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**RUSSIAN POTENTIAL FOR INFLUENCE IN THE
ROMANIAN AND GREEK ENERGY SECTOR**

by

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**RUSSIAN POTENTIAL FOR INFLUENCE IN THE ROMANIAN AND GREEK
ENERGY SECTOR**

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ABSTRACT

The purpose of the study is to assess the balance between vulnerability and power within the Romanian and Greek energy networks. The study presents visual analytic perspectives on the potential implications of Russian influence in the Romanian and Greek energy sectors; we found no network-analysis-type studies focusing on the energy sector, and we found few studies on Russian influence in the energy sectors of the two countries examined. Specifically, we explore the question, how could Russia exert influence over Romania and Greece through their energy sectors? To answer the question, we conducted phased research. First, we analyzed the energy companies' social networks and measured the actors' centrality (measures of indirect influence of power) and brokerage potential (measures path distance between companies within the network). Second, we conducted a geospatial analysis of the gas pipelines infrastructure and energy companies and facilities' infrastructure to determine the geospatial control of the resources. Third, we conducted a comparative and temporal analysis of energy-related indicators to determine Romania's and Greece's degree of dependency on energy resources. This study concludes by identifying three intervention strategies and policy recommendations for each country to counter Russian influence through utilizing energy resources and companies.

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LIST OF ACRONYMS AND ABBREVIATIONS

AGSC	Azeri Gas Supply Company
BCM	Billion Cubic Meter
DEPA	Hellenic Public Company of Natural Gas
DESFA	Hellenic Gas Transmission System Operator
DIME	Diplomatic, Information, Military, and Economic
E.ON	Energy On
EEZ	Exclusive Economic Zone
ENI	Ente Nazionale Idrocarburi
EU	European Union
GDP	Gross Domestic Product
HAEE	Hellenic Association for the Energy Economics
HELPE	Hellenic Public Petroleum Company
HHRM	Gas Resources Management Company
IEA	International Energy Agency
KMG	KazMunayGas
KTOE	Kilotons of Oil Equivalent
LNG	Liquefied Natural Gas
MN	Mažeikiu Nafta
MOL	Magyar Olaj és Gázipari Részvénytársaság
MTOE	Million Tons of Oil Equivalent
NATO	North Atlantic Treaty Organization
OMV	Österreichische Mineralölverwaltung
OPEC	Organization of the Petroleum Exporting Countries
PKN	Polski Koncern Naftowy
QGIS	Quantum Geographic Information System
RAP	Readiness Action Plan
ROC	Russian Orthodox Church
SNA	Social Network Analysis
TAP	Trans-Adriatic Pipeline
TPES	Total Primary Energy Supply
US	United States
VN	Ventspils Nafta
WWII	World War II

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I. INTRODUCTION

Russian annexation of Crimea in 2014 roused an immediate threat in Europe that increased the need for reliable deterrence by smaller states against Russian aggression. For Romania and Greece, deterrence is best served by an approach that combines a heavy reliance on North Atlantic Treaty Organization (NATO) membership, increased economic growth, and enhanced readiness and intelligence related to hybrid threats.¹ The Russian annexation of Crimea revealed lessons of how Russia can employ hybrid warfare to its advantage. Although the Russian hybrid warfare approach to implementing their goals consists of a wider political, economic, military and information strategy, the focus of this study is to identify Russian potential for influence in the Romanian and Greek energy sectors by mapping the existing corporate network. Identifying Russian potential for economic influence will help highlight possible solutions for Romania and Greece to maintain their independence and sovereignty. Ultimately, Romania's and Greece's economic deterrence strategy should encompass increased economic connections toward the West with the purpose of building alternatives to Russia in the energy sector.

Both Romania and Greece have historical connections with Russia. Formerly a satellite of the Soviet Union between 1945 and 1989, Romania is close to Russia's border; and because of its geostrategic position (it opens to the Black Sea, and is the largest country in southeastern Europe and the 12th largest in Europe), Romania is inside Russia's "belt of insecurity and instability."² At this time, Greece and Russia enjoy good diplomatic relations due to the religious and cultural ties between the two nations and their historical friendship. In addition, Russia has enduring geopolitical interests in Greece due to Greece's

¹ Marcin Andrzej Piotrowski and Kinga Raś identified implications of the Russian aggression for NATO's Eastern flank countries; see Marcin A. Piotrowski and Kinga Raś, "Russian Hybrid Threats to the Baltic States," *PISM Bulletin*, no. 67 (2017), <http://www.pism.pl/Publications/PISM-Bulletin/Russian-Hybrid-Threats-to-the-Baltic-States#>.

² Ulrich Kühn, "U.S.-Russian Relations and the Future Security of Europe," *Arms Control Today* 47, no. 1 (Jan./Feb. 2017): 18, <http://libproxy.nps.edu/login?url=https://search.proquest.com/docview/1874616273?accounted=12702>.

geographical position as a crossroad between Europe and Asia, with access to the Mediterranean Sea and proximity to the Suez Canal and the Middle East.

The purpose of the study is to identify the balance between vulnerability and power within each country's energy network. The study presents visual analytics perspectives on the potential implications of Russian influence in the Romanian and Greek energy sectors for two reasons: we found no existing studies that employ network analyses on the energy sector, and few studies on Russian influence in the Balkan states' energy sectors. Specifically, we examine the question, how could Russia exert influence over Romania and Greece through their energy sectors? To answer the question, we conduct phased research. First, we analyze the energy companies' social networks to determine their brokerage potential and influence. Secondly, we conduct a geospatial analysis of the gas pipelines, energy companies' spatial presence, and facilities infrastructure to determine the geospatial control of resources. Thirdly, we conduct a comparative and temporal analysis of energy-related indicators to determine Romania's and Greece's degree of dependency on energy resources.

A. LITERATURE REVIEW

The literature review is focused on the issues of combined warfare, economy and energy sector as means of combined warfare, the Russian use of energy resources as means of foreign policy, and the networks relevance and use on the issue.

1. Combined Warfare Literature

In the article "An Emerging Synthesis for a New Way of War: Combination Warfare and Future Innovation," James Callard and Peter Faber explain combination warfare in the 21st century, starting from Sun Tzu's "asymmetric" principles, then building on Qiao Ling and Wang Xiangsui's theory presented in their book, *Unrestricted Warfare: Assumptions on War and Tactics in the Age of Globalization*.³ Ling and Xiangsui argue

³ James Callard and Peter Faber, "An Emerging Synthesis for a New Way of War: Combination Warfare and Future Innovation," *Georgetown Journal of International Affairs* 3, no. 1 (Winter/Spring 2002): 61-68.

that conflicts will become increasingly “civilianized” in the 21st century, in which war is a combination of all military, non-military, and above-military (i.e., international organizations) domains. Combination warfare is a “vertical” and “horizontal” mix, and it encompasses of all these forms of war along with the non-military, economic-related forms of war, including financial warfare, trade warfare, resources warfare, economic warfare, and sanctions warfare.⁴ A fictional China-Taiwan scenario is used to demonstrate how combinations of military, non-military, and above military-means, both at the strategic and tactical levels, are mixed and matched toward the overall goal of Taiwan’s capitulation without war. By using combinations of non-military means (media, financial, and economic warfare) and above-military means (cultural, ideological, psychological and diplomatic warfare) China might weaken the Taiwanese government and reach its goals without the employment of military means.⁵

In 1997, Boris Yeltsin, the first president of the Russian Federation, had warned that “the eastward expansion of NATO is a mistake and a serious one at that.”⁶ If Russia seeks to maintain influence, then it will see NATO or European Union (EU) expansion as a threat. Russia considers itself a status quo power that needs to protect its interests. To protect its interests, Russia relies on a “belt of insecurity and instability” strategy on its border with NATO.⁷ In employing this strategy, Russia uses Hybrid Warfare that incorporates non-military, economic means as a crucial element of its approach.

Several theories exist that may help explain Russia’s use of hybrid warfare.⁸ Frank Steder, a scholar from the Norwegian Defense research establishment, claims Russia is

⁴ Qiao Ling and Wang Xiangsui, *Unrestricted Warfare: Assumptions on War and Tactics in the Age of Globalization* (Beijing: PLA Literature and Arts Publishing House, 1999): 146, <https://www.c4i.org/unrestricted.pdf>.

⁵ James and Faber, “An Emerging Synthesis for a New Way of War.”

⁶ Kuhn, “U.S.-Russian Relations and the Future Security of Europe,” 18.

⁷ Kuhn.

⁸ Naval Postgraduate School Journal *CTX (Combating Terrorism Exchange)* presents a close look at Russia’s aggressive behavior in Eastern Europe, focusing on Hybrid Warfare theory through a review that includes a set of articles meant to reveal Russian means of imposing their goals; see Naval Postgraduate School (U.S.), *CTX (Combating Terrorism Exchange)* 6, no. 4 (November 2016):109, <https://calhoun.nps.edu/.handle.net/10945/51376>.

employing a model known as the Gerasimov Strategy. This strategy uses the military to contain other countries, and non-military means, such as political, economic, and information, to resolve inter-governmental conflicts and to pursue Russia's interests. It is a dynamic strategy that consists of six phases, beginning with conflict and ending with the establishment of favorable settlements.⁹ Economic tools are an important element in its use. These tools, such as economic sanctions, to create political and diplomatic pressure, and economic blockades to escalate crises, may ultimately lead to the use of the military to obtain a resolution favorable to Russia. The recent examples in Georgia and Ukraine highlight Russia's use of this strategy.¹⁰

2. Economic and Energy Sectors as Means of Combined Warfare Literature

Economic and energy sector considerations, which are inherently tied to one another, are important elements of a country's national security interests. Callard and Faber describe combination warfare as "polyphonic warfare because it seeks to overwhelm others by assaulting them in as many domains or spheres of activity as possible."¹¹ A closer look at their matrix of means reveals that the economy and energy sector are targets of non-military forms of war. Similarly, Robert J. Art states that the main power assets that a state owns include population, geography, governance, military power, economic wealth, and leadership. According to Art, "economic wealth has the highest fungibility," and "wealth is also integral to military power."¹² Furthermore, in his memorable book *The Political Economy of International Relations*, Robert Gilpin underlines the conflictual nature of international economic relations. Gilpin argues that "the process of uneven growth and structural change is accompanied by intermittent periods of economic cooperation and conflict" and that "economic interdependence is never symmetrical; indeed, it constitutes

⁹ Frank B. Steder, "Introduction: The Theory, History, and Current State of Hybrid Warfare," *CTX (Combating Terrorism Exchange)* 6, no. 4 (November 2016):12, <http://hdl.handle.net/10945/51376>.

¹⁰ Steder, 8–12.

¹¹ James and Faber, "An Emerging Synthesis for a New Way of War: Combination Warfare and Future Innovation," 63.

¹² Robert J. Art, "American Foreign Policy and the Fungibility of Force," *Security Studies* 5, no. 4, (April 1999):7, <https://doi.org/10.1080/09636419608429287>.

a source of continuous conflict and insecurity.”¹³ Let us also take into account the third and the fourth assumptions of John J. Mearsheimer: the third assumption is that “states can never be certain about the intentions of other states,” and “the fourth assumption is that the most basic motive driving states is survival. States want to maintain their sovereignty.”¹⁴ We can reasonably conclude that the economy and energy, as an element of the former, have a key role in the states’ security dilemma.¹⁵ The relation between economy and energy will reveal the impact of energy in the security dilemma.

Several researchers have indicated that economic growth and industry is directly tied to energy. Ernst R. Berndt and David O. Wood research the relationship between energy and industry arguing that energy is such a significant input for an industry that not even technology can overcome its impact on the industry outputs.¹⁶ Energy prices and energy resources scarcity directly determine the overall efficiency of industry production levels. David I. Stern also highlights the importance of energy in economies. The author states that there is a causal relationship between energy and economic growth, and that “energy is significant in explaining GDP.”¹⁷

Since the economy is a major factor in the international system and energy is a significant sector within an economy, it is also crucial to examine the relationship between war, conflict, and energy. Historical evidence suggests that energy plays a vital role in the outbreak of wars and conflicts. For instance, several scholars suggest that energy resources

¹³ Robert Gilpin, *The Political Economy of International Relations* (Princeton, New Jersey: Princeton University Press, 1987), 34, 111.

