: A Case Study of the Nord Stream Pipeline, Its Oppurtunities and Risks for Europe, and Its Impact on European Energy Security." (2011), 62–63.
[77] Proedrou, "The EU–Russia Energy Approach under the Prism of Interdependence," 335.
[78] Nord Stream AG, "Who We Are," Nord Stream AG, accessed May 26, 2022, https://www.nord-stream.com/about-us/.

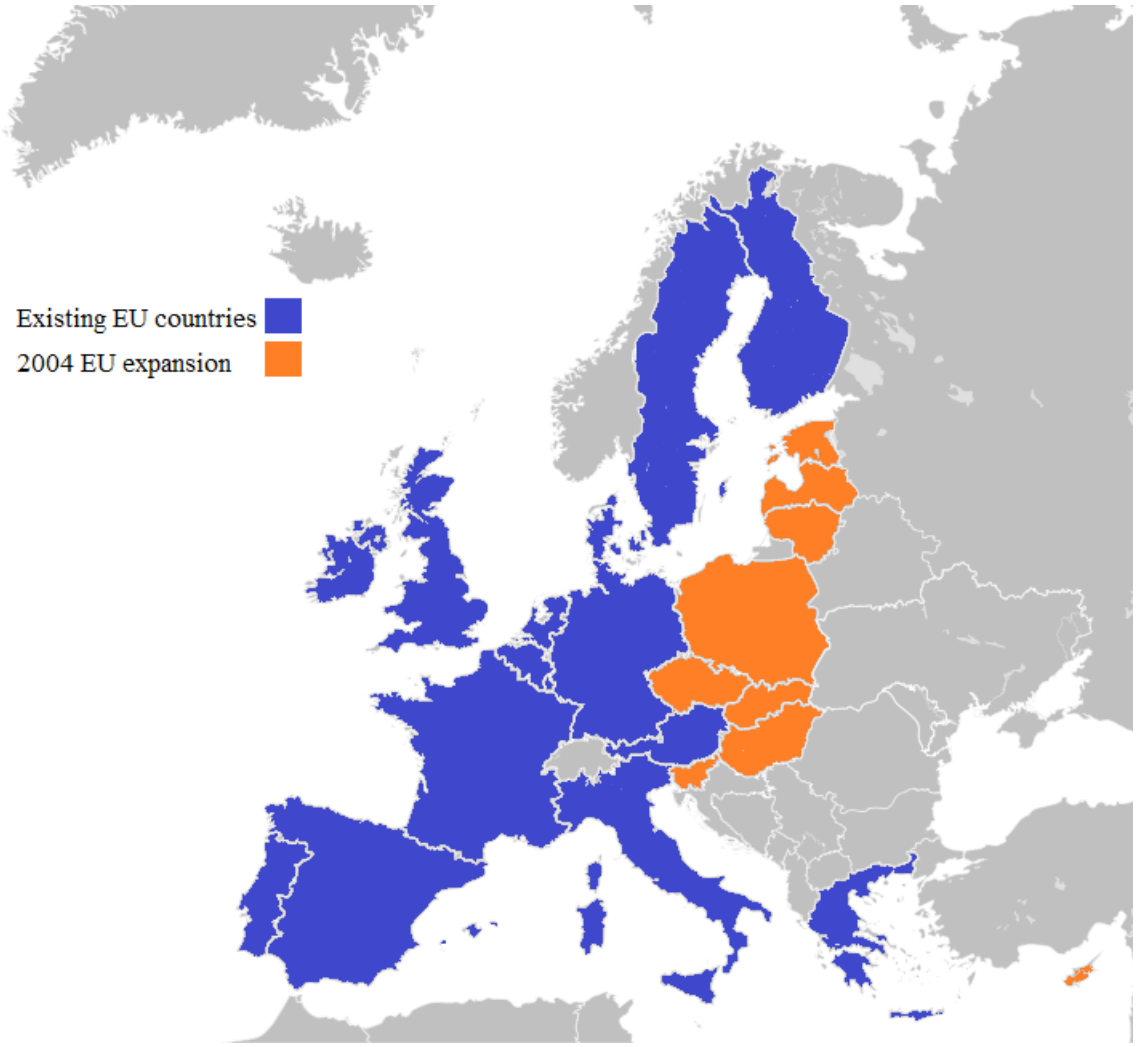

Figure 2. 2004 EU eastern expansion.

Opposition to Nord Stream

With the eastern expansion of the EU in 2004, 10 new states joined the EU, of which seven were members of the Eastern bloc. Dependence on Russian natural gas was high for most new members, while Estonia, Latvia, and Lithuania depended completely on Russian gas.[79] These states often held more radical views on Russia, resulting in a higher total number of member states insisting on a tougher stance.[80] The opposition to Nord Stream provided several arguments against construction. The poles opposed Nord Stream for three reasons. Their first issue was that Nord Stream would circumvent Poland as a transit country. A leg of the Yamal pipeline crosses polish territory. Also, in 2004 Poland proposed the cheaper and easier to maintain Amber pipeline crossing land. According to the poles the construction of Nord Stream

[79] Proedrou, "The EU–Russia Energy Approach under the Prism of Interdependence," 346; Casier, "The Rise of Energy to the Top of the EU-Russia Agenda," 542.
[80] Casier, "The Rise of Energy to the Top of the EU-Russia Agenda," 550.

would not be sensible.[81] Finally, the Polish people and politicians employed grand historical narratives implying the pipeline would damage polish national identity and security.[82] Estonian and Lithuanian opposition was less fierce but rooted in historical grievances. Estonia blocked Nord Stream in its territorial waters due to Russian harassment of Estonian diplomats.[83] Lithuania opposed Nord Stream due to discriminatory Russian railway tariffs for goods transiting the Baltic states and previous Russian oil supply cuts.[84] Similarly, Russia had cut off oil supply to Latvia but the country wanted to take part in Nord Stream and is therefore the only Baltic state not critical of Nord Stream.[85] The 2006 and 2009 Russo-Ukrainian gas disputes further intensified these objections to Nord Stream.

Russo-Ukrainian gas disputes

The Russian-Ukrainian gas relationship had been strained since the late 1990s. Russia accused Ukraine of diverting natural gas numerous times, even proposing the construction of a separate pipeline to bypass Ukraine, a project which was shelved after gas relation normalization in 2001-2002.[86] Russia accused Ukraine of diverting natural gas from the pipeline on Ukrainian soil, and proclaimed Ukraine had accrued $1.62bn in debt. The debt was settled in 2004 when new arrangements were made by Gazprom and Naftogaz, the Ukrainian gas company, for the gas transit through Ukraine.[87] However, the resolution of previous disputes was annulled in 2005 when the same issues, like the height of the supposed debt, concerns about Russian gas stored in Ukraine, natural gas price increase by Gazprom, and failure to reach agreement on the refurbishment of the Ukrainian natural gas network, resurfaced.[88] These grievances festered throughout 2005. Eventually, negotiations on the price increase proposed by Gazprom culminated into a complete supply disruption on 1 January 2006.[89] Gazprom blamed Ukraine for taking gas from the pipeline, while Ukraine denied these allegations, instead putting the blame on Gazprom for not pumping enough gas into Ukraine.[90] On 4 January natural gas supply

[81] Bouzarovski and Konieczny, "Landscapes of Paradox," 14.
[82] Bouzarovski and Konieczny, 10.
[83] Leonard and Popescu, *A Power Audit of EU-Russia Relations*, 21.
[84] Leonard and Popescu, 48.
[85] Leonard and Popescu, 46.
[86] Jonathan Stern, "Natural Gas Security Problems in Europe: The Russian–Ukrainian Crisis of 2006," *Asia-Pacific Review* 13, no. 1 (May 2006): 35–36.
[87] Stern, 37.
[88] Stern, 42.
[89] Stern, 43.
[90] Stern, 43.

returned to normal levels. Gazprom and Naftogaz resolved their issues by signing a 5-year contract.[91]

The implications for the EU of the 2006 Russia-Ukrainian gas dispute varied, with some member states, especially eastern European, reporting losing up to a third of gas imports.[92] Still, the effects of the supply disruption were annoying at best as no EU customers had their gas supply interrupted. Natural gas demand during this week was low due to mild weather for the time of year, and many industries were not fully operational over the new year period.[93]

Similar grievances led in late 2008 and early 2009 to another supply disruption. Throughout 2008 ample discussion took place between Russia and Ukraine, and Gazprom and Naftogaz, on the future of their gas relation, prices, payments, and contract. Accusations, recriminations, misinformation, and threats from both Ukraine and Russia plagued the establishment of a new gas contract.[94] Eventually, Russia partially cut gas supplies to Ukraine on 1 January 2009. In contrast to 2006, this dispute lasted until 20 January 2009.[95] Ukraine and Russia eventually settled the dispute by agreeing to the price level, natural gas volume, payment terms, code of conduct, and tariffs.[96] Russia was able to cut supply to Ukraine, and consequently to the EU, and avoided international and bilateral ramifications by its non-ratification of the Energy Charter Treaty.[97]