¹⁴ John J. Mearsheimer, “The False Promise of International Institutions,” *International Security* 19, no. 3 (Winter, 1994–1995): 10, <https://www.jstor.org/stable/2539078>.

¹⁵ Jervis describes the core idea of the security dilemma as “the heart of the security dilemma argument is that an increase in one state’s security can make others less secure, not because of misperceptions or imagined hostility, but because of the anarchic context of international relations”; see Robert Jervis, *Perception and Misperception in International Politics: New Edition* (Princeton, NJ: Princeton University Press, 2017), 76.

¹⁶ Ernst R. Berndt and David O. Wood, “Technology, Prices, and the Derived Demand for Energy,” *The Review of Economics and Statistics* 57, no. 3 (1975): 259–68, <https://doi.org/10.2307/1923910>.

¹⁷ David I. Stern, “Multivariate Cointegration Analysis of the Role of Energy in the U.S. Macroeconomy” (working paper, the Australian National University Centre for Resource and Environmental Studies Ecological Economics Program, 1998), 9, <https://openresearch.repository.anu.edu.au/bitstream/1885/40554/2/eep9803.pdf>.

were an important factor that led to the outbreak of war in World War I and World War II. Particularly, as the German industrial sector developed, German leaders were constantly seeking new “lebensraum” to confront the scarcity of resources.¹⁸ Ferdinand Foch, the French military theorist and Marshal during the First World War, is quoted as saying that “a drop of gasoline was worth in war more than a drop of blood.” During World War II, the need for oil also defined many of the strategic and the operational decisions, such as the German reliance on Romanian oil from Ploiesti and the German campaign in North Africa.¹⁹ In the case of the Middle East, Toby C. Jones states that “oil and war have become increasingly interconnected in the Middle East. Indeed, that relationship has become a seemingly permanent one.”²⁰ Michael Ross from the University of California, Los Angeles, argues that “the likelihood of civil wars in countries that produce oil, gas, and diamonds rose sharply from the early 1970s to the late 1990s.”²¹ Despite the fact that, nowadays, resource wars are located far from the Western industrial countries, their impact is global by damaging the biodiversity, favoring the proliferation of arms, and questioning the importance of human rights.²²

Apart from war, resources are also connected with energy exporting states’ ability to achieve their strategic goals. The energy crises during the 1970s were caused by the Arab members of the Arabic Organization of the Petroleum Exporting Countries (OPEC) striving to impose their political will.²³ The Arab oil embargo highlights the crucial role of economics in the field of international security. It also raises important questions about the dominant theory of realism. As Kathleen J. Hancock and Vlado Vivodab mention,

¹⁸ Allan J. P. Taylor, *The Origins of the Second World War* (New York: Simon and Schuster, 1996), 42–45.

¹⁹ Gavriil Preda, “German Foreign Policy towards the Romanian Oil during 1938–1940,” *International Journal of Social Science and Humanity* 3, no. 3 (May 2013): 326–327, <http://www.ijssh.org/papers/255-S00048.pdf>.

²⁰ Toby C. Jones, “America, Oil, and War in the Middle East,” *Journal of American History* 99, no. 1 (June 2012): 209, <https://doi.org/10.1093/jahist/jas045>.

²¹ Michael Ross, “A Closer Look at Oil, Diamonds, and Civil War,” *Annual Review of Political Science* 9 (June 2006): 265–300, 267, <https://doi.org/10.1146/annurev.polisci.9.081304.161338>.

²² Michael Renner, “The Anatomy of Resource Wars” (working paper, World Watch Paper 162, World Watch Institute, 2002), 9, <http://www.worldwatch.org/system/files/EWP162.pdf>.

²³ Charles D. Smith, *Palestine and the Arab–Israeli Conflict* (New York: Bedford, 2006), 329.

“under realist assumptions, the most powerful states, as measured by military strength and GDP, get what they want. Thus, OPEC in the 1970s shattered this assumption by crippling the United States (US) and Europe, demonstrating the weaknesses of what were supposed to be the most powerful states.”²⁴ Many researchers have examined the use of oil as a weapon of political influence²⁵ while others focused on the domestic strategies that were aroused by the crises.²⁶ Russia has used energy as a weapon in the past. In January 2009, Russia cut the supply of natural gas in Europe due to the decrease in its price;²⁷ in June 2014, during the Ukrainian crisis, Russia cut off the supply of natural gas in Ukraine to increase the pressure on the Ukrainian side.²⁸

3. The Russian Use of Energy Resources as Means of Foreign Policy Literature

After the collapse of the Soviet Union, Russia invested in its energy industry and took advantage of its vast natural sources. According to the International Energy Agency (IEA), Russia was second in the world in crude oil production (12.6 percent of world total) and in natural gas production (17.8 percent of world total) in 2016. Russia was also second in the world in crude oil net exports (12.2 percent of world total) and first in natural gas exports (23.6 percent of world total).²⁹ In his article “Countering Russian Hybrid

²⁴ Kathleen J. Hancocka and Vlado Vivodab, “International Political Economy: A Field Born of the OPEC Crisis Returns to Its Energy Roots,” *Energy Research & Social Science* 1 (March 2014): 209, <https://doi.org/10.1016/j.erss.2014.03.017>.

²⁵ Roy Licklider, “Political Power and the Arab Oil Weapon: The Experience of Five Industrial Nations,” *International Studies Quarterly* 32, no. 2 (June 1988): 205–226, <http://www.jstor.org/stable/2600627>; Hanns Maull, *Oil and Influence: The Oil Weapon Examined* (International Institute for Strategic Studies, 1975).

²⁶ John G. Ikenberry, “The Irony of State Strength: Comparative Responses to the Oil Shocks in the 1970s,” *International Organization* 40, no. 1 (Winter, 1986): 105–137, <http://www.jstor.org/stable/2706744>.

²⁷ Andrew E. Kramer, “Russia Cuts Gas, and Europe Shivers,” *New York Times*, January 6, 2009, <http://www.nytimes.com/2009/01/07/world/europe/07gazprom.html?pagewanted=all>.

²⁸ Neil MacFarquhar, “Gazprom Cuts Russia’s Natural Gas Supply to Ukraine,” *New York Times*, June 16, 2014, <https://www.nytimes.com/2014/06/17/world/europe/russia-gazprom-increases-pressure-on-ukraine-in-gas-dispute.html>.

²⁹ International Energy Agency, *Key World Energy Statistics 2017* (France: International Energy Agency Publications, 2017), 97, <https://www.iea.org/publications/freepublications/publication/KeyWorld2017.pdf>.

Warfare,” CW4 Stephen M. Dayspring states that in practice, Moscow subsidizes part of the Ukrainian oil industry to maintain low prices that are raised in critical moments such as the elections or when there is a need of concessions.³⁰

Russia also appears to use other economic tactics to employ hybrid warfare. Agnia Grigas identified “oil sanctions, ‘gas isolation’ and dissuasion of Western firms from investing in Baltic energy projects”³¹ as other tools Russia uses in the economic domain. The author argues that Estonia’s, Latvia’s, and Lithuania’s entry into both the EU and NATO seemed to diminish the Russian influence over them. Nevertheless, Russian influence is “still perceived as a threat to their economies, energy sectors, and societies.”³² These countries’ political fragmentations, their mixed ethnicity, and their high reliance of on Russian oil, gas, and infrastructure, creates opportunities for Russia to influence their policies. Since 1990, Russia has used oil sanctions over 40 times against European states as a political means to punish and leverage regional countries. The most recent examples are “the halting of oil supplies to the Latvian port operator Ventspils Nafta (VN) since 2003, the Lithuanian oil refinery Mažeikiu Nafta (MN) since 2006, as well as interruptions to the oil supply via rail to Estonia in May 2007.”³³ The Latvian closure was a result of the government resistance to investment in VN. The Lithuanian closure followed after the government approved the refinery transfer of Russia’s Yukos to Poland’s Polski Koncern Naftowy (PKN), and the Estonian closure was caused by the government decision to move a Soviet-era monument from the city center to a cemetery.

The Naval Postgraduate School (NPS) thesis “Russian Energy Policy Vis-a-Vis Europe: Natural Resources as a Means of Foreign Policy,” written by Kostiantyn Vagin, describes Russia’s energy strategy from the perspective of its ambitions to be a superpower. Asymmetric interdependence of European countries on Russian energy works against a

³⁰ Stephen M. Dayspring, “Countering Russian Hybrid Warfare: Acknowledging the Character of Modern Conflict,” *Naval Postgraduate School (U.S.) CTX (Combating Terrorism Exchange)* 6, no.4 (November 2016): 25.

³¹ Agnia Grigas, *Legacies, Coercion and Soft Power: Russian influence in the Baltic States* (London: Chatham House, 2012), 1.

³² Grigas.

³³ Grigas, 4.

common EU security policy “as long as energy security of each individual state is not delegated to the supranational authority.”³⁴

In his paper, “Natural Gas as an Instrument of Russian State Power,” Alexander Ghaleb argues that the potential for the natural gas supply to be used as a coercion instrument of state power is higher than the oil one.³⁵ The author argues that, because many of the world’s economies have increased their consumption of natural gas in order to support their economic and technological advances, natural gas can be an effective tool of state power.³⁶ Control of the gas pipelines then becomes a foreign policy for both Russia and Eastern and Central Europe. Dependence on Russian natural gas by the EU countries may lead to political fractures within the EU. Apart from the physical network of pipelines, Russians influence Europe by using a wide variety of social networks.

4. Networks Relevance and Use Literature

Insurgency and terrorist network expert John Arquilla states in his influential book, *Worst Enemy: The Reluctant Transformation of the American Military*, that in today’s post-9/11 world, networks are power multipliers. By the use of networks, small and lightly armed teams, such as terrorist organizations, can achieve large effects. Networks are also hard to track, and therefore, it is hard to destroy them. His work points out the difficulties for organizations such as the armed forces (i.e., formal hierarchies) to confront flat, organic networks, and he introduced the term of “netwar” to describe this challenge for security.³⁷

³⁴ Kostiantyn V. Vagin, “Russian Energy Policy Vis-a-Vis Europe: Natural Resources as a Means of Foreign Policy” (master’s thesis, Naval Postgraduate School, 2012), 54, <https://calhoun.nps.edu/handle/10945/7422>.

³⁵ Alexander Ghaleb, *Natural Gas as an Instrument of Russian State Power*, The Letort Papers (Carlisle: U.S. Army War College Strategic Studies Institute, 2011), v, <https://ssi.armywarcollege.edu/pubs/display.cfm?pubID=1088>.

³⁶ Ghaleb, 12.

³⁷ John Arquilla, *Worst Enemy: The Reluctant Transformation of the American Military* (Chicago: Ivan R. Dee, 2008), 156–163.

In addition, these networks' complex structures and lack of hierarchy mitigates the potential effects that a decapitation strategy may have against them.³⁸

It seems that the Russians, and particularly President Vladimir Putin's administration, use the network approach to achieve their political objectives. According to the Dinu Patriciu Eurasia Center report for the Atlantic Council, Russia is building networks across Europe as part of Kremlin's influence strategy. The authors argue that "the ultimate goal in the near abroad is to control the government or ensure the failure of a pro-Western leadership, in Europe, the goal is to weaken NATO and the EU."³⁹ In its effort to influence Europe, the Kremlin uses a wide variety of networks to seek its strategic goals, such as political parties, the Russia diaspora, civil organizations, the Moscow Patriarchate, companies, political advisors, businessmen, the media, and forums. The advantages of the networked approach are the relative increase in the efficiency of geographically targeting an opponent's resources needed for employing their options, and the ability to decrease the time from planning to execution of a strategy against various actors. In addition, the network approach allows a nefarious actor to plausibly deny any responsibility for acts, which would be condemned by the international community. To conclude, as Arquilla states, "it takes a network to confront a network."⁴⁰

There are few studies on how Russia's interests are influencing the Romanian and the Greek energy sectors and whether these influences are based on the Russian energy companies' profit-based interests. Nevertheless, the term "energy security" has been increasingly used and is considered to be a key factor to regional security. Energy security concepts currently in use address a logic of war, a logic of subsistence, and a 'total' security logic, each one of them carrying different policy vehicles and normative consequences.⁴¹

³⁸ Aaron Mannes, "Testing the Snake Head Strategy: Does Killing or Capturing Its Leaders Reduce a Terrorist Group's Activity?" *International Policy Solutions* 9 (Spring 2008): 40–49, <http://dx.doi.org/10.2139/ssrn.2988670>.

³⁹ Alina Polyakova et al., *The Kremlin's Trojan Horses: Russian Influence in France, Germany, and the United Kingdom* (Washington, DC: Atlantic Council Dinu Patriciu Eurasia Center, 2016), 4, <http://www.atlanticcouncil.org/publications/reports/kremlin-trojan-horses>.

⁴⁰ Arquilla, *Worst Enemy: The Reluctant Transformation of the American Military*, 158.

⁴¹ Felix Ciută, "Conceptual Notes on Energy Security: Total or Banal Security?" *Security Dialogue* 41, no. 2 (April 2010): 123, <https://www.jstor.org/stable/26301149>.

The IEA defines energy security as “the uninterrupted availability of energy resources at an affordable price.”⁴² Therefore, by mapping the relations among companies working in the Romanian and Greek energy sectors, we seek to highlight important players and illuminate the current state of the networks.

As we conducted our research, we discovered a lack of empirical studies focused on Russia’s potential influence on Romania and Greece. Also, the studies that do exist focus on relations between the EU and Russia, and they do not provide quantitative analyses of the oil, gas, and green energy firms’ control of resources in Romania and Greece. Previous studies primarily examine Russian and EU policy comparisons; they do track imports and exports from Russia to the EU. Thus, identifying Russia’s pathways of influence in the energy sector is the first step in developing ways to counter them.

B. METHODOLOGY

Our claim is that Russia can exert influence over Romania and Greece using the energy sector as a means toward its security goals. Based on past examples of Russia’s use of oil and gas blockades (see Ukraine and Baltic states examples in the preceding Literature Review section), we define influence as the ability of Russian companies, within the energy sector, to cut off other countries’ capacity to provide the required energy sources for maintaining their independence and sovereignty in decision making. Our main assumption is that the greater a Russian company’s influence is on an energy sector, the greater the potential it will have to coerce Romania and/or Greece. To measure the extent of potential for influence, we conducted extensive open-source research.

We began by looking for information about companies and the relations between them (affiliate, subordinate, cooperation) inside Romania and Greece. Based on that information, we collected relational data about the companies’ connections to other companies outside of their respective country. We obtained the vast majority of our network data from news articles, company websites, and annual financial reports. For our

⁴² “Energy Security,” International Energy Security, accessed March 11, 2018, <https://www.iea.org/topics/energysecurity/>.

spatial data, we extracted data from geospatial databases pertaining to natural gas pipelines and energy infrastructure.⁴³

To analyze our data for both the Greek and Romanian cases, we utilized a combination of social network analysis (SNA), geospatial analysis, and temporal analysis. SNA is a set of theories and techniques that allows researchers to examine social structures and how those structures relate to real-world outcomes. Cunningham et al. state that “social networks are an important concept for understanding the needs, motivations, and capacities of individuals in a society.”⁴⁴ Using SNA, we can “quantify, test, and predict various social phenomena within the network” such as the importance of the actors, the structure of the network, and the patterns of social interaction.⁴⁵ In the research fields of company interactions and corporate interlocks, many scholars use SNA to describe firms’ power, influence, innovation and financial stability.⁴⁶ In our research, SNA allows us to identify key organizations and characterize the types of activities that connect foreign energy companies, such as Russian companies, with the Romanian and Greek companies. SNA also assists with identifying the structurally “important” energy companies based on different criteria.

We structured our relational data using an edgelist format, and a codebook guided our coding process to ensure our network data are reliable. Our network data are primarily one-mode data⁴⁷ with direct organization-to-organization ties; however, we used a few two-mode⁴⁸ links, connecting two organizations through an event to ensure we have a

⁴³ “Spatial Data Download,” DIVA-GIS Database, accessed April 9, 2018, <http://www.diva-gis.org/datadown>; “Portal: Power Plant,” Enipedia, accessed April 9, 2018, http://enipedia.tudelft.nl/wiki/Portal:Power_Plants; “NaturalGasInfrastructure,” Enipedia, accessed April 9, 2018, <http://enipedia.tudelft.nl/wiki/NaturalGasInfrastructure>.

⁴⁴ Daniel Cunningham, Sean Everton, and Philip Murphy, *Understanding Dark Networks: A Strategic Framework for the Use of Social Network Analysis, Reprint edition* (Lanham, MD: Rowman & Littlefield Publishers, 2016), 5.

⁴⁵ Cunningham, Everton, and Murphy, 6.

⁴⁶ Stephen P. Borgatti et al., “Network Analysis in the Social Sciences,” *Science* 323, no. 5916 (February 2009): 892–895, <https://doi.org/10.1126/science.1165821>.

⁴⁷ One-mode relational data consists of a single set of actors.

⁴⁸ Two-mode relational data consists of two sets of actors.

representative picture of the energy networks. We converted the two-mode links into one-mode links to create a completely one-mode, organizational social network. With this aggregate network, we were able to conduct social network analysis.

Specifically, we utilized network topographical measures and centrality to characterize and describe the energy networks. Network topography measures, such as density and centralization, describe aspects of a network's overall structure, which ultimately highlight potential tradeoffs a network may have to make regarding its attempts to balance security and performance. Centrality is a concept pertaining to "important" nodes, or actors. Like topography, several measures exist that help analysts identify central and peripheral players. We implemented SNA in the open-source tool, the Organizational Risk Analyzer (ORA).

In our research, we used geospatial analysis for two reasons. First, geospatial mapping allows us to assess where energy companies are geographically concentrated. This approach lets us illuminate potential pathways and networks between organizations that are utilized in and around Romania and Greece. Second, we used geospatial analysis for obtaining a picture of the broader energy network and to map temporal trends related to how much influence each organization potentially has and whether that influence is growing or waning. Specifically, we use the geospatial mapping tool Quantum Geographic Information System (QGIS), which is available open source and allows users to create maps, networks, criteria-based color-coded maps, and multilayer multi-criteria for analysis.⁴⁹

Lastly, the combination of SNA and geospatial analysis reveals Russia's pathways of influence in the energy sector, which is the first step meant to identify possible countermeasures in the energy security strategy to prevent further Russian control over the energy sector. SNA and geospatial analysis of critical pathways of influence assist the military and economy strategy decision makers in planning and crisis response.

⁴⁹ Before moving forward, it is important to note that due to the sensitivity of some energy companies' activities in and around Romania and Greece, in some cases, we drew inferences about the existence and capabilities of their networks, based on educated guesses because of the limited ability to verify the companies' internal policies.

C. SCOPE OF THE THESIS

Romania and Greece will likely continue to deal with this problem set in the future. The issue of Russian aggression and the use of hybrid warfare is a significant problem not only for these countries, but also for NATO as it struggles to develop a strategy to counter and deter Russia. Visual analytics, which in this case is a combination of social network, geospatial, and temporal analyses, is an appropriate approach to examine this topic because illuminating Russia's pathways of influence is the first step to developing ways to counter them. These pathways have geospatial, temporal, and network aspects that lend themselves well to visual analysis.

Overall, this study seeks to identify possible countermeasures in the energy security strategy of Greece and Romania to prevent further Russian control over their respective energy sectors.

D. THESIS OUTLINE

Following this Introduction, Chapter II presents the Romanian energy security analysis. In this chapter, we first place Romania in the geopolitical scene and review Romania's deterrence policy in relation to Russian hybrid warfare. Secondly, we review Romania's energy security and resources in the oil, gas, and green energy sectors. Finally, we conduct an SNA report of the energy companies that operate in Romania to refine the overall image of the Romanian energy sector.

Chapter III presents the Greek energy security analysis. In this chapter, we first examine Greek-Russian relations. Next, we review Greek energy security in accordance with EU, NATO, and national resources. Third, we integrate Greece in the geopolitical scene using geospatial analysis. Finally, we conduct an SNA report of the energy companies that operate in Greece, and we use temporal and quantitative analysis to refine the overall image of the Greek energy sector.

And finally, Chapter IV presents policy recommendations and conclusions. Based on our findings we first compare the two countries' research results and then propose possible courses of action to be considered in order to increase Romania's and Greece's energy independence.

E. BENEFITS OF STUDY

By mapping the Russian network of influence in the energy sector, we can observe their pathways of influence in the energy sector and develop measures to mitigate it. The network approach will support the military intelligence branch to identify the economic dimension of the operational environment and make recommendations. Our research could be used as the basis for more-extended analysis of the Russian network in both Greece and Romania. We can logically assume that the Russian energy network is just one part of the wider Russian network in these countries. Other researchers could use our research either as a model to analyze a different part of the Russian network or as an initial point in order to reveal bonds between the Russian energy network and the other parts of the Russian network. Our research could also be used as a framework for other European countries. Finally, the parallel study of the Greek and Romanian cases might reveal Russian patterns, trends, or even strategies in the energy sector.

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II. ROMANIAN ENERGY SECURITY ANALYSIS

The Armed Conflict Database reported that in “April 2014, pro-Russian separatists [battled] Ukrainian forces in eastern regions of the country. The rebellion, which [had] received material, personnel, and direct military support from Moscow, followed Russia’s annexation of Crimea in March.”⁵⁰ As a consequence of Russia’s actions, NATO chose to update its passive deterrence strategies to more active ones. At the same time, the immediate threat to countries inside Russia’s sphere of influence caused increased concern because of their proximity to Russia.

The increased concerns are shared also by Romania and Greece, and this chapter addresses those concerns from Romania’s perspective. Its content is divided into two sections. The first section is a substantive background of the broader Romanian security environment. This chapter’s second section is a data analysis of the Romanian energy sector security, which is described within the broader context outlined in the first section. The scope of this section is to analyze NATO-Russia diplomatic, military, and cultural factors, followed by Romania’s specific diplomatic and military facts and implications.

A. ROMANIAN DIPLOMATIC, ECONOMIC, AND MILITARY SECURITY ENVIRONMENT

This section is critical for contextualizing the broader military and diplomatic dimensions of the NATO-Russian balance of power, and for understanding how the Romanian energy sector is embedded within the larger Russian hybrid warfare strategy. Specifically, this section explores ways that EU diplomacy and NATO forces could be used to deter Russia from expanding its sphere of influence over its neighbors in Europe.

1. NATO-Russian Relations

Russia’s “belt of insecurity and instability” strategy may impact the security and sovereignty of countries inside Russia’s sphere of influence. Therefore, Russia’s sphere of

⁵⁰ “Ukraine,” The International Institute for Strategic Studies (IISS) Armed Conflict Database, accessed April 9, 2018, <http://acd.iiss.org/en/conflicts/ukraine-3fdb>.

influence policy raises high concerns for NATO, which suspended cooperation with Russia in response to its annexation of the Crimean Peninsula.

In addition, even if not explicitly stated, Russia's intent is to maintain former Soviet countries and former communist countries under its influence, so it sees any NATO or EU expansion going against its interests. As early as 1997, Boris Yeltsin, the first president of the Russian Federation, had warned that "the eastward expansion of NATO is a mistake and a serious one at that."⁵¹ Russia considers itself a status quo power that needs to protect its interests.