In contrast to 2006, this protracted supply disruption had more acute consequences for the EU. Supply to the EU was reduced since 1 January 2009 but expanded to a complete disruption on 7 January 2009 resulting in parts of south-eastern Europe, completely reliant on Russian gas, receiving no gas for 13 days.[98] The supply disruption was condemned on multiple grounds as member states suffered economic and humanitarian damage.[99]

The existing opposition to Nord Stream, primarily from Poland and the Baltic states, intensified as the member states now had two historical precedents that showed Russian ability to employ

[91] Stern, 45.
[92] Stern, 44.
[93] Stern, 45.
[94] Simon Pirani, Jonathan P Stern, and Katja Yafimava, *The Russo-Ukrainian Gas Dispute of January 2009: A Comprehensive Assessment* (Oxford: Oxford Institute for Energy Studies, 2009), 12–18.
[95] Pirani, Stern, and Yafimava, 19.
[96] Pirani, Stern, and Yafimava, 26–28.
[97] Michael Gonchar and Vitalii Martyniuk, "Evolution of Energy Wars: From the Oil Embargo 1973 Till Gas Aggression 2009," *International Issues & Slovak Foreign Policy Affairs* 18, no. 1 (2009): 51.
[98] Pirani, Stern, and Yafimava, *The Russo-Ukrainian Gas Dispute of January 2009*, 22.
[99] Pirani, Stern, and Yafimava, 60–62.

natural gas as a coercive measure. Despite this opposition the construction of Nord Stream started in 2009.

Conclusion

This chapter showed how the EU-Russian relationship has evolved since the fall of the Soviet Union. The EU hoped to integrate and cooperate with its large eastern neighbor. This movement was spearheaded by Germany who sought to tie its economy to Russia and emphasized the necessity for Russian energy. The relationship became more institutionalized, but this development encountered Russian resistance which emphasized its hegemony. Instead of complex interdependence, where interdependence is dispersed along many different dimensions not only focusing trade, interdependence had only been established in the energy sector. After the EU enlargement, where Central and Eastern European states joined the Union with historically grounded resentment of Russia, its member were increasingly at odds on how to deal with Russia. Consequently, the plans for the construction of Nord Stream encountered opposition from Poland, Estonia, and Lithuania. In 2005 the opposition often invoked grand historical narratives portraying Russia as the enemy. After the Russo-Ukrainian gas dispute, Polish and Baltic opposition to Nord Stream acquired historical precedent. They were able to reference the events of 2006 and 2009, and proclaim that the EU would suffer a similar fate if dependence on Russia would continue to expand.

The development of the EU-Russian relationship from the early 1990s until the construction of Nord Stream shows a clear path. In the beginning, the relation was based on mutual economic benefits, increasing interdependence, Russian integration with the EU, and institutionalization. However, friction existed from the start and increased as time passed. The differences between the EU and Russia became increasingly clear. Despite opposition, Russia and the divided Union pursued cooperation in energy. The quest for interdependence in multiple fields seemed more distant as energy became the main ‘economic benefit’. But the questions remains, to what extent was the critique of Nord Stream justified? Did the pipeline increase Russia’s ability to employ a supply disruption as a coercive measure against the EU? Maybe Poland and the Baltic States overreacted. Perhaps they misjudged the extent to which Russia was able to utilize European dependency on Russian gas. This might be the case, but what if their evaluation was correct? If they were right, the EU committed a grand mistake constructing Nord Stream and dove headfirst into proverbial Russian arms. This thesis aims to prove if their apprehension was justified or not and either vindicate or prove them wrong. The coming chapters will analyze the

situation prior to and after the construction of Nord Stream and absolve the world of these doubts.

Chapter 2: A Russian supply disruption before the construction of Nord Stream

This chapter aims to establish the state of natural gas in the EU. This is necessary to facilitate the future comparison of the situation prior to, and after the construction of Nord Stream. To determine whether Polish and Baltic concerns were justified this chapter focusses on 2010, the year before completing Nord Stream's construction. This chapter will utilize the concepts, interdependence sensitivity and vulnerability, as discussed in the theoretical and methodological sections of the introduction. Sensitivity is defined as the liability to costly effects before alteration of policies and vulnerability as the liability to costly effects after alteration of policies. Sensitivity is vital to assessing and comparing dependence on Russian gas while vulnerability is essential to assessing and comparing the actual ability of the EU to resist a supply disruption. To assess these costly effects, the indicators affordability and accessibility will be employed. Combined in relative terms will allow comparison across two time periods. In essence, this chapter will provide an answer to the following two questions:

1. To what degree was the EU subject to interdependence sensitivity in 2010?
2. To what degree was the EU subject to interdependence vulnerability in 2010?

To answer these sub questions the status of the natural gas market in the EU needs to be established. To assess the status of the natural gas market EU domestic production, natural gas import capacity, liquified natural gas (LNG) import capacity, and underground gas storage (UGS) capacity will be discussed. Thereafter, this chapter will highlight infrastructural deficiencies impacting the effects of a Russian supply disruption. After establishing EU natural gas market resilience, the degree the EU was subject to interdependence sensitivity will be determined. Afterwards, the degree of interdependence vulnerability will be determined using the indicators accessibility and affordability.

Domestic natural gas

In 2010 the EU's largest domestic producers, the Netherlands and the UK, constituted 72% of total European production. The remaining European countries produced marginal natural gas amounts as evident from figure 3. Could the Netherlands and the UK increase production during a supply disruption?

	Production[100]	Consumption[101]
European Union	183.8	521.3
Netherlands	75.3	46.8
United Kingdom	57.9	98.5
Germany	11.1	88.1
Romania	10	12.5
Denmark	8.5	5.3[102]
Italy	8	79.1

Figure 3. EU production and consumption in bcm.

In 2010 the Netherlands was, as the largest producer in the EU, a reliable natural gas supplier. Groningen, the northern part of the country, produced the majority of Dutch gas. Projections of future natural gas production in this northern province were very positive as the region was expected to continue producing at least 30 billion cubic meters (bcm) per year until 2030.[103] Despite positive projections two local developments were about to disturb the trajectory of Groningen gas production. First, the region was experiencing an increase in seismological activity since 2003.[104] Even though minor earthquakes were happening more frequent, in 2010 there were no concrete plans to cut production in Groningen. In the years to come however, this would lead to issues. Second, despite general positivity on Groningen's future, reports acknowledged the maturity of Groningen as gas producing region and maintained at least an annual production loss of 1bcm.[105] A mature gas field generally signifies the long use of a gas field, and that discovery of new gas pockets becomes less frequent. The 2011 dip in Dutch production might be exemplary for the age of Groningen gas fields.[106] So, how could the Netherlands aid the EU during a Russian supply disruption? The age of the field in combination with the production drop in 2011 make it safe to assume the Netherlands would not be able to increase production in the short term. Therefore, the Dutch gas field does not increase accessibility and in turn affordability. In the case of the UK, gas production has been in decline since the early 2000s. The UK natural gas production decline is associated with 'progressive depletion of developed resources, diminishing exploration activity, very few sizeable new

[100] British Petroleum Company, "BP Statistical Review of World Energy 2019," 32.
[101] British Petroleum Company, 34.
[102] European Commission. Directorate General for Energy., *EU Energy in Figures*, 2012, 40.
[103] EBN, "Focus on Dutch Gas 2010" (Utrecht: EBN, 2010), 18–19.
[104] K. van Thienen-Visser and J. N. Breunese, "Induced Seismicity of the Groningen Gas Field: History and Recent Developments," *The Leading Edge* 34, no. 6 (June 2015): 664.
[105] EBN, "Focus on Dutch Gas," 4.
[106] British Petroleum Company, "BP Statistical Review of World Energy 2019," 32.

discoveries and higher unit operating costs.'[107] Therefore, a production increase in response to a Russian supply disruption seemed unlikely.

Natural gas imports

In 2010 the major natural gas suppliers to the EU were Russia, Norway, and Algeria. The EU imported 371.8 bcm of natural gas to satisfy its natural gas consumption.[108] Russia was the largest natural gas supplier in 2010 supplying 25% of EU natural gas demand and is therefore essential for EU energy security. As evident from figure 4, Norway and Algeria also supplied a substantial portion of EU consumption. Were Norway and Algeria able to increase their export to the EU during a Russian supply disruption?

In 2010, Norway constituted a significant part of EU natural gas import, as depicted in figure 4.[109] Prior to 2010, forecasts regarding Norway natural gas production varied from high to low estimates. The high estimate, in which natural gas fields in the North Sea, Norwegian Sea, and the Barents Sea are taken into account with fast development of said fields, Norway could have produced 115bcm in 2010.[110] In addition, the pipelines connecting Norway to the EU had a combined capacity of 130bcm meaning these pipelines were underutilized.[111] In theory, the pipelines would be able to transport nearly 30 extra bcm of natural gas annually to the EU. If the high production estimate was correct, resulting in 115bcm Norwegian gas production in 2010, Norway could have supplied an additional 9bcm to the EU. However, as is evident from the source material, Norway never reached this high production forecast. The plausibility of Norway increasing production to substitute for Russian gas is low. Consequently, Norwegian natural gas import does not cater to an increase of accessibility.