In order to protect its interests, Russia relies on a "belt of insecurity and instability" strategy on its border with NATO, because in internally divided states, Russian hybrid warfare can be effective.⁵² Beginning on Russia's border and extending outward toward Western Europe, there are three belts of insecurity and instability (Figure 1): the first belt is formed from the former Soviet countries that are not NATO members (Belarus, Ukraine, Moldova); the second belt is formed from former communist countries that are NATO countries (the Baltic states, Poland, Slovakia, Hungary, Romania, Bulgaria, and Greece); and the third belt is formed from Western European countries. In the first belt falls Ukraine, where Russia has directly engaged forces as a form of direct coercion against NATO and as deterrence against countries on its western border that want to orient themselves toward the West (NATO, EU). In the second and third belts are Eastern European and Western European countries, where Russia has engaged in airspace violations, economic coercion, propaganda (disinformation), and financial support of populist movements (support to separatist groups), to name a few. Russia uses these efforts to have its claims accepted as a response to NATO's and the EU's criticism of Crimea's annexation. The closer the belt is to Russia, the bigger the risk for the countries in it. As an example, "hybrid warfare" may be employed in first-belt former Soviet countries like Moldova where Russian influence remains high, but in the outer belts works only if the states are internally divided.

⁵¹ Ulrich Kühn, "U.S.-Russian Relations and the Future Security of Europe," *Arms Control Today* 47, no. 1 (2017): 18.

⁵² Kühn.



Figure 1. Russia’s “Belts of Insecurity and Instability”⁵³

The success of NATO deterrent threats has two parts: credibility and intent. First, the military resources balance favors NATO, so the capability to deter a hybrid aggression is there. The question remains, however, will it be enough to deter Russia’s use of hybrid warfare to expand its sphere of influence? The second part is the intent to do what NATO threatens to do,⁵⁴ in which Russia seeks to challenge the cohesion of the 28 NATO countries and employs hybrid warfare to have its claims accepted and to undermine NATO’s will to take action. The last NATO official stance is that, despite more than two decades of efforts to develop dialogue and practical cooperation with Russia, the “cooperation [with Russia] has been suspended in response to Russia’s military intervention in Ukraine, which the Allies condemn in the strongest terms; ... however, the alliance does not seek confrontation and poses no threat to Russia.”⁵⁵ While Russia has increased its military spending and force modernization and has shown the ability to rapidly concentrate force along its Ukrainian border in the military exercises organized during the Ukraine crisis, the prospect of it facing

⁵³ Adapted from DIVA-GIS Database, “Spatial Data Download.”

⁵⁴ Kenneth Watman, Dean Wilkening with John Arquilla and Brian Nichiporuk, *U.S. Deterrence Strategies* (Santa Monica, CA: RAND, 1995), 57.

⁵⁵“Relations with Russia,” NATO, April 9, 2018, https://www.nato.int/cps/en/natolive/topics_50090.htm.

the superior conventional power of the 28 NATO countries, including the United States, remains improbable.

Nevertheless, Russia has overtly expressed its commitment to defend Russian minorities; thus, NATO's challenge is to reassure the countries inside Russia's second belt of instability about NATO's defense commitments. To meet this requirement, during the September 2014 NATO Wales Summit, NATO agreed on the Readiness Action Plan (RAP) to increase the military protection of its eastern countries. The RAP established the increase in the number of complex military exercises in Eastern Europe, the NATO force reaction readiness level, and the pre-deployment of equipment. At the same time, the RAP states the establishment of multi-national NATO command and control facilities in its eastern allies' territory (Estonia, Latvia, Lithuania, Poland, Romania, and Bulgaria).⁵⁶

Ultimately, it is important for both NATO and Romania to figure out where Russia's strategy is weak. It is only through understanding and using Russia's weaknesses that both NATO and Romania's own government will be able to deter Russian influence.

2. Romanian-Russian Relations

Since the fall of the Romanian communist regime in 1989, the Romanian people have continued to be concerned about Russian influence in the country, all the while gradually stepping away from it. At least three reasons exist for the pro-Russia politicians, initially installed in 1989, fall in 1996 (the first post-communist President Ion Iliescu was colleagues with Gorbachev while in university): the Romanian gold treasure that was sent to Moscow before Germany occupied Bucharest during World War II but was never returned; the brutal communist regime imposed by the Soviet Union after World War II; and Russia's annexation of the Romanian province of Basarabia, most of which is currently part of Moldova.⁵⁷ Therefore, Romania's accession to NATO in 2004 and the EU in 2007 were driven by the

⁵⁶ Michael Ruhle, "NATO and the Ukraine Crisis," *American Foreign Policy Interests* 37, no. 2 (2015): 82, 10.1080/10803920.2015.1038925.

⁵⁷ Moldova territory changed appurtenance several times beginning in 1856 and ending in 1944; Russia deported local population from this territory and colonized the territory with Russian-speakers in order to reduce the Romanians-to-Slavs ratio.

country's efforts to minimize Russian influence and to distance itself from Russia's sphere of influence.⁵⁸

3. Romanian-Russian Economic and Military Balance

Romanian-Russian relations, however, remain highly unbalanced in their political, economic, and regional dimensions due to the two countries' relative sizes and military resources. Figure 2, which was extracted from the globalfirepower.com database, illustrates Romania's size, demographics, finances, and military assets as a percentage of Russia's levels of those same variables. Figure 3 illustrates the growth in Romania's defense budget over the last several years.

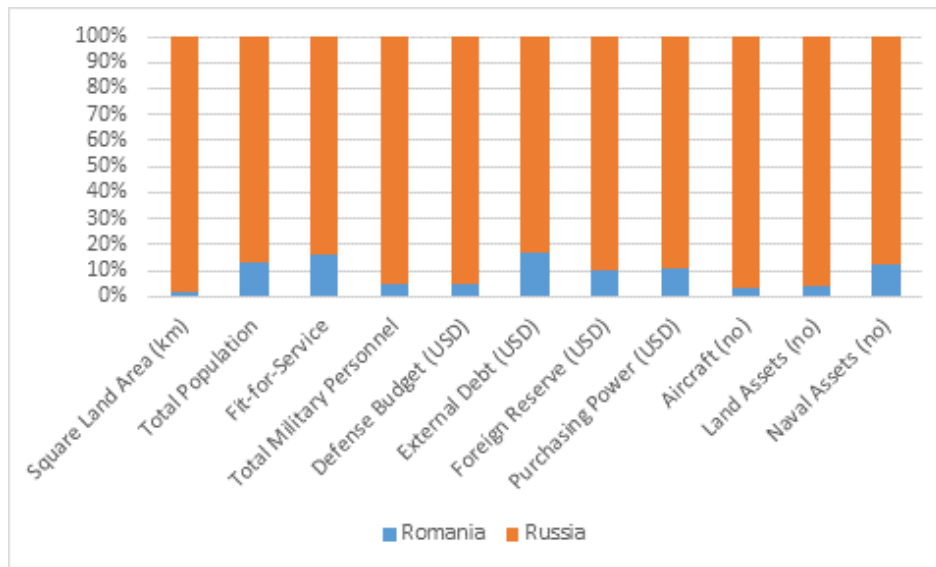


Figure 2. Area, Demographics, Financial and Military Indicators Comparison⁵⁹

⁵⁸ Theodor Tudoroiu, "From Spheres of Influence to Energy Wars: Russian Influence in Post-Communist Romania," *Journal of Communist Studies and Transition Politics* 24, no. 3 (2008): 386–414, 10.1080/13523270802267922.

⁵⁹ Adapted from GlobalFirepower.com Database, "Comparison Results of World Military Strengths/ Military power comparison results for Romania vs. Russia," accessed April 9, 2018, <http://www.globalfirepower.com/countries-comparison-detail.asp?form=form&country1=romania&country2=russia&Submit=COMPARE>.

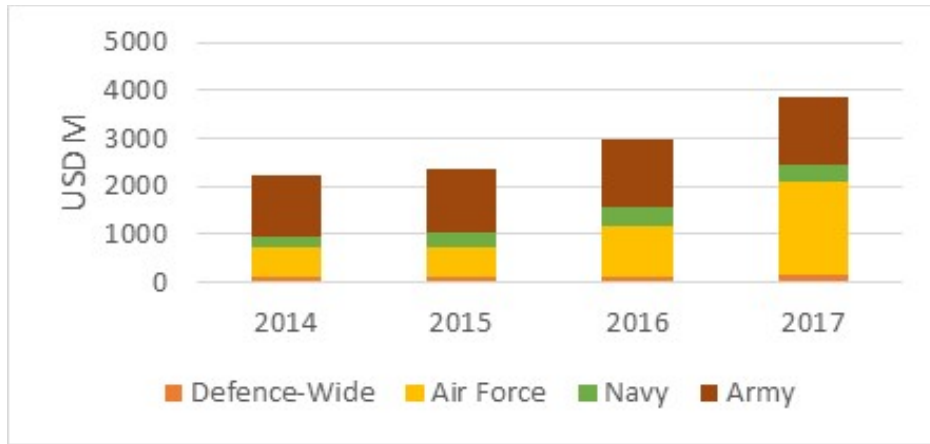


Figure 3. Defense Budget by Force for Romania⁶⁰

As depicted in Figure 2, geographic area and demographics are independent constants that place Romania in a median range of 5 percent of Russia’s values, constants for which Romanian policies for improvement are limited. The financial variables, on the other hand, may be increased through developing the economy with internal policies that support private investor development toward competitive levels and encourage commerce outside Romanian borders. Romania’s structural reforms to reduce the complexity of administrative procedures are ongoing, and infrastructure development remains a national priority. The government’s aggressive fiscal policies, along with private consumption, are driving economic growth and development. The annual growth rate in Romania’s gross domestic product (GDP) averaged 3.03 percent from 1996 until 2017.⁶¹ Romania’s defense budget is increasing yearly, as seen in Figure 3, and represents 2 percent of Romania’s GDP. All measures have resulted in slow but steady development in all fields.

Romania is also modernizing and replacing its pre-1989 Soviet-produced weapons with weapons and equipment that will allow interoperability with its NATO allies. Figure 2 includes a quantitative comparison of the military assets but it does not count the improvement in equipment quality and technological features. In addition to military

⁶⁰ Adapted from “Romania,” Jane’s by IHS Markit, accessed April 9, 2018, <https://janes.ihs.com/dashboard/country/Romania>.

⁶¹ “Romania GDP Annual Growth Rate,” Trading Economics, accessed April 9, 2018, <https://tradingeconomics.com/romania/gdp-growth-annual>.

equipment modernization, Romania will host one of the NATO coordinating units. Furthermore, Romania has agreed to host onshore Aegis interceptor missiles as part of the NATO European missile defense shield, and continues to support NATO maritime military drills in the Black Sea. Because of these actions, Romanian-Russian relations are likely to continue to deteriorate.

4. Romanian-NATO Relations

With the aim of remaining self-sustainable in light of Russia's influence and relative strength, Romania is taking two directions in working with NATO. The first direction is to actively maintain its diplomatic and military relations with the United States and NATO. Diplomatically, the June 9, 2018, visit of Romanian President Klaus Iohannis to the White House directly increased the credibility of the alliance in the region. In response to a direct question from President Iohannis about the threats posed by Russia to the security of Eastern European countries, Romania included, and the U.S. commitment to act under Article 5 in case of military aggression, President Trump answered that "I'm committing the United States, and have committed, but I'm committing the United States to Article 5. And certainly we are there to protect."⁶² At the same time, the NATO and U.S. military bases in Romania, along with complex exercises organized by the coalition, prove both the coalition's capability and the intent to use that capability if circumstances require it and if it strengthens the deterrence of Russia.

The second direction is Romania and NATO working together for close intelligence monitoring of Russia's actions and intents, and for increasing early warning capabilities against Russia's hybrid threats on NATO's eastern flank. The Romanian border guard, police, and other civilian services, who might be the first responders to Russian hybrid threats, must be strengthened because they have to react even before NATO can react under

⁶² Remarks by President Trump and President Iohannis of Romania in a Joint Press Conference, The White House Office of the Press Secretary, June 9, 2017, <https://www.whitehouse.gov/the-press-office/2017/06/09/remarks-president-trump-and-president-iohannis-romania-joint-press>.