[107] Marshall Hall, "Gas Production from the UK Continental Shelf: An Assessment of Resources, Economics and Regulatory Reform" (Oxford Institute for Energy Studies, July 2019), 4.
[108] European Commission. Directorate General for Energy., *EU Energy in Figures*, 2012, 63.
[109] European Commission. Directorate General for Energy., 22.
[110] Bengt Söderbergh, Kristofer Jakobsson, and Kjell Aleklett, "European Energy Security: The Future of Norwegian Natural Gas Production," *Energy Policy* 37, no. 12 (December 2009): 5052–53.
[111] Andrea Gilardoni, *The World Market for Natural Gas: Implications for Europe* (Berlin Heidelberg: Springer, 2008), 64.

	Production[112]	Export to EU[113]	% of EU import	% of EU consumption
Russia	598.4	130.4	35%	25%
Norway	106.4	100.5	27%	19%
Algeria	77.4	50.3	14%	10%

Figure 4. EU natural gas import source.

In 2010 Algeria supplied the EU through 2 pipelines. The Maghreb-Europe pipeline with 12.5bcm capacity, transporting gas to Spain, and the Trans-Mediterranean pipeline, with 30.2bcm capacity, transporting gas to Italy. In 2010 the Maghreb-Europe pipeline transported 9bcm.[114] In addition, the Maghreb-Europe pipeline transported 25bcm natural gas.[115] Combined, these two pipelines utilized 34bcm of the 42.7bcm capacity. In addition, the Medgaz pipeline, with 8bcm capacity transporting gas to Spain, was under construction and planned for inauguration in March 2011.[116] LNG made up the remainder of natural gas exported by Algeria to the EU.

In 2009 demand for Algerian gas had dipped due to the global financial crisis, resulting in lower production levels.[117] Consequently, a Russian supply disruption would result in a demand resurgence and allow Algeria to increase production. However, several issues prevented an increase in production. In early 2010 a corruption investigation led to the suspension of more than a dozen Sonatrach executives, the Algerian gas company, on corruption charges. The mismanagement of Sonatrach 'became […] associated with the […] overall governance […] that had characterised the Algerian energy sector in the 2000s and […] the need for change'.[118] Another issue was the 'chronic underinvestment' leading to worsening infrastructure and the necessity for new gas field development. Significant investment would be necessary to make Algeria a reliable supplier.[119] By 2010, it seemed unlikely Algeria could have made an impact during a Russian supply disruption because of its inability to increase production in the short and long term. Finally, Algerian natural gas, excluding LNG, enters Europe through the previously mentioned pipelines to Spain and Italy. For the natural gas to reach the member states most vulnerable to a Russian supply disruption, pipeline infrastructure and interconnection points connecting Italy and Spain to the European gas grid are necessary. This

[112] British Petroleum Company, "BP Statistical Review of World Energy 2019," 32.
[113] European Commission. Directorate General for Energy., *EU Energy in Figures*, 2012, 63.
[114] International Energy Agency, "Gas Trade Flows."
[115] International Energy Agency.
[116] "MEDGAZ | The Company | History | Background," accessed April 8, 2022, https://www.medgaz.com/medgaz/pages/historia_antecedentes-eng.htm.
[117] Hakim Darbouche, "Algeria's Shifting Gas Export Strategy: Between Policy and Market Constraints," *The Oxford Institute for Energy Studies* 48 (2011): 5.
[118] Darbouche, 6.
[119] Darbouche, 5–10.

will be elaborated upon in 'Infrastructural deficiencies'. However, an increase in Algerian gas production will be able to supplant Italian loss of Russian gas.

In 2010, aside from the use of existing external natural gas sources, another pipeline project was planned. The Nabucco pipeline was to transport natural gas from different parts of the Middle East to Austria. The potential suppliers for Nabucco in 2010 were Azerbaijan, Turkmenistan, and Iran.[120] Nabucco's projected capacity Nabucco was 8bcm, but after several years other legs of the pipeline would be finished increasing its capacity to 31bcm.[121] However, this pipeline's potential existence already faced its first defeat in 2009 when only a portion of stake holding countries signed the intergovernmental agreement.[122] Despite this discouraging development, the pipeline was still pursued and projected to finish in 2014. Be that as it may, the pipeline had no effect on a supply disruption in 2010.

LNG imports

Another opportunity for the EU to increase its natural gas accessibility was the import of liquefied natural gas (LNG). LNG is natural gas that is cooled to temperatures below 162° Celsius turning the gas to a liquid. Natural gas takes up 600 times less space when it is cooled and converted to a liquid. This allows for efficient shipping of natural gas.[123] Once the LNG reaches its destination its turned back into natural gas and injected into the natural gas pipeline network.

In 2010 the EU housed 17 liquefied natural gas (LNG) terminals. These LNG terminals had a 165bcm combined send-out capacity, the capacity to receive LNG from ships and convert the liquid to natural gas.[124] This send-out capacity was not fully utilized as, after regasification, only 89.29bcm of natural gas was imported to the EU as LNG.[125] The member states with LNG processing capacity in the EU and their respective number of terminals and send-out capacity is available in figure 5.

[120] Erkan Erdogdu, "Bypassing Russia: Nabucco Project and Its Implications for the European Gas Security," *Renewable and Sustainable Energy Reviews* 14, no. 9 (December 2010): 2943.
[121] Erdogdu, 2944.
[122] Elina Brutschin, *EU Gas Security Architecture: The Role of the Commissions's Entrepreneurship*, Palgrave Pivot (London: Palgrave Macmillan, 2016), 22.
[123] "Liquefied Natural Gas (LNG) | Shell Global," accessed June 10, 2022, https://www.shell.com/energy-and-innovation/natural-gas/liquefied-natural-gas-lng.html.
[124] King & Spalding LLP, "LNG in Europe 2018: An Overview of LNG Import Terminals in Europe," 2019.
[125] Jean-Yves Robin and Vincent Demoury, "GIIGNL Annual Report 2010" (International Group of Liquefied Natural Gas Importers, 2011), 5.

It seems that the EU's LNG send-out capacity is adequate enough to substitute for a large amount of natural gas during a supply disruption as the EU utilized only a fraction of its send-out capacity. Around 85.4bcm of send-out capacity was not used. However, due to the geographical location of these terminals they could not substitute Russian gas. The majority of the terminals, apart from those in the UK and Belgium, were in Southern Europe. Imported LNG could not reach the countries that relied on Russian gas in significant amounts. The next section of this chapter will explain why this was the case.

	# of terminals[126]	Send-out capacity in bcm[127]	Import in bcm[128]
EU	17	165	79.6
Spain	6	69.5	27.5
United Kingdom	3	48.1	18.7
France	4	26.9	13.9
Italy	2	11.5	9
Belgium	1	9	6.4
Portugal	1	7.6	3
Greece	1	5.2	1.1

Figure 5. Terminals, send-out capacity and imported LNG in the EU.

Infrastructural deficiencies

Several infrastructural deficiencies were present in 2010 in the EU which hamper the utilization of the LNG send-out capacity. These deficiencies, as this paragraph will show, also obstruct additional pipeline deliveries from Algeria.

The European gas network in 2010 had several issues. The member states that relied the most on Russian natural gas, as presented in figure 6, were situated primarily in Eastern Europe. This would not be a problem if the EU natural gas network was flexible and allowed transportation all across Europe without limitations. Alas, limitations were plentiful. The European gas network in 2010 lacked bidirectional connections at cross-border points. A cross-border point lies on the border between two member states and connects the natural gas pipeline network of a member state, with the gas pipeline network of another member state. Cross-border points come in two varieties: unidirectional and bidirectional. A unidirectional cross-border point can only transport gas in one direction. A bidirectional cross-border point can transport gas in both

[126] King & Spalding LLP, "LNG in Europe 2018."
[127] King & Spalding LLP.
[128] British Petroleum Company, "BP Statistical Review of World Energy 2011" (London: British Petroleum Co., 2011).

directions and offers the option to reverse flow when necessary. Also, the borders that were equipped with bidirectional cross-border points in 2010 often lacked significant capacity.

	Import from Russia	Total imports	% import dependence
Austria	5.25	6.77	75.6
Bulgaria	2.16	2.16	100
Czech Republic	8.44	11.54	73.1
Estonia	0.36	0.36	100
Finland	4.5	4.5	100
Germany	34.43	92.82	37.1
Greece	2.05	2.71	75.6
Hungary	6.47	7.47	86.6
Italy	14.2	66.26	21.4
Latvia	0.66	0.66	100
Lithuania	2.63	2.63	100
Poland	9.08	10.15	89.5
Slovakia	5.47	5.47	100
Slovenia	0.5	0.88	56.8

Figure 6. import dependence on Russian natural gas.[129]

In 2010, Spain and Portugal had combined 77.1bcm LNG send-out capacity of which only 30.1bcm was utilized. In theory, Spain and Portugal could increase LNG deliveries by 47bcm. However, during a Russian supply disruption, the Spanish/Portuguese LNG converted to natural gas would be unable to reach member states reliant on Russian natural gas in significant amounts. The cross-border connections Larrau and Biriatou-Irun on the French-Spanish border are equipped with bidirectional capacity but have a combined capacity less than 2bcm annually when transporting gas from Spain to France.[130] Consequently, imported LNG from Spain and Portugal cannot reach the member states reliant on Russian natural gas.

France had LNG import terminals with a significant send-out capacity of 27bcm, of which France utilized 14bcm.[131] LNG regassified by France runs into issues at several cross-border interconnection points. France had three cross-border interconnections with Belgium, transporting gas to France, lacking bidirectional capacity. Additionally, France connects with Germany and Open Grid Europe at Medelsheim/Obergailbach, once again delivering gas to France, without bidirectional capacity.[132] France was able to deliver natural gas to Switzerland and Switzerland thereafter to Italy. Italy connects to both Austria and Slovenia, both countries with significant import dependence on Russia. Italy could deliver gas to Slovenia but this

[129] British Petroleum Company, 29.
[130] ENTSOG, "The European Natural Gas Network 2010."
[131] King & Spalding LLP, "LNG in Europe 2018"; British Petroleum Company, "BP Statistical Review of World Energy 2019," 28–29.
[132] ENTSOG, "The European Natural Gas Network 2010."

connection point only had around a 1bcm capacity. In Austria's, the cross-border connection point lacks bidirectional capacity.[133]

Likewise, Greek border points also lacked bidirectional capacity. Greece connected to Bulgaria at one unidirectional cross-border point. This point only allowed transport from Bulgaria to Greece. In the case of a Russian supply disruption Greece could increase LNG imports with 4.1bcm to cater to domestic demand but could not aid surrounding countries.[134]

The last countries with significant LNG infrastructure would be the UK and Belgium with a combined 57.1bcm send-out capacity of which 25.3bcm was utilized. Through a combination of the North Sea pipeline, Interconnector, with 25.5bcm capacity, through which 9bcm flowed in 2010, and Belgian LNG terminals, an additional 31.8bcm could be transported to the EU grid through Belgium.[135]

This paragraph showed that LNG imports increase accessibility to natural gas during a Russian supply disruption. However, LNG import will only cater to a small supply of additional natural gas. This paragraph also showed that most European LNG send-out capacity was useless in 2010 in the event of a Russian supply disruption.

Underground gas storage capacity

The use of underground gas storages can offer short term relief in the case of a Russian supply disruption. Underground gas storages employ empty aquifers, hard-rock caverns, depleted reservoirs, mines, or subterranean salt deposits to store natural gas. Underground gas storage contain natural gas with two designations: cushion gas and working gas. Cushion gas is permanent inventory necessary to maintain pressure and working gas is withdrawable gas available to the market.[136] When natural gas levels in storage decrease, the pressure decreases which results in a lower withdrawal rate. Withdrawal rate is the amount of natural gas which can be extracted from underground gas storage in a period of time, until cushion gas has been reached.[137]

[133] ENTSOG.
[134] ENTSOG.
[135] International Energy Agency; ENTSOG, "The European Natural Gas Network 2010."
[136] "The Basics of Underground Natural Gas Storage - U.S. Energy Information Administration," accessed April 24, 2022, https://www.eia.gov/naturalgas/storage/basics/.
[137] Nuria Rodríguez-Gómez, Nicola Zaccarelli, and Ricardo Bolado-Lavín, "European Ability to Cope with a Gas Crisis. Comparison between 2009 and 2014," *Energy Policy* 97 (October 2016): 463–64.

Employing these storages can act as a buffer during a supply disruption. However, only to a certain degree. These storages are able to deliver natural gas depending on the amount of natural gas stored. When these storage are depleted, and the withdrawal rate declines, their usability will decrease. Consequently, underground gas storage only caters to short-term relief. In addition, the level of natural gas in these storages is dependent on the time of year, higher before winter, lower during summer, and the gas in the storages is often times reserved for regular usage. When natural gas is withdrawn from underground gas storages, a natural gas shortage is delayed, but will reappear if the supply disruption endures.[138]

The opening stock of the EU in 2010 in underground gas storage was 63.1bcm, while the closing stock was 56.5bcm.[139] The EU housed 129 storage facilities with a combined working gas capacity in underground gas storage of 82bcm.[140]

The viability of employing natural gas stored in underground gas storages during a Russian supply disruption is hindered by two factors: decreasing withdrawal rate tied to the amount of natural gas stored and depleting underground gas storage converts a short-term problem to a long-term problem. Consequently, using underground gas storages positively influences accessibility but only mildly.

Policies countering a supply disruption

In the period 2000-2010 the need for successful coordination on natural gas supply security was much higher than the period before, 1980-2000.[141] Consequently, several groups and regulations were established to cater to this need.

Two groups were set up in this period which influence the effects of a Russian supply disruption. The Gas Coordination Group, based on directive 2004/67/EC, was established in 2006 and tasked with the coordination of supply security in the European Community.[142] In addition, the group had to assist Member States in the coordination of measures taken to deal

[138] Rodríguez-Gómez, Zaccarelli, and Bolado-Lavín, 464.
[139] "Home - Eurostat."
[140] Nuria Rodríguez-Gómez, Nicola Zaccarelli, and Ricardo Bolado-Lavín, "Improvement in the EU Gas Transmission Network Between 2009 and 2014," *JRC Science for Policy Report*, 2015, 56.
[141] Brutschin, *EU Gas Security Architecture*, 43.
[142] Council of the European Union, "Council Directive 2004/67/EC of 26 April 2004 Concerning Measures to Safeguard Security of Natural Gas Supply," 2004.

with a supply disruption.[143] The Gas Coordination Group proved very limited in its usefulness as it only started meeting in 2009 after the Russo-Ukrainian gas dispute.[144]

The second group influencing the effects of a Russian supply disruption is the network of energy security correspondents. The network was set up to create 'an early warning system for possible energy disruptions through a coordination between the European Commission, the Council Secretariat and the member states.'[145]

In addition to these groups, policies were installed in an attempt to improve energy security. In 2009 the Third Energy Package, the prior packages released in 1996 and 2003, was installed in the EU. The goal of the Third Energy Package was to liberalize the electricity and natural gas market.[146] For this reason the package has also been dubbed the 'Third Liberalisation Package'.[147] The second directive of the Third Energy Package, Directive 2009/73/EC, repealing Directive 2003/55/EC, concerned common rules for the internal market in natural gas.[148] Three policies in this directive affected the consequences of a Russian supply disruption: unbundling obligations and the 'Gazprom Clause', and third party access obligations.

Through implementing the unbundling obligations of Article 9, energy companies are not allowed to control natural gas supply, transportation and production.[149] Therefore, this article prevents energy monopolies.[150] In addition, sometimes called the 'Gazprom Clause', article 11 introduced that third country operators of EU transmission and distribution networks are subject to the same rules as EU operators.[151] Consequently, article 9 stating that production companies must be separated from distribution and transmission, also applies to third country companies reducing Russian control of the European natural gas market. Lastly, third party access obligations, where other companies must be granted access to transmission and distribution

[143] Commission of the European Communities, "Commission Decision of 7 November 2006 Establishing the Composition of the Gas Coordination Group," 2006.
[144] Brutschin, *EU Gas Security Architecture*, 78.
[145] Brutschin, 20.
[146] Adrien de Hauteclocque and Vincent Rious, "Reconsidering the European Regulation of Merchant Transmission Investment in Light of the Third Energy Package: The Role of Dominant Generators," *Energy Policy* 39, no. 11 (November 2011): 7069.
[147] Tatiana Romanova, "Is Russian Energy Policy towards the EU Only about Geopolitics? The Case of the Third Liberalisation Package," *Geopolitics* 21, no. 4 (October 2016): 858.
[148] European Parliament and Council of the European Union, "Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 Concerning Common Rules for the Internal Market in Natural Gas and Repealing Directive 2003/55/EC," 2009, 43.
[149] European Parliament and Council of the European Union.
[150] Brutschin, *EU Gas Security Architecture*, 47.
[151] Guillaume Van Der Loo, "EU-Russia Trade Relations: It Takes WTO to Tango?," *Legal Issues of Economic Integration* 40, no. 1 (2013): 20.

systems, and LNG facilities allows other companies access to utilize infrastructure during a supply disruption.[152]

The implications of these groups and policies for a Russian supply disruption are limited at best. When a supply disruption is imminent, the network of energy security correspondents resulted in earlier awareness. Consequently, member states could prepare better for the supply disruption and utilize an emergency plan set up by the Gas Coordination Group. However, in 2010 the Gas Coordination Group only had limited meetings.[153] Therefore, the Gas Coordination Group could hardly fulfill its tasks of coordinating supply security and assisting member states in coordinating measures during a supply disruption.[154]

The eventual improvement of gas supply security came with Regulation (EU) NO 994/2010. However, the implementation of this regulation and its effects came after 2010. Therefore, this regulation will be extensively discussed in chapter 3.