Articles 4 and 5 of the Washington Treaty.⁶³ Regardless of the Romanian and NATO efforts, the Russian government may take some risky decisions. This emphasizes the need for constant commitment and consistency within the NATO alliance.

Altogether, these diplomatic and military efforts to deter Russia, from inside Romania and from NATO, rely heavily on the assumption that the current balance of power is maintained. Yet, the assumption is flawed, because if even one of the 28 NATO countries does not vote to respond to an outside aggression, the aggressor can continue to pursue its interests without any repercussions. The aggressor's interest, therefore, is to create inside the alliance a lack of consensus about what the threshold is for a "grey area" aggression like cyber-attacks, subversion, or economic support of populist movements, and to develop new internal disturbances inside the alliance. The pressure on Russia's neighboring countries for timely measures to maintain their independence comes from their need to consolidate the balance of power stability assumption with facts: increased economic growth, increased military readiness, enhanced capabilities of internal first responders to deter hybrid threats, and close intelligence monitoring.

B. DATA ANALYSIS OF THE ROMANIAN ENERGY SECTOR

This chapter now turns to data analysis of the Romanian energy sector, with an emphasis on how Russia may target and influence that sector through hybrid warfare. In 2016, Romania's energy mix (illustrated in Figure 4) was dominated by oil and gas, each representing 28 percent of the total energy distribution, followed by coal and hydro with 16 and 12 percent, respectively. Also of note are the oil, coal, and gas imports seen on the Romania Energy Balances side of Figure 4; these signal existing gaps in Romania's ability to meet its energy demands.

⁶³ Marcin Andrzej Piotrowski and Kinga Raś, "Russian Hybrid Threats to the Baltic States," *Bulletin PISM*, no. 67 (July 12, 2017): 2, <http://www.pism.pl/Publications/PISM-Bulletin/Russian-Hybrid-Threats-to-the-Baltic-States#>.

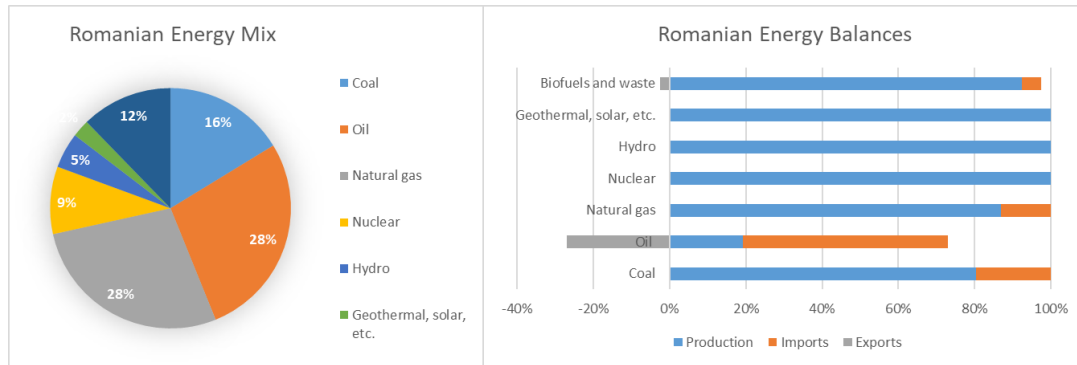


Figure 4. 2016 Romania's Energy Mix and Balances⁶⁴

This analysis focuses on Russian potential to utilize hybrid warfare against the Romanian energy sector for three reasons. First, Russia has already employed hybrid warfare against countries situated close to its borders (Georgia 2008, Ukraine 2014). While hybrid warfare includes a wider political, economic, military, and information strategy,⁶⁵ the focus of this section is on the Romanian gas and oil energy companies because they are ranked in the top 20 for revenue income based on their reported turnover to the Romanian Ministry of Finance.⁶⁶ Second, the economic and energy sectors are inherently tied to one another because they are part of the non-military forms of war.⁶⁷ As stated by Gilpin, “economic interdependence is never symmetrical; indeed, it constitutes a source of continuous conflict and insecurity.”⁶⁸ Third, historical evidence points out the vital role energy plays in wars and other conflicts (see the energy crises examples of World War II and the 1970s in the Literature Review in Chapter I). In this context, energy-exporting states have the ability to exert political pressure over other states and achieve their goals. For instance, Agnia Grigas

⁶⁴ Adapted from “Romania: Balances for 2016,” International Energy Agency, accessed October 17, 2018, <https://www.iea.org/statistics/?country=ROMANIA&year=2016&category=Key%20indicators&indicator=TPESbySource&mode=chart&categoryBrowse=false&dataTable=BALANCES&showDataTable=true>.

⁶⁵ Steder, “Introduction: The Theory, History, and Current State of Hybrid Warfare,” 8–12.

⁶⁶ Andrei Chirileasa and City Compass Media, “Top 20 Companies in Romania by Turnover,” *Romania Insider* (blog), June 9, 2014, <https://www.romania-insider.com/top-20-companies-in-romania-by-turnover/>.

⁶⁷ See Callard and Faber, “An Emerging Synthesis for a New Way of War,” 61–68.

⁶⁸ Gilpin, *The Political Economy of International Relations*, 34.

argues that since 1990, Russia has used oil sanctions in support of its political goals in Central and Eastern European states over 40 times.⁶⁹

Data Sources

While the link analysis was focused on Romania, in order to trace the ties to map influence, the network quickly expanded across Europe with a few connections reaching China and the United States. Once we had our two-mode link analysis network, we converted the two-mode data into one-mode data, which resulted in a one-mode, organizational social network. With this aggregate network, we used social network analysis to analyze the network's structure and to identify central organizations.

Next, we mapped our network geospatially, obtaining coordinates for corporation headquarters locations and energy infrastructure, and adding in a layer showing the natural gas pipeline network throughout Europe for obtaining the broader energy network picture. Finally, using data gleaned from annual financial reports, we gathered financial and production data for the past three years in an attempt to map recent temporal trends and answer the question of how much influence each organization potentially has and whether or not that influence is growing or waning.

The vast majority of the data we collected was unstructured and was obtained primarily from news articles, company websites, and annual financial reports. Our list of sources was extensive. We did find some limited structured data in the form of geospatial databases for natural gas pipelines and natural gas power plants from the open source global energy website ENIPEDIA.⁷⁰ While we cannot verify the accuracy of the ENIPEDIA data, it provided useful visuals to aid in our geospatial analysis in terms of providing some context for the reach and influence Russia has throughout Europe in the natural gas sector. We structured the data we gleaned from news articles and company websites in an edgelist format and captured the definitions of the relations type between them in a codebook.

⁶⁹ Grigas, *Legacies, Coercion and Soft Power: Russian Influence in the Baltic States*, 1.

⁷⁰ "Home Page," Enipedia, accessed April 9, 2018, http://enipedia.tudelft.nl/wiki/Main_Page.

1. Geospatial Analysis

As expected, the general overview of the energy sector presented in Figure 5 shows direct ties through infrastructure between Russia and Europe. Similarly with Russia, Romania has a relatively high number of energy facilities in its territory, and of note is an internal circular gas pipeline infrastructure. One of the key takeaways is that the natural gas that powers the majority of the European countries primarily flows out from Russia. Romania is one of the few exceptions due to its own gas resources and infrastructure (see Figure 8).

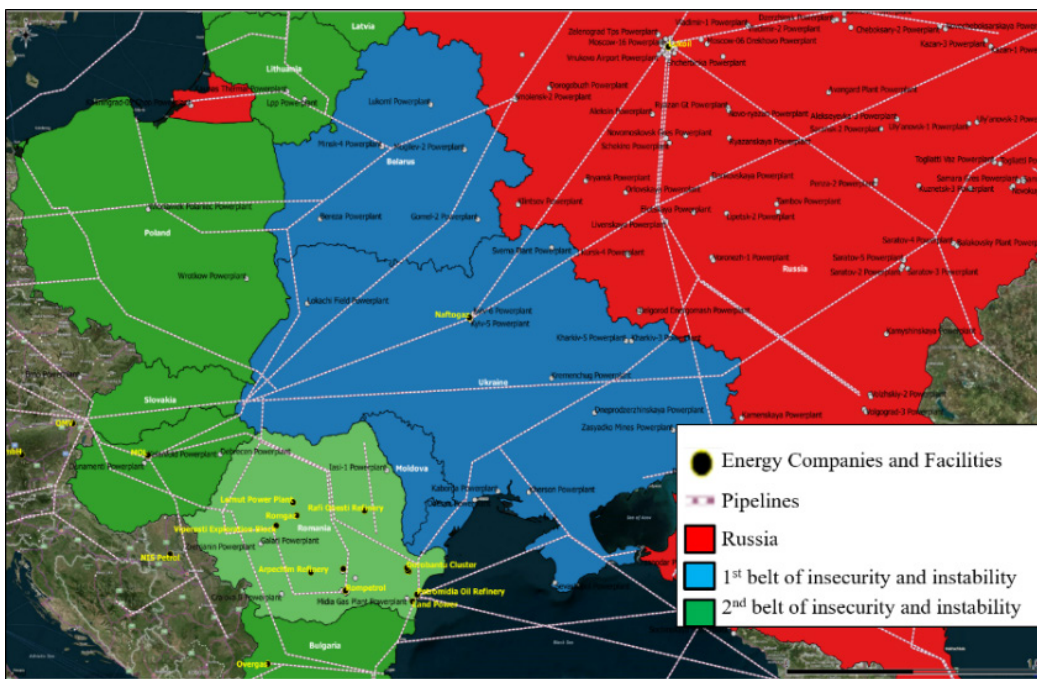


Figure 5. Pipelines and Actors in Relation to Russian Sphere of Influence⁷¹

Second, as shown in Figure 6, Moscow exerts incredible influence in the region through the use of economic power in the energy industry and, according to our initial

⁷¹ Adapted from “Countries Administrative Areas,” DIVA-GIS Spatial Data Download, accessed April 9, 2018, <http://www.diva-gis.org/datadown>; Enipedia Database, “Portal:Power Plants,” accessed April 9, 2018, http://enipedia.tudelft.nl/wiki/Portal:Power_Plants; Enipedia Database, “Natural Gas Infrastructure,” accessed April 9, 2018, <http://enipedia.tudelft.nl/wiki/NaturalGasInfrastructure>, using QGIS.

analysis, is connected to every major energy company throughout Europe within two to three steps. Russian GAZPROM has economic ties with the German Energy On (E.ON), the Austrian Österreichische Mineralölverwaltung (OMV), the Hungarian Magyar Olaj és Gázipari Részvénytársaság (MOL), the Italian Ente Nazionale Idrocarburi (ENI), and the Romanian Rompetrol through the company's majority shareholder, Kazakhstan's KazMunayGas (KMG) International.⁷² Commercial ties between the energy companies are important in creating a free energy market, but at the same time, they are a path of influence in case of a conflict.

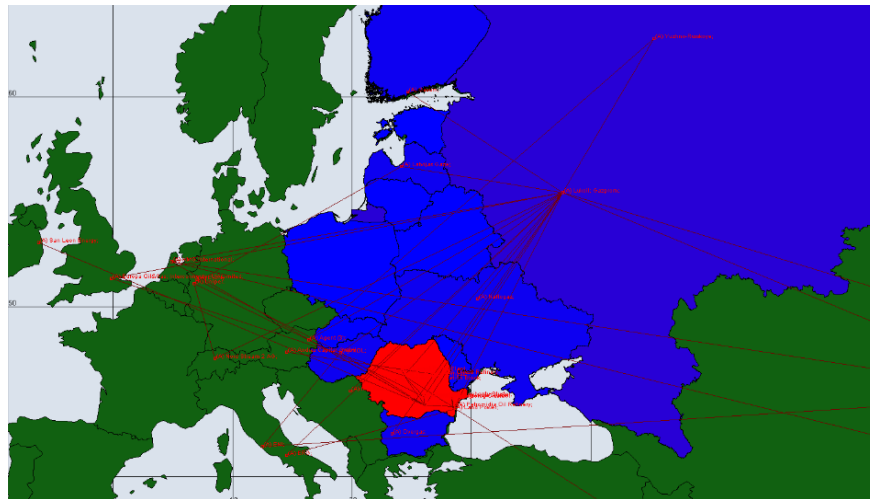


Figure 6. Relational Network Displayed Geospatially⁷³

The energy infrastructure in Romania, presented in Figure 7, includes at least five active oil refineries, nine natural gas burning power plants, one 84 Megawatt hours (MWh) wind power plant, natural gas pipelines, and additional exploration and production facilities not identified in our research. According to our analysis, Romanian vulnerability in the gas sector is low. The petroleum sector of the energy industry, on the other hand, is more susceptible to outside influence through the oil refineries and gas stations. As we see next in the social network analysis, what is significant is that three of the five active oil refineries

⁷² For reference on the relations between companies, see the aggregated energy network in Figure 8.