Interdependence sensitivity

This chapter has shown that the EU is highly dependent on Russian gas. During a Russian supply disruption the EU would lose 25% of its natural gas consumption. Still, the degree of costly effects incurred on member states will vary. As depicted in figure 6, not all member states relied equally on Russian gas. The countries that depend the most on Russian gas would incur the highest costly effects. Given the amount of stored gas within their borders, the effects of the supply disruption would be felt instantaneously. Similar to the natural gas disruption in 2009 which severely hit the Balkans, the dependent states would see losses of electricity and household heating. How harsh the implications would be depends on different factors. In 2009 the disruption occurred in the winter. The cold climate of some of the dependent states resulted in a humanitarian disaster.[155] Luckily, this disruption lasted less than a month. For the other European States that consume no Russian gas the implications would be less severe. Gas prices would rise and trade with their eastern neighbors might decrease, the implications would be mild.

[152] European Parliament and Council of the European Union, "Directive 2009/73/EC."
[153] Brutschin, *EU Gas Security Architecture*, 78.
[154] Commission of the European Communities, "Commission Decision of 7 November 2006 Establishing the Composition of the Gas Coordination Group."
[155] Jonathan Stern, "Gas Deliveries on Humanitarian Grounds," 2009.

Interdependence vulnerability

To determine the liability to costly effects for the EU in the event of a Russian supply disruption after policy alteration, the indicators accessibility and affordability will be employed.

The EU had several strategies to replace Russian supply loss. An increase in domestic production seemed unlikely in the short term as both the UK and Dutch gas production areas were mature and in decline. Increasing imports was better suited to increase accessibility to natural gas. As we have seen, Norwegian pipelines to the EU were equipped with enough capacity. Still, the resource giant seemed unlikely to increase production in the short term as production forecasts were high but never reached their potential. In contrast, Algeria was more likely to increase production. The North-African country reduced production in 2009 due to diminished demand. A supply disruption would increase demand drastically. If Algeria could overcome bad management and deteriorating infrastructure, the country could have proven useful in supplying Italy with gas increasing accessibility. Another strategy for the EU to increase accessibility to natural gas is to increase LNG imports. Greek LNG can only aid Greece in substitution of around 2bcm. In contrast, utilizing Belgian and UK LNG granted the EU access to an additional 31.8bcm combined. Increased LNG imports do decrease affordability as the per-unit costs of LNG tend to be higher than natural gas transported through pipelines.

The final strategy for the EU to increase accessibility is the use of gas stored in underground gas storages. Utilization of underground gas storage has downsides. The gas is usually reserved for everyday use, meaning use will delay gas shortage issues. This fact in combination with a lower closing stock compared to the opening stock means more gas was already withdrawn than injected. Consequently, natural gas storage in 2010 does not increase accessibility.

Lastly, the gas coordination group and the network of energy security correspondents were in their infancy. The effects of unbundling policies to reduce Russian influence over the EU barely affected accessibility and affordability.

Conclusion

This chapter determined the degree of interdependence sensitivity and vulnerability of the EU to a Russian supply disruption prior to the construction of Nord Stream in 2010. Clearly, the dependent member states were sensitive to a Russian supply disruption. The remaining EU members would experience costly effects, but these would be incomparable to the experience of their eastern neighbors. Vulnerability has more significance than sensitivity. The strategies

available to the EU increased availability but lowered accessibility. Therefore, in 2010 the concerns of the opposition to Nord Stream were grounded. Poland and the Baltic States were vulnerable to the effects of a Russian supply disruption. Still, their opposition to the pipeline might be exorbitant. In 2010 vulnerability to a Russian supply disruption was high, perhaps too high. Their inability to substitute Russian gas indeed proves to be a catastrophe. Does the construction of Nord Stream indeed worsen their fate? Perhaps Nord Stream transformed their situation during a Russian supply disruption from tragic to calamitous. However, they could not foresee the developments of EU natural gas infrastructure on the horizon. Maybe the EU successfully improves its infrastructure and policies enough to handle a supply disruption, but are the improvements enough? Will the EU, even with the construction of Nord Stream, be able to resist a supply disruption? To eliminate these questions the following chapter will establish how well the EU could endure a Russian supply disruption in 2017. The degree of interdependence sensitivity and vulnerability after the construction of Nord Stream will be determined. Consequently, in chapter 3 its findings will be compared to the findings of chapter 2 and conclude how Nord Stream has affected Russian ability to employ a supply disruption.

Chapter 3: A Russian supply disruption after the construction of Nord Stream

The EU-Russian relationship experienced a tumultuous period in 2010-2017. Despite Ukraine's position in the middle of East and West, its desire to side with the West was not welcomed by the Kremlin. In 2014 little green men invaded the Ukrainian provinces Luhank and Donetsk and Russia annexed the Crimean peninsula.[156] War had returned to Europe. The world condemned Russia for its digression and the EU imposed heavy sanctions.[157] Once again, dependence on Russian gas took center stage in the EU as an important natural gas pipeline traversed Ukrainian soil. After the annexation in 2014 natural gas imports from Russia declined due to sanctions. However, the total imports quickly returned to their previous level, and as a consequence of Nord Stream, continued its growth, as depicted in figure 7. Against this background this chapter will focus on 2017, the year Nord Stream's capacity was fully utilized. This chapter will provide an answer to the following two questions:

1. To what degree was the EU subject to interdependence sensitivity in 2017?
2. To what degree was the EU subject to interdependence vulnerability in 2017?

To answer these sub questions this chapter will first establish the effects of Nord Stream on the EU natural gas market. In addition, the available natural gas to the EU through domestic production, natural gas imports, LNG imports, and underground gas storage will be determined. Thereafter, this chapter will highlight the various improvements made to natural gas infrastructure. These improvements are the consequence of existing and new regulation. Besides the infrastructural improvements, this chapter will also discuss the additional effects of these regulations. After the establishment of the factors influencing the EU's resilience to a Russian supply disruption, both the degree of interdependence sensitivity and vulnerability will be determined.

Nord Stream

The construction and opening of Nord Stream in 2011 increased accessibility of the EU to natural gas as evident from figure 7. Consequently, In the period 2010-2017, EU natural gas imports from Russia increased EU dependence on Russia for 38% of its total natural gas consumption. The total increase in imports is about the same as the total imported billion cubic

[156] Tor Bukkvoll, "Why Putin Went to War: Ideology, Interests and Decision-Making in the Russian Use of Force in Crimea and Donbas," *Contemporary Politics* 22, no. 3 (July 2, 2016): 275.
[157] Nathalie Rodriguez, "The Event That Defied Putin: The Annexation of Crimea and Its Negative Economic Consequences with the European Union (EU)," The Jean Monnet/ Robert Schuman Paper Series, 21, no. 10 (2021): 5–6.

meters (bcm) through Nord Stream. Therefore, the increased Russian import can be completely attributed to Nord Stream.

The increased import from Russia had several downsides. The EU previously underscored its aim to diversify gas imports. Nord Stream has had the opposite effect. Nord Stream diversified the routes for natural gas to reach the EU, but the consequent underutilization of the pipelines on Ukrainian soil had the reverse effect.[158] In essence, Nord Stream diversified import routes but not import sources.

Year/Gas in bcm	**EU consumption[159]**	**EU production[160]**	**Russian import[161]**	**Share Russian gas of EU consumption**	**Nord Stream[162]**
2010	521.3	183.8	130.4	25.02%	0
2011	471	164.2	116.6	24.76%	0.6
2012	459.1	153.7	116.6	25.40%	11.3
2013	451.2	151.5	137.6	30.51%	23.5
2014	401.7	138.2	125.8	31.30%	34
2015	418.7	125.7	132.9	31.74%	36
2016	449.3	124.7	167.2	37.21%	43.7
2017	465.7	119.7	178.7	38.38%	49.4

Figure 7. Nord Stream import.

Domestic natural gas

As expected, natural gas produced domestically in the EU saw a sharp decrease as evidenced in figure 8. The major producers, being the UK and the Netherlands, decreased production significantly.[163] As mentioned in chapter 2, the Netherlands experienced seismological activity. This seismological activity around Groningen, where the major Dutch gas production fields are located, increased in the period 2010-2017 resulting in further cuts in production.[164] This decrease in domestic production decreases the accessibility to natural gas for the EU.