⁷³ Adapted from references in Appendix A using ORA.

are Russian (or proxy) owned, and we estimate that approximately two-thirds of the filling stations are also Russian- or proxy-owned. Potentially up to 60 percent of the nation’s petroleum industry and products are subject to Russian economic influence.⁷⁴

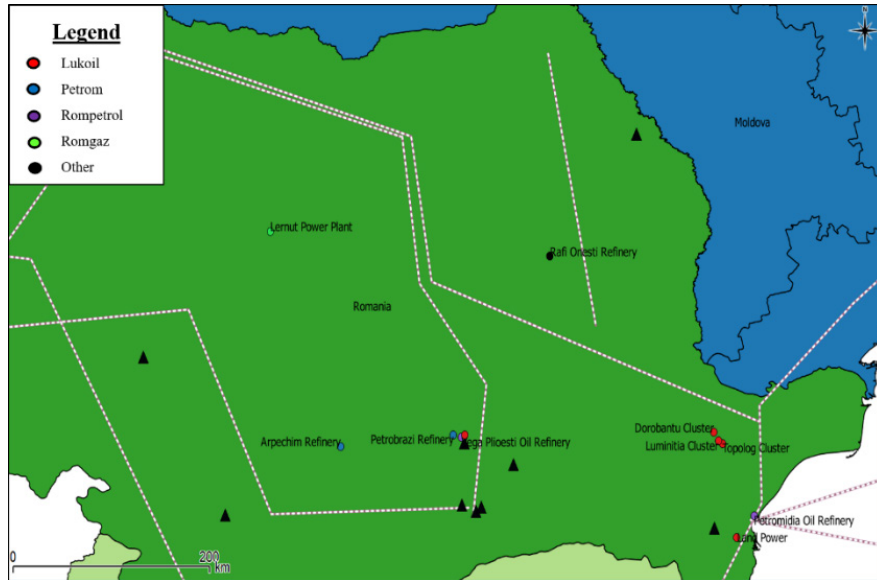


Figure 7. Romanian Energy Infrastructure by Ownership⁷⁵

2. Social Network Analysis

This research examines government and corporate organizations that make up the Romanian energy sector. Though most of the organizations are Romanian, the network also includes several European organizations involved in the energy sector that might be directly and indirectly linked to Russian entities, and who, therefore, might serve as nodes that can

⁷⁴ See the aggregated energy network in Figure 8 indicating Lukoil is a Russian company and Rompetrol is owned by KMG International, which is owned by Khazakstan nationalized Oil and Gas Company KasMunayGas.

⁷⁵ Adapted from DIVA-GIS Database, “Spatial Data Download”; Enipedia Database, “Power Plants,” using QGIS.

influence the energy sector. A few subsidiaries of umbrella organizations are included in the network as well (Figure 8).⁷⁶

⁷⁶ We recognize this may bias our results somewhat by leaving out some subsidiaries and their relations to umbrella organizations; however, some companies like Gazprom are significantly larger than others and therefore have many more subsidiaries than the others, which would have biased our results even further. Thus, we attempted to include relations and organizations that appeared within our data sources and that, at least according to open source research, are active players within the energy networks.

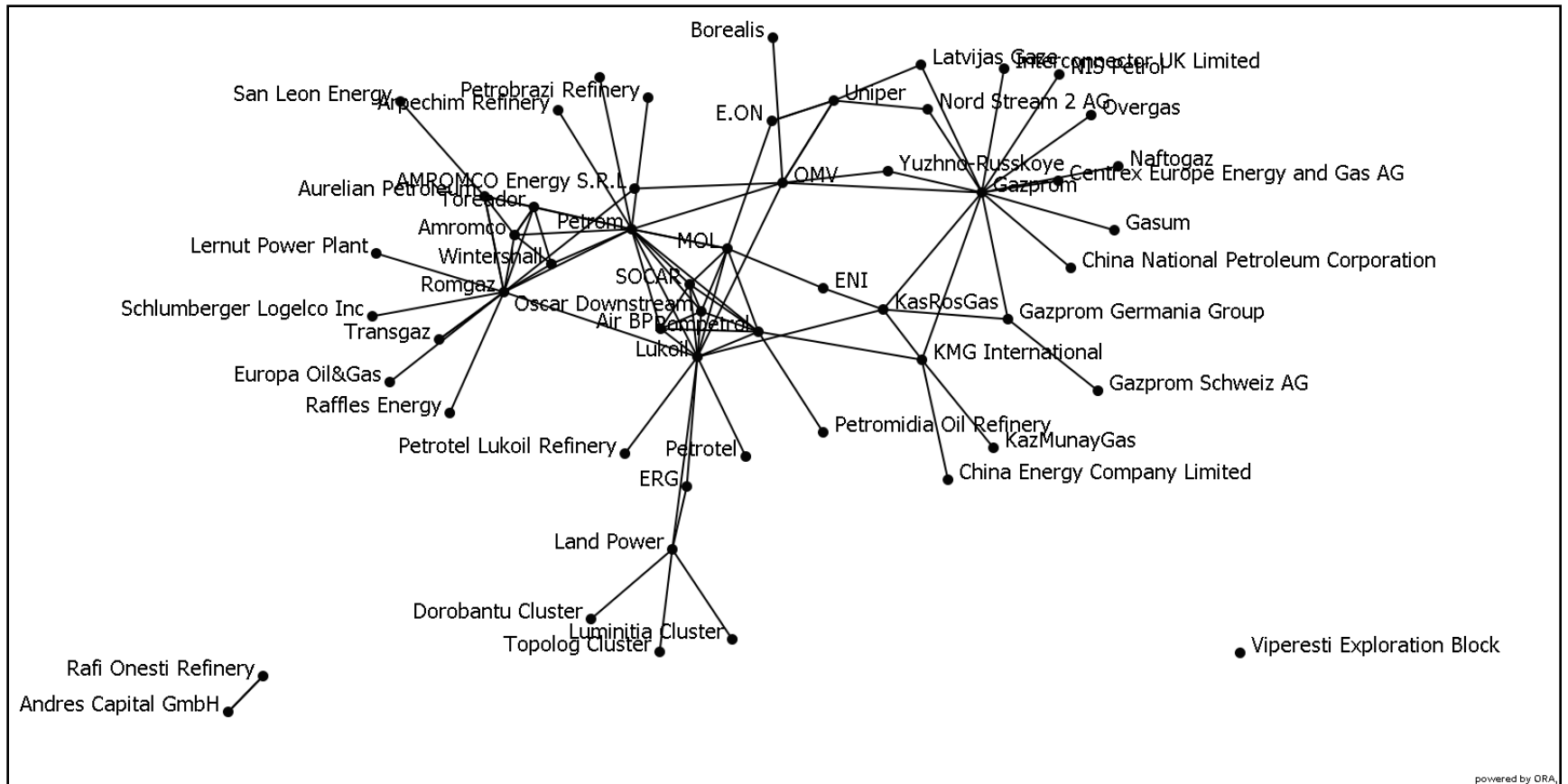


Figure 8. Aggregated Energy Network⁷⁷

⁷⁷ Adapted from references in Appendix A using ORA.

In terms of network topography, we used four specific measures to characterize the Romanian energy network’s structure: size, density, and degree, and betweenness centralization. Table 1 reflects the results. The network consists of 55 organizations, but had we listed all subsidiaries of the major companies (GAZPROM, OMV, MOL, KMG International, etc.), our network could easily have expanded into the hundreds to thousands of nodes. Nevertheless, the organizations included in this analysis likely represent the central core of the network.

Conceptually, density measures how interconnected a network is while statistically the output ranges from 0 to 1, where a completely disconnected network has a density score of 0 and a fully connected network has a density score of 1; of course, most real-world networks are somewhere in-between. In the context of influence, a network with relatively high density may offer many avenues (i.e., links) through which information and influence may flow. Alternatively, a sparse network offers few links through which information and influence can disseminate. The Romanian energy network, as seen in the results in Table 1, is sparse, which indicates that the network lacks overall cohesion and offers few avenues for influence. Nevertheless, it is certainly possible for Russian entities to utilize a single relationship with great effect, which we explore with our centrality results.

Table 1. Romanian Energy Network Level Measures⁷⁸

Measure	Value
Actors	55
Density	.035
Degree Centralization	.063
Betweenness Centralization	.101

Centralization is another important topographic measure. Like density, the statistical output ranges from 0 to 1, where a decentralized network is likely to have a score near 0 while centralized networks are likely to have scores near 1. Decentralized networks

⁷⁸ Adapted from references in Appendix A using ORA, table values extracted from the Energy Network SNA Report generated by ORA using the references in Appendix A.

are those in which no single actor (in this case, a company) dominates the network, whereas centralized networks are often built around a central hub. Several forms of centralization exist. In this analysis, we utilize degree centralization and betweenness centralization. The former indicates the extent to which a single company (or a few companies) dominates in terms of the number of connections it possesses. The latter highlights the extent to which brokerage is dominated by one or a few actors.

As depicted in Table 1, our network is fairly decentralized, being valued at .063 for degree centralization and .101 for betweenness centralization. The decentralized nature of the network indicates that even if a major actor were removed, the other actors in the network would easily be able to move in and fill the void, thus making the network as a whole very resilient in terms of providing energy production and distribution throughout Europe.

In terms of centrality, we turn to betweenness and degree centrality. The former measures the extent to which each company sits on the shortest path between other pairs of companies. For example, imagine three companies (A, B, and C) that want to share information in a context in which company A communicates with company B, B communicates with company C, but A and C do not communicate directly. In that scenario, company B sits directly between A and C, which provides it with an advantage in terms of information flow. Thus, actors with high betweenness centrality are often considered nodes that possess brokerage potential. Degree centrality is a simple measure that counts the number of connections that each company possesses. In this analysis, a company with relatively many connections might be active, powerful, or influential.

Due to the limited size of the network and our purposeful focus on Romania, it makes sense that the organizations with the highest values for betweenness centrality (brokerage potential), depicted in Figure 9, would be Romanian companies.