[158] Eric Pardo Sauvageot, "Between Russia as Producer and Ukraine as a Transit Country: EU Dilemma of Interdependence and Energy Security," *Energy Policy* 145 (October 2020): 3.
[159] British Petroleum Company, "BP Statistical Review of World Energy 2019," 34.
[160] British Petroleum Company, 32.
[161] European Commission. Directorate General for Energy., *EU Energy in Figures: Statistical Pocketbooks 2012-2020*, EU Energy in Figures (Luxembourg: Publications Office of the European Union, n.d.).
[162] European Commission, "Gas Trade Flows - Data Product," IEA, accessed March 7, 2022, https://www.iea.org/data-and-statistics/data-product/gas-trade-flows.
[163] British Petroleum Company, "BP Statistical Review of World Energy 2018" (London: British Petroleum Co., 2018), 29.
[164] "Dutch Government to Cut Groningen Gas-Field Output - WSJ," accessed May 4, 2022, https://www.wsj.com/articles/dutch-government-to-cut-groningen-gas-field-output-1435076916.

Year/bcm	Total EU	UK	NL
2010 production	183.8	57.9	73.8
2017 production	119.7	41.9	36.6
2010 consumption	521.3	98.5	45.6
2017 consumption	465.7	78.8	36.1

Figure 8. Natural gas production and consumption in the EU of which UK, and NL.[165]

Natural gas imports

Aside from the substantial increase in imports from Russia, the EU also expanded imports from Norway. The increased Norwegian production capacity is the main reason why the EU was able to expand imports from Norway. In 2017 Norway produced 123bcm natural gas of which the EU imported 117bcm.[166] As projected around 2010, the Norwegian production peak was reached in 2017, as in the years after Norwegian production started a steady decline.[167]

In the period 2010-2017 as evidenced in figure 9, the construction of the Medgaz pipeline increased the total import capacity from Algeria. Despite this increase in import capacity the total gas imported from Algeria remained about the same.[168] Even though the Medgaz pipeline increased import capacity from Algeria, Algerian gas is clearly in decline. The Oxford Institute for Energy Studies identified this decline and attributed it to the 'incontrovertible' decrease in production, insecure investment climate, increase in domestic demand, and anti-fracking protests.[169] In addition, the Maghreb-Europe pipeline will be decommissioned in 2021 further exemplifying the decline in Algerian production.[170]

year/bcm per pipeline	Medgaz	Mahgreb-Europe	Trans Mediterranean	Total
2010 capacity	0	12.5	30.2	42.7
2017 capacity	9	12.5	30.2	51.7
2010 import	0	9	25	34
2017 import	6.5	7.6	18.8	32.9

Figure 9. Algerian capacity and import per pipeline.

[165] British Petroleum Company, "BP Statistical Review of World Energy 2019," 32–34.
[166] European Commission. Directorate General for Energy., *EU Energy in Figures: Statistical Pocketbook 2019*, EU Energy in Figures (Luxembourg: Publications Office of the European Union, 2019).
[167] British Petroleum Company, "BP Statistical Review of World Energy 2021" (London: British Petroleum Co., 2021).
[168] European Commission, "Gas Trade Flows - Data Product."
[169] Ali Aissaoui, "Algerian Gas: Troubling Trends, Troubled Policies" (Oxford Institute for Energy Studies, May 2016), 21–22.
[170] "What Impact Will the Maghreb-Europe Gas Pipeline Have on Morocco?," The Africa Report.com, September 13, 2021, https://www.theafricareport.com/125484/what-impact-will-the-maghreb-europe-gas-pipeline-have-on-morocco/.

The previous chapter discussed the insecure plans for the Nabucco pipeline project aimed to diversify EU gas imports.[171] Despite multiple countries official agreement for the project, Turkey and Azerbaijan cancelled Nabucco in June 2013 resulting in even greater reliance in Russian natural gas.[172] To replace Nabucco, the Trans-Adriatic pipeline linking the Trans-Anatolian pipeline with the European network, importing gas from Azerbaijan was instead constructed. However, this pipeline only started operations late 2020.[173]

LNG imports

In the period 2010-2017 the EU member states build eight additional LNG terminals resulting in 25 LNG terminals in total. Two terminals were located in Poland and Lithuania making them very suitable to substitute Russian gas during a supply disruption.[174] The improved LNG infrastructure and the connection of the Iberian Peninsula with the European gas network increased the feasibility of LNG utilization in the event of a Russian supply disruption. During the period 2015-2018 this infrastructure was barely utilized due to several factors. The LNG price in this period was at a relatively high level due to demand on the Asian market, with the inauguration of Nord Stream the price Europeans could pay for natural gas outcompeted LNG prices, and LNG utilization is by definition costlier due to liquification and regasification.[175] If the EU wants to utilize its LNG capacity in the event of a Russian supply disruption, it has to pay a firm price for LNG and commit to a 'high degree of usage and predictable unit delivery.'[176] LNG infrastructure will therefore bring significant costs to the EU, but would cater to a large portion, depending on the available LNG supply on the world market, of the European gas demand. This dependence on the available LNG supply does not pose a problem as around this time the US and Australian LNG production capacity were significantly growing. In the period 2008-2020, the global LNG supply more than doubled from 207bcm to 424bcm.[177] In addition, LNG is more flexible than natural gas transported through pipelines meaning a switch to LNG will allow the EU to make use of different suppliers.[178]

[171] Erdogdu, "Bypassing Russia."
[172] "European Union's Nabucco Pipeline Project Aborted - World Socialist Web Site," accessed May 12, 2022, https://www.wsws.org/en/articles/2013/07/13/nabu-j13.html.
[173] "TANAP," accessed May 12, 2022, https://www.tanap.com/en/project-background.
[174] King & Spalding LLP, "LNG in Europe 2018," 16–19.
[175] Aziiz Sutrisno and Floor Alkemade, "EU Gas Infrastructure Resilience: Competition, Internal Changes, and Renewable Energy Pressure," *Energy Reports*, 2020, 25–26.
[176] Sutrisno and Alkemade, 26.
[177] Sauvageot, "Between Russia as Producer and Ukraine as a Transit Country," 5–6.
[178] Sauvageot, 5.

Underground gas storage capacity

The natural gas and LNG opening stocks of the EU at the start of 2010 were 63.1bcm. The opening stock of the EU peaked in 2015 at 82bcm and was at 70.4bcm at the start of 2017.[179] The total underground gas storage working gas capacity increased from 82bcm in 2010 to 114bcm in 2017.[180] Consequently, during a supply disruption, the EU will have access to more natural gas and therefore a longer period before the effects of the disruption are felt. The increased underground gas storage capacity is not offset by the EU consumption level as consumption in the EU decreased in the period 2010-2017.

Policies

In the period 2010-2017 policies were installed specifically catered to increase gas supply security. The previous chapter identified infrastructural weaknesses in the European gas transmission network. Many of these weaknesses were also identified and solved resulting from Regulation (EU) 994/2010 and Regulation (EU) No 347/2013.[181] Regulation (EU) 994/2010 concerned increasing gas supply security in the EU, both infrastructurally and in aiding member states in preparation for a supply disruption, while Regulation (EU) No 347/2013 built upon the infrastructure section of 994/2010 specifically targeting infrastructural weaknesses both in the electricity and gas market.

In 2010 limited bidirectional capacity prevented LNG imported by Portugal and Spain to enter the central European gas network. The interconnection points at Biriatou and Larrau were already bi-directional, but their capacity was limited to 4.8bcm.[182] These interconnection points have been combined into one, VIP PIRINEOS, and their capacity expanded to 8.4bcm annually.[183] On the border between France and Belgium the capacity for France to transport gas to Belgium has been expanded. Previously, there were three interconnection points lacking bidirectional capacity. This infrastructural deficit has remained, but an interconnection point on the French-Belgian border at Alveringem was added with the capacity to transport 10.1bcm

[179] "Home - Eurostat."
[180] Gas Infrastructure Europe, "Storage Map 2018."
[181] European Parliament and Council of the European Union, "Regulation (EU) No 994/2010 of the European Parliament and of the Council of 20 October 2010 Concerning Measures to Safeguard Security of Gas Supply and Repealing Council Directive 2004/67/EC," 2010; European Parliament and European Council, "Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on Guidelines for Trans-European Energy Infrastructure and Repealing Decision No 1364/2006/EC and Amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009," 2013.
[182] ENTSOG, "The European Natural Gas Network 2010."
[183] ENTSOG, "The European Natural Gas Network 2017."

annually to Belgium. Consequently, LNG imported by France can enter the European network through Belgium. Further eastwards, interconnection points Mallnow on the German-Polish border, and Csanadpalota on the Romanian-Hungarian border acquired bidirectional capacity.[184] Consequently, gas imported using the LNG infrastructure of southern member states is able to reach the member states reliant on Russian gas.

In contrast, the lack of bidirectional capacity on the French-German border at Medelsheim, and on the French-Swiss border, is still in place.[185] While the EC identified the connection between Germany and the Czech Republic as an important interconnection point, the main interconnection point Waidhaus is still not bidirectional in 2017. The existing bidirectional capacity on the German-Czech border at interconnection point Hora Svaté Kateřiny/Deutschneudorf only has a 5bcm capacity annually.[186] However, the Czech republic has an annual consumption of 7.2bcm of natural gas resulting in the capacity of this interconnection point satisfying 69% of the Czech Republic's natural gas consumption.[187]

In addition to resolving infrastructural weaknesses, due to Regulation (EU) 994/2010 member states became obligated to enforce several policies. Even though the EC installed the regulation in 2010, the member states had time to enforce these policies. The majority of the policies in this regulation were in place across the EU in 2017. The member states' first obligation was to identify 'protected consumers' and ensure their access to natural gas when supplies are scarce or demand is exceptionally high.[188] In a report analyzing member states' efforts for the implementation of Regulation EU 994/2010, the commission staff concludes that protected consumers across the EU are unequally protected.[189] In the event of a Russian supply disruption certain member states will have catered to a steady natural gas supply for at least 30 days for protected consumers. However, as is evident from the report, this is not the case across the EU.

The second obligation was the implementation of the N-1 formula. The N-1 formula describes 'the ability of the technical capacity of the gas infrastructure to satisfy total gas demand […] in the event of disruption of the single largest gas infrastructure during a day of exceptionally high

[184] ENTSOG.
[185] ENTSOG.
[186] ENTSOG.
[187] European Commission. Directorate General for Energy., *EU Energy in Figures: Statistical Pocketbook 2019*, 184.
[188] European Parliament and Council of the European Union, "Regulation (EU) No 994/2010."
[189] "Report on the Implementation of Regulation (EU) 994/2010 and Its Contribution to Solidarity and Preparedness for Gas Disruptions in the EU," 2014, 6.

gas demand'.[190] In the same report from 2014 it is stated that all member states will adhere by 2016. The implementation of this rule has two consequences; the market will be able to fulfill demand during a supply disruption and, if this is not the case, the member state will make investments to satisfy the formula.[191]

The third obligation of Regulation EU 994/2010 was to implement bidirectional capacity at interconnection points on borders. The effects of Regulation EU 994/2010 can be found in the part on infrastructural improvements.

The fourth obligation was to implement risk assessments, preventive action plans and emergency plans. The report on the member states' implementation was critical. The quality of the assessments and plans varied because of the different methods and approaches. In addition, most assessments and plans failed to incorporate the regional level, instead focusing on the national level. The reports note a lack of cooperation and information sharing. Consequently, planned actions in the event of a supply disruption might interfere with actions neighboring countries proposed in their plans.[192] These assessments and plans require biannual revision. Therefore, their quality will improve as the years pass. The first evaluation was in 2014 meaning all member states will have produced another edition of their assessments and plans increasing their preparedness for a supply disruption.

New policies

The policies discussed in the previous chapter have changed the European gas situation in the period 2010-2017. In addition to the discussed policies, another policy has been enacted in the period 2010-2017. Regulation (EU) No 347/2013, primarily an expansion of Regulation (EU) 994/2010, furthered the infrastructural improvements of Regulation (EU) 994/2010. This new regulation indicates projects of common interest, being infrastructural improvements for both the European gas and electricity market.[193]

[190] European Parliament and Council of the European Union, "Regulation (EU) No 994/2010."
[191] European Parliament and Council of the European Union.
[192] "Report on the Implementation of Regulation (EU) 994/2010 and Its Contribution to Solidarity and Preparedness for Gas Disruptions in the EU."
[193] European Parliament and European Council, "Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on Guidelines for Trans-European Energy Infrastructure and Repealing Decision No 1364/2006/EC and Amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009."

Interdependence Sensitivity

In the event of a Russian supply disruption, before policies are altered to try to change the situation, the EU will suffer costs losing 38% of their natural gas consumption. The EU industries and consumers that rely the most on natural gas for production or energy will incur the heaviest damages. Without policy alterations these effects will be felt instantaneously as there will be less gas available to cater to heating for consumers, electricity for industry and consumers, and production will decrease. The EU regions reliant on Russian natural gas, like Germany and several east-European countries, will experience the heaviest effects. This equates to the EU experiencing a high degree of interdependence sensitivity in 2017.

Interdependence vulnerability

To determine the liability of costly effects for the EU in the event of a Russian supply disruption after alteration of policies, the indicators accessibility and affordability will be employed.

In 2017 the EU had four pursuable strategies to increase accessibility to natural gas; increase domestic production, increase imports, use underground gas storage (UGS), and finally increase LNG imports.

Domestic production and import increases were unlikely. Domestic production was declining for years and the producing countries were either unwilling or unable to reverse this trend. In addition, the main external natural gas sources for the EU, Norway and Algeria, were unable to increase production in the short term. Norway already reached peak production in 2017 and Algeria's declining production did not seem reversible.[194] Therefore, these strategies did not increase accessibility to natural gas and did not lead to a decrease of the liability to costly effects.

Increased utilization of UGS infrastructure and LNG imports were viable strategies to increase accessibility. Using gas stored in UGS would provide the EU with an alternative natural gas source, at least until UGS runs out. In addition, improved infrastructure of the European natural gas network allowed effective LNG terminal send-out capacity utilization. While most important interconnection points became bidirectional, this is not the case for every point resulting in disparities between member states in the possibility of natural gas reaching the member states' network.

[194] Aissaoui, "Algerian Gas," 20.

The use of natural gas in UGS would not increase costs for the EU. The gas in UGS was already paid for and the extraction of said gas from the ground was a matter of turning a valve meaning this will have close to no effect on affordability. In contrast, increased LNG import negatively influences affordability. LNG has higher operating costs due to the necessity for transportation, liquification and regassification. Another factor increasing LNG prices was the high demand for LNG on the Asian market, meaning the EU had to compete for LNG through pricing further decreasing affordability. Despite using LNG raising natural gas prices, it does allow the EU to continue 'business as usual' as households would not experience loss of heating, households and industry would not lose access to electricity, and industry would be able to continue production.

Another factor diminishing the liability to suffer costs is the preparedness of the member states for a supply disruption. The N-1 rule, risk assessments, PAP, and EP further diminish potential costs as consumers woudl not immediately experience the effects of a supply disruption.

Discussing the findings

This chapter determined the degree of interdependence sensitivity and vulnerability of the EU vis a vis Russia in 2017. The findings of this chapter are compared to the findings of the previous chapter using the indicators accessibility and affordability in figure 10.

Year	2017 compared to 2010	
Indicator	Accessibility	Affordability
Domestic natural gas	The EU produced less natural gas domestically. Also, a short-term increase in production was less plausible than in 2010.	Lower domestic natural gas production equates to more natural gas requiring substitution. This raises demand and consequently prices for natural gas.
Natural gas imports	The two other main import sources besides Russia, Norway and Algeria, were in decline. Short-term increase in imports was less plausible than in 2010.	Increase of import through pipelines is the most cost-effective. Absence of short-term import increases forces the EU to source more expensive gas.
Underground gas storage (UGS)	EU working gas capacity increased significantly allowing short-term access to natural gas.	Increased reserves equate to less short-term demand for Russian gas. However, if the supply disruption endures, the shortage will reemerge more intense as UGS gas is not reserved for emergency situations.
Liquified natural gas (LNG)	Increased LNG send-out capacity, in combination with infrastructure improvements, allowed the EU to significantly increase LNG imports.	LNG is more expensive than imports through pipelines due to higher operating costs and competition with the Asian market. Still, maintaining gas supply prevents more costly effects than incurred by high LNG prices.
Policies	Regulation (EU) 994/2010 prepared the EU for a supply disruption. Reduces demand and consequently increases accessibility.	Reduced demand makes natural gas price less likely to rise, consequently increasing affordability.

Figure 10. comparison between 2017 and 2010.

The construction and use of Nord Stream resulted in a hefty increase of interdependence sensitivity, that is, the liability to suffer costs imposed by external events prior to alteration of policies, by increasing dependence on Russian gas. The EU's access to natural gas became less diversified and, in the event of a supply disruption, more liable to costly effects. However, after analysis of the policies in place, and natural gas infrastructure in the EU, the opposite is the case for interdependence vulnerability. In 2017 the EU had plenty tools at its disposal to minimize the costly effects of a supply disruption. The EU was not able to achieve complete mitigation of the liability to costly effects in 2017, but the height of the costly effects, determined by the level of accessibility and affordability, seems manageable, and a clear improvement compared to 2010. Even though affordability of natural gas was low through LNG

imports, because of the high level of accessibility the EU would continue functioning and other costly effects, linked to an inadequate supply of natural gas, would be circumvented. Clearly, the EU's newfound ability to utilize LNG imports was the most important development countering a supply disruption.

Conclusion

This thesis sought to determine the extent to which Nord Stream affected Russia's ability to employ a supply disruption as a coercive measure against the EU. There is no doubt that the opening of Nord Stream increased European dependence on Russian gas. Clearly, the EU became more sensitive to external change, in this case a Russian supply disruption, in 2017 compared to 2010. Increased natural gas imports raised the share of Russian gas of total European consumption from 25% to 38%. Despite the reduction of natural gas consumption, in 2017 the increased capacity of Nord Stream was fully utilized and corresponds to the real increase of natural gas imported from Russia, 130.4bcm to 178.7bcm. Consequently, in 2017 the EU loses a larger part of consumption, both as a share and real number, than in 2010.