3. Centrality Measures

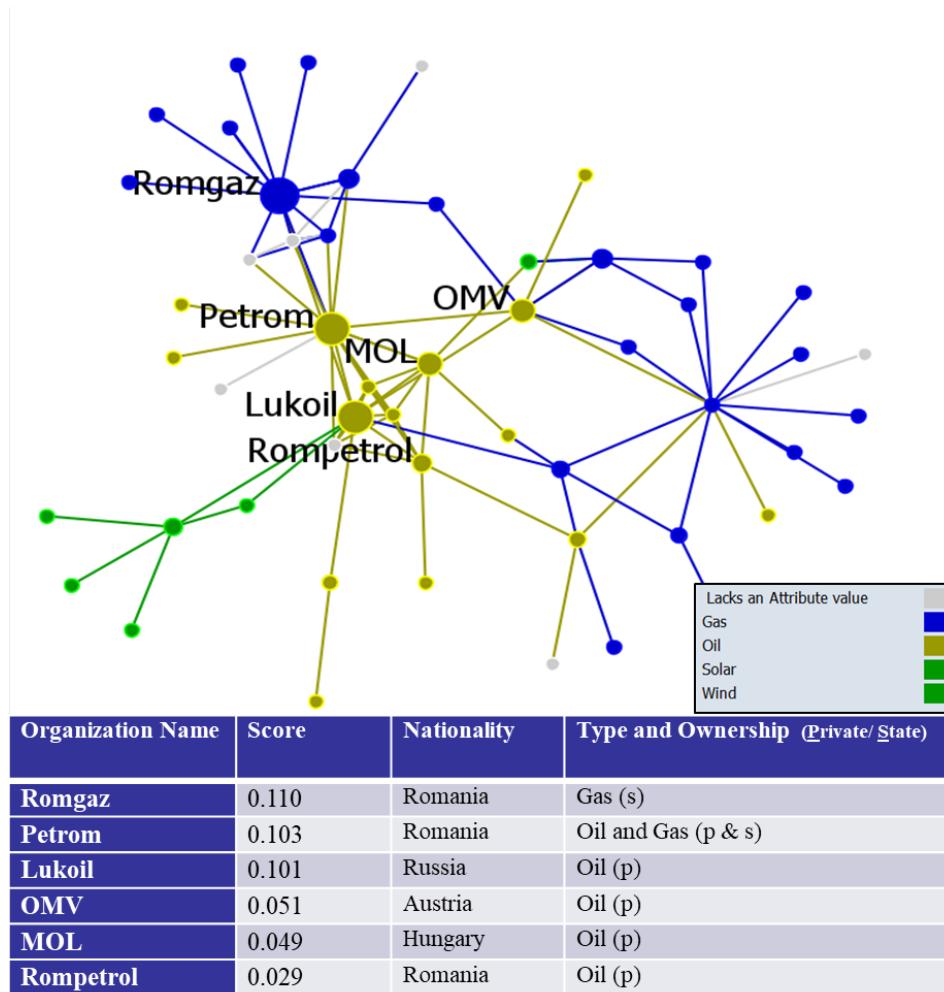


Figure 9. Betweenness Centrality – Potential Brokers in the Romanian Energy Sector⁷⁹

Though these results are interesting, one must also consider the context in which this network operates. So while Romgaz barely scores the highest in betweenness centrality, Romgaz probably has very little brokerage potential with Lukoil or Rompetrol, the two most significant actors representing Russian influence in the Romanian energy market. This is because Romgaz is a nationalized natural gas company while Lukoil and

⁷⁹ Adapted from references in Appendix A using ORA, table values extracted from the Energy Network SNA Report generated by ORA using the references in Appendix A.

Rompetro are private companies within the petroleum sector of the Romanian energy market.⁸⁰ This highlights the importance of real-world context to social network analysis, as not all networks function the same. Just because SNA seems to indicate Romgaz would be ripe to leverage as a broker within the network, the real world context of the situation indicates that it would have little to no brokerage potential over certain organizations in the network. Conversely, Petrom which is majority owned by Austria's OMV, scores the second highest in betweenness centrality, and real-world context would indicate that Petrom probably has the highest potential to be a broker within the Romanian energy network. This result is likely because Petrom is both a natural gas and a petroleum company, and it also controls large sectors of the Romanian market on both fronts.⁸¹ It would probably have regular interaction with, and potential business leverage over, every other energy company in the country.

In the case of our energy network, degree centrality (depicted in Figure 10) best reflects the situation of the most active energy companies for both Romania and throughout Europe because the network was built from inside Romania's companies through the outside ones. As already stated, Petrom probably has the greatest potential for brokerage in Romania and as such probably has more influence over both fronts of the energy market in the country than any of the other companies we included in our analysis.

⁸⁰ "Annual Report 2016," Romgaz, April 9, 2018:17, <https://www.romgaz.ro/en/content/annual-report-2016>.

⁸¹ "Annual Report 2016," OMV Petrom, April 9, 2018, http://www.bvb.ro/infocont/infocont17/SNP_20170426122744_2016-Annual-Report.pdf.

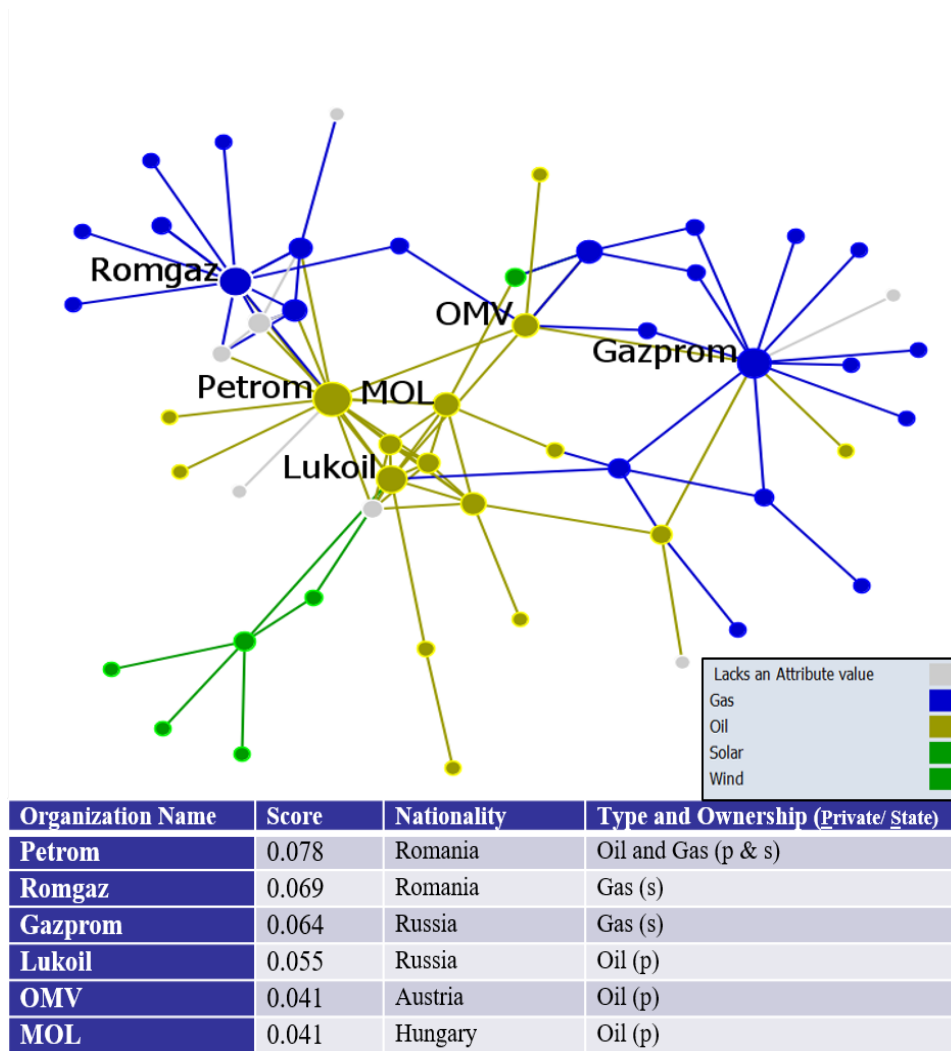


Figure 10. Degree Centrality – Most Active Actors in the Energy Sector⁸²

On the other hand, according to the degree centrality metrics, GAZPROM scores third. While its place within this metric has been skewed by the large number of direct subsidiaries included in the network, GAZPROM is unequivocally the most connected and most influential actor throughout Europe in the energy sector, and is one of the largest gas and oil companies on the planet.⁸³ Because of this influence throughout Europe, which our

⁸² Adapted from references in Appendix A using ORA, table values extracted from the Energy Network SNA Report generated by ORA using the references in Appendix A.

⁸³ “About Gazprom,” Gazprom, April 9, 2018, <http://www.gazprom.com/about/>.

analysis only hints at, GAZPROM has the potential to leverage dependent relationships among governments throughout the EU to pressure Romanian policy and potentially affect the Romanian energy industry.

4. Temporal Analysis

With regard to the energy industry (Figures 11 and 12), Romania is practically self-sufficient in the natural gas sector but less sufficient in the petroleum industry.

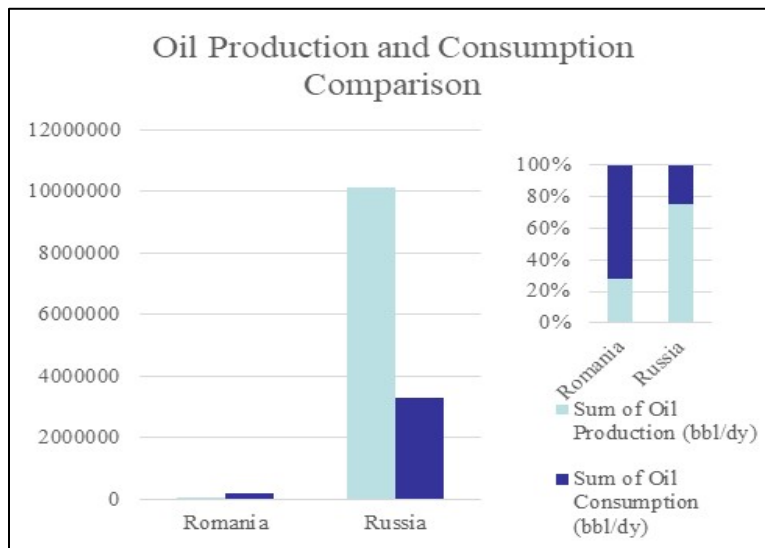


Figure 11. Comparison of Russian and Romanian Oil Production and Consumption⁸⁴

⁸⁴ Adapted from "Romania," Jane's By IHS Markit, accessed April 9, 2018, <https://janes.ihs.com/dashboard/country/Romania>.

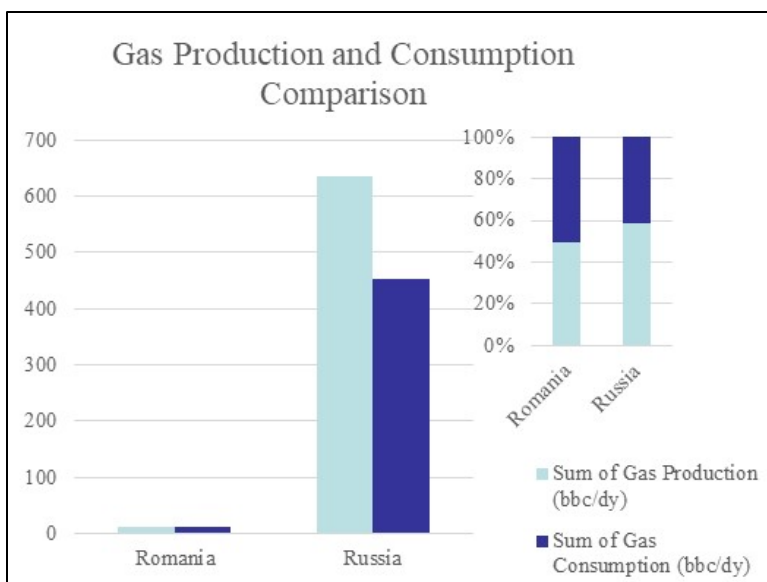


Figure 12. Comparison of Russian and Romanian Gas Production and Consumption⁸⁵

Romania has sizeable reserves within the country and its territorial waters off the Black Sea and, as the graphs in Figure 12 show, Romania produces about as much natural gas as it consumes. This puts Romania in an enviable position when compared to the rest of Europe, especially given that GAZPROM is the main lever of Russian influence in this sector.

When analyzing the petroleum industry, however, a potential avenue of influence emerges, as Romania only produces about 25 percent of the petroleum that it uses per year. These oil markets in Romania have been primarily served by four actors: OMV Petrom, Rompetrol, Lukoil, and MOL. These actors own and operate a significant percentage of the filling stations in the country but does not own or operate any of the refineries; thus, their potential impact is limited, and it was not included in the temporal analysis.

Romanian petroleum companies Petrom and Romgaz have experienced declines in profits while Rompetrol has made a modest profit. In Figure 13, we compared annual profit, oil refinery throughput, natural gas production, and energy production. Unfortunately, we

⁸⁵ Adapted from Jane's By IHS Markit.

were unable to find annual financial reports for the Romanian branch of Lukoil and thus excluded that company from the majority of this analysis. Lukoil is a massive corporation that dwarfs all of the Romanian companies assessed combined, and therefore, comparing data for companies bounded in scope to Romania to data for a corporation that spans the globe does not accurately indicate Lukoil’s direct influence within Romania. The trend that emerges when comparing profits for the past three years is that the two companies farthest removed from Russian control, Petrom and Romgaz, have experienced declines in profits over between 2014 and 2016, while Rompetrol, with KMG International as its majority shareholder, has recovered from a year of significant losses to two consecutive years of modest profits. We assess that these observations and trends are more likely due to a decline in global oil prices than any concerted efforts from Russia to affect the Romanian economy.

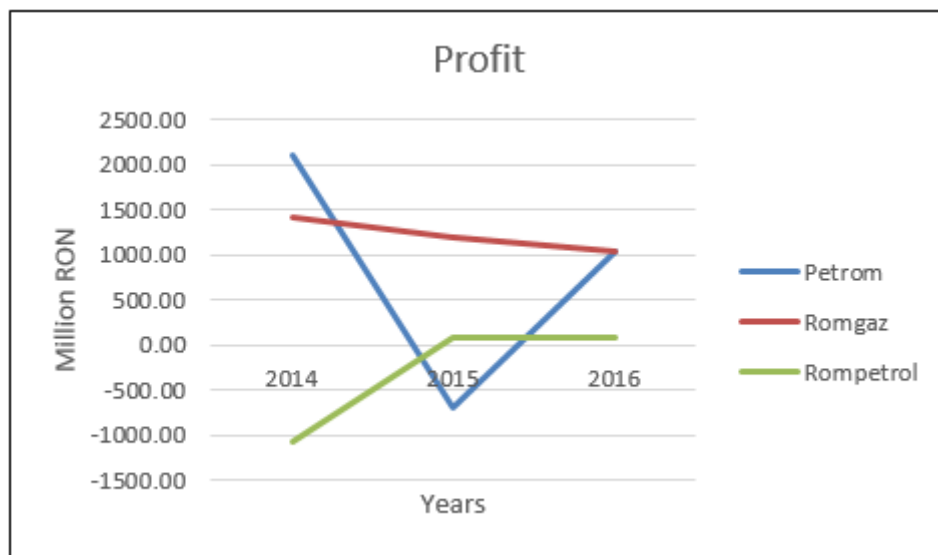


Figure 13. Romanian Oil and Gas Companies Profit Comparison⁸⁶

Of the five most active refineries within Romania, Lukoil and Rompetrol own and operate three while Petrom owns and operates two, meaning that approximately 63 percent

⁸⁶ Adapted from “Annual Report 2016,” Romgaz, April 9, 2018, <https://www.romgaz.ro/en/content/annual-report-2016>; “Annual Report 2016,” OMV Petrom, April 9, 2018, http://www.bvb.ro/infocont/infocont17/SNP_20170426122744_2016-Annual-Report.pdf; “Annual Report 2016,” Rompetrol, April 9, 2018, https://www.bvb.ro/infocont/infocont17/RRC_20170428142015_Annual-Report-for-2016-Eng.pdf.

of the country’s refining capacity in 2016, as shown in Figure 14, was controlled by Russia or Russian aligned companies. This represents the greatest economic vulnerability within the Romanian energy industry. Additionally, we were able to find statistics for filling stations within Romania, and when including MOL owned and operated filling stations, Lukoil and Rompetrol together own and operate 58 percent of the filling stations within the country.⁸⁷ Thus, when viewed holistically, within the petroleum industry in Romania, Russia has the potential to affect approximately 60 percent of the refining and distribution of petroleum products throughout the country.

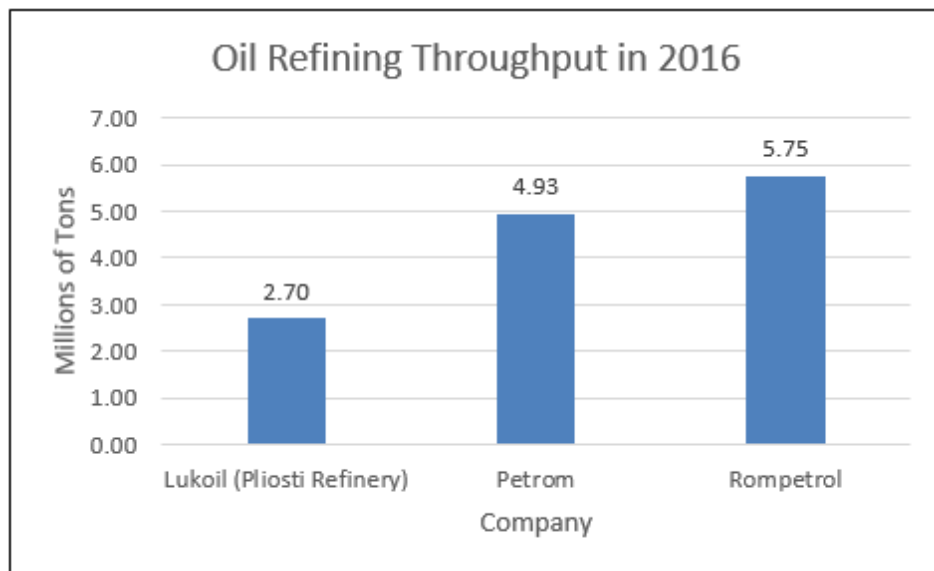


Figure 14. Romanian Oil Refining Throughput⁸⁸

⁸⁷“LUKOIL Romania,” LUKOIL, April 9, 2018, <http://www.lukoil.ro/ro/>; Kindla Péter and Greenroom, “MOL Romania,” MOL Romania, April 9, 2018, <https://molromania.ro/ro/despre-mol/mol-romania/scurt-istoric>; “Statii de distributie carburant,” OMV PETROM Romania, April 9, 2018, http://www.omv.ro/portal/01/ro/omv_ro/Home/Statii_de_distributie_carburant.

⁸⁸ Adapted from “Annual Report,” LUKOIL, April 9, 2018, <http://www.lukoil.com/InvestorAndShareholderCenter/ReportsAndPresentations/AnnualReports>; “Annual Report 2016,” OMV Petrom, April 9, 2018, http://www.bvb.ro/infocont/infocont17/SNP_20170426122744_2016-Annual-Report.pdf; “Annual Report 2016,” Rompetrol, April 9, 2018, https://www.bvb.ro/infocont/infocont17/RRC_20170428142015_Annual-Report-for-2016-Eng.pdf.

The gas that supplies the natural gas-fired power plants within Romania is mainly internally supplied. Analyzing natural gas production and energy production, Figure 15 and Figure 16, are interrelated. As stated earlier, Romania is largely self-sufficient within the natural gas energy sector; nationalized Romgaz and Petrom, which is majority owned by Austria's OMV, together are responsible for the gas production and energy production within the country. The only trend of note is the decline of Romgaz when compared to Petrom, thus ceding more of the market to a privatized company owned by Austrian corporation OMV. OMV has some relational ties to GAZPROM, and thus a greater share of the Romanian gas market controlled by OMV opens Romania up to potential avenues of economic influence.

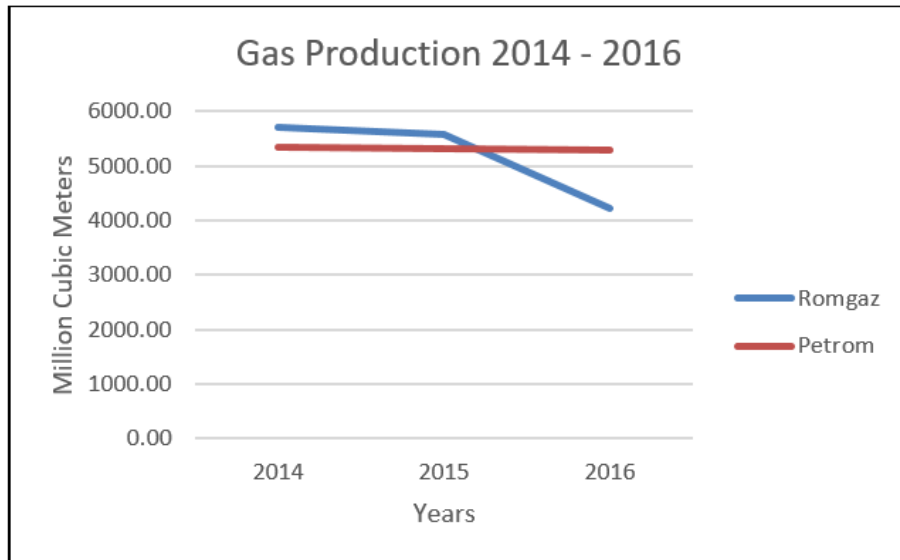


Figure 15. Romanian Natural Gas Production⁸⁹

⁸⁹ Adapted from “Annual Report 2016,” OMV Petrom, April 9, 2018, http://www.bvb.ro/infocont/infocont17/SNP_20170426122744_2016-Annual-Report.pdf; “Annual Report 2014,” Romgaz, April 9, 2018, <https://www.romgaz.ro/en/content/annual-report-2014>; “Annual Report 2016,” Romgaz, April 9, 2018, <https://www.romgaz.ro/en/content/annual-report-2016>.

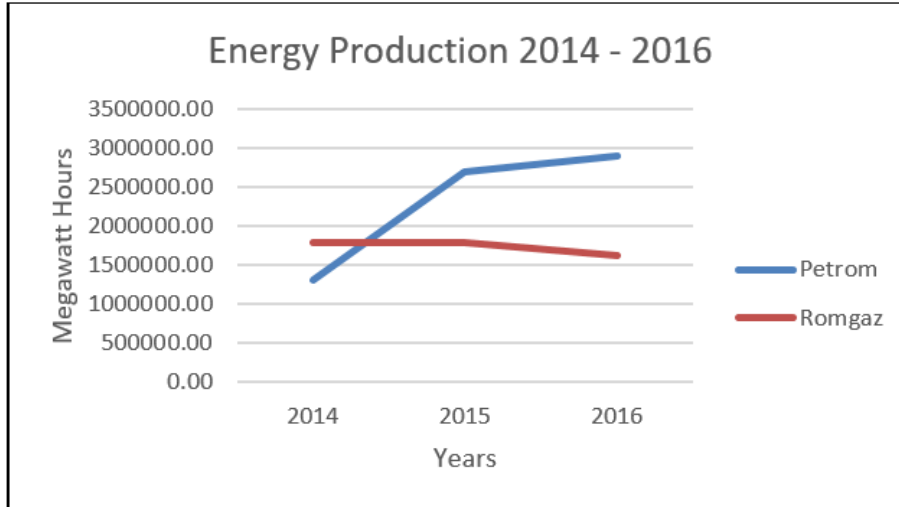


Figure 16. Romanian Energy Production⁹⁰

C. CONCLUSION

Overall, we began our analysis by building a relational network, starting with Romanian energy companies and following links outwards to determine potential influential actors. Based on the research scope, the aggregate network (see Figure 9) accounted for 55 actors (i.e., major energy corporations and part of the subsidiaries). The resulting network level measurements indicate a fairly decentralized network, which would normally indicate resilience in providing and distributing energy throughout Europe. However, removing key Russian controlled energy resources nodes also requires key resources node replacements in place in order to avoid instability in the energy market. For energy-dependent small states, the higher the market instability, the higher are the chances of state destabilization and therefore the higher exposure to outside influences is.

Our social network analysis also indicated that Romanian companies, namely Petrom and Romgaz, had the highest value for betweenness centrality (measures of brokerage potential, Figure 10). By overlapping real-world context with the SNA analysis, we assessed that the ranking of companies' brokerage potential is slightly different. The

⁹⁰ Adapted from “Annual Report 2016,” OMV Petrom, April 9, 2018, http://www.bvb.ro/infocont/infocont17/SNP_20170426122744_2016-Annual-Report.pdf