However, interdependence sensitivity does not equate to power or ability to successfully employ coercive measures. To demonstrate Russia's ability to employ a supply disruption as a coercive measure against the EU, interdependence vulnerability is more vital. As professed by Keohane & Nye, interdependence vulnerability has a strategic dimension.

The establishment of EU vulnerability after the opening of Nord Stream is more complicated. This thesis has analyzed a Russian natural gas supply disruption in the EU and concluded that Nord Stream has affected Russia's ability to employ a supply disruption, as is evident from the high level of sensitivity, but positive developments in EU gas infrastructure, in combination with the policies as formulated in Regulation (EU) 994/2010 and Directive/73/EC, significantly counter most costly effects resulting from the supply disruption. Employing the indicators accessibility and affordability allowed comparison between 2010 and 2017. Employing the indicator 'accessibility' showed that in 2010 short-term alternative sources of natural gas were barely available, or infrastructure was lacking, to substitute Russian natural gas during a supply disruption. In contrast, accessibility showed that in 2017 the EU did have significant alternatives likes liquified natural gas and underground gas storage. Also, the indicator 'affordability' showed that the strategies available in 2017 would produce plenty costly effects. Despite low affordability in 2017, the economic damage prevented by allowing society at large to maintain adequate natural gas supply, and consequent continuation of 'business as usual', weighs up against the decreased natural gas affordability. In 2017 the EU was still vulnerable to a supply disruption, but the degree of vulnerability was lower compared to 2010. The construction of Nord Stream had a profound influence on the implications of a Russian supply disruption, but the EU has adapted to the possibility of such an event occurring. Most member states, as regional differences still remain, will be able to survive. A supply disruption will result

in inflation and increased living costs, but the increased EU natural gas network resilience will be sufficient for most member states to endure.

The introduction of this thesis identified a clear schism in the literature on the EU-Russian relationship. On the one hand, neo-realists who underline EU or Russian power over the other, and on the other hand, neoliberals who emphasize the potential for decreased conflict through cooperation. In the words of Dominique Finon, the EU-Russian relationship 'is developing more as neo-realist theory predicts and [realism and liberalism] are increasingly entangled.'[195] In agreement with Finon, the position of this thesis is ambivalent in this debate as the findings can be interpreted in different ways.

If one interprets the finding of this thesis with a realist lens, one could argue that the infrastructural improvements and policies enacted in the period 2010-2017 have threatened Russia and disturbed the balance of power. By lowering Russian coercive power over the EU, expressed in its ability to inflict costly effects on the EU through a supply disruption, Russia acquired a more inferior position in the world and has decreased ability to influence outcomes. By making significant improvements to the EU natural gas network, the EU has threatened Russian ability to influence outcomes diminishing its security. In the spirit of Krickovic, this can be interpreted as a security dilemma 'where neither side can improve its security without threatening the security of the other side.'[196] Classical realists that argue the existence of a zero-sum game might even claim that by decreasing Russian power, the EU has increased its own power.

On the other side a liberal might interpret the findings differently. A liberal could argue that the construction of Nord Stream catered to an increase in interdependence and cooperation decreasing the potential for conflict. The infrastructural improvements in the European natural gas network have further facilitated liberalization of the gas market and increased possibility to transport regasified LNG across the EU allowing forces of demand and supply to flourish. Also, the existence and intensification of the trade relationship by the construction of Nord Stream allowed Russia to employ a supply disruption as a coercive measure, despite its limited effectiveness as shown by this thesis, instead of resorting to military force. Increased dependence because of Nord Stream consequently reduced the potential for military conflict.

[195] Finon and Locatelli, "Russian and European Gas Interdependence," 425.
[196] Krickovic, "When Interdependence Produces Conflict," 3.

Despite abundant publication on Nord Stream prior to its actual construction, the interest for the pipeline project and its implications waned quickly. This thesis aimed to contribute to resolving the underrepresentation of Nord Stream in the literature. Additionally, from a methodological point of view, this thesis employed the concepts propagated by Keohane & Nye, interdependence sensitivity and vulnerability. Engaging with, and operationalizing these concepts illustrated the usefulness of their work to show the possible effects of a supply disruption. Sensitivity is a fine tool to show how an external change, in this case a supply disruption, affects an actor. Vulnerability proved an excellent tool to assess how well an actor can deal with an external change. Combined, the indicators show the resilience of the EU and how Nord Stream influenced Russia's ability to use a supply disruption against the EU. This thesis did illustrate the inferior utility of sensitivity compared to vulnerability. Especially when determining the effect of a supply disruption. As Keohane & Nye already claimed, vulnerability carries a strategic dimension while sensitivity does not. Therefore, the concept reveals less information on power than vulnerability does. In addition, the vagueness of the concept of costly effects can be a blessing and a curse. Costly effects can be very narrow, meaning solely currency loss due to an external change, or like in this thesis, can mean a plethora of things. Costly effects in this thesis constituted the loss of natural gas supply, the increase in price of natural gas due to lower supply, the increase of expenses due to using LNG for natural gas instead of pipelines, and costs accrued by pursuing policy strategies to counter the effects of a supply disruption.

This research considers two counter-factual scenarios: a supply disruption in 2010 and a supply disruption in 2017. One can imagine, as this thesis showed, the EU response to a supply disruption. This does mean many assumptions on the response of the EU were necessary and some parts of this thesis are speculative in nature. This might detract from the value of the research in this thesis. Despite this assessment, an exercise such as performed in this thesis might be the only method to formulate an answer to the research question. In addition, this thesis assessed the status of the natural gas network in the EU. Of course, for the sake of comparison and scope, this was a simplification of reality. More factors influence EU vulnerability to a supply disruption and Russia's ability to employ this strategy as a coercive measure than discussed in this thesis.

Other realities this thesis faces are the implications of developments in the EU-Russian relationship from 2010 until 2017. Events that come to mind are the annexation of Crimea, consequent sanctions against Russia, later agreement on the construction of Nord Stream 2, and

the Syrian civil war where Russia sided with the Syrian government. These events show that the EU and Russia do not exist in a vacuum and the EU's response to a supply disruption might be different pertaining to the then acute global development.

Also, the focus on the EU completely disregards Russia. Reversing the research by focusing on Russia will show the other side of the coin. Consequently, combining this research with one more focused on Russia will picture a more accurate representation of EU-Russian relations and their ability to employ a supply disruption as coercive measure. As is evident, this is where this thesis meets its limits. An author who did not disregard the Russian side is Tom Casier, who employed interdependence sensitivity and vulnerability, as formulated by Keohane & Nye, to describe the EU-Russian relationship in terms of supply and demand. According to Casier, Russia's ability to employ coercive measures rests on a dual condition: the EU is dependent on Russian gas due to lack of alternatives and therefore suffers high costly effects from a supply disruption, and Russia is not dependent on gas sales to the EU suffering low costly effects from a supply disruption.[197] Casier discussed if Russia had leverage over the EU by studying both sides. Similar research, but with Nord Stream as subject, would further our understanding of the actual effects of the construction of this pipeline. Attempting to show the Russian side of the story raises several questions; How did Nord Stream influence the faring of the Russian economy? To what extent did Nord Stream influence Russia's dependence on the EU for capital gains through the natural gas trade? To what extent did Nord Stream influence Russia's vulnerability to a supply disruption, initiated by the EU by means of an import embargo, or initiated by Russia herself?

Another way to approach the subject matter is to focus more on the largest critics of Nord Stream. As illustrated in chapter 1, the largest critics of Nord Stream were the member states that joined the EU in 2004 and already depended for most, if not all, of their natural gas on Russia. Poland, Estonia, and Lithuania were the harshest critics of Nord Stream. Stefan Bouzarovski and Marcin Konieczny wrote on Poland's discourse on the construction of Nord Stream. The others garnered less attention.[198]

While this thesis centralized the EU, research into the vulnerability to a Russian supply disruption of Poland or the previously mentioned Baltic States is warranted. Even though the biggest benefactor of Nord Stream was Germany, these states protested the most. Was their

[197] Casier, "Russia's Energy Leverage over the EU," 497–98.
[198] Bouzarovski and Konieczny, "Landscapes of Paradox."

protest justified? Of course, we now know, after the invasion of Ukraine, that Putin reasons using antiquated rhetoric of spheres of influence and restoration of Russia to a global superpower, but were and are these member states safe? Or should the EU have headed them more in the past? Did Russia have ulterior motives for the construction of Nord Stream?

In conclusion, this thesis has made three contribution to the existing body of literature. First, the thesis contributed by analyzing the implications of the construction of Nord Stream. A feat which after its finalization had not yet been accomplished. Second, the application of the framework by Keohane & Nye to a new case furthers our understanding of interdependence, when it produces conflict, and when it results in cooperation. Finally, this research has shown how the EU natural gas network has developed in the period 2010-2017. It has determined in what way these changes affect Russia's ability to employ a supply disruption and might further our understanding of the implications of EU policy and infrastructure projects.

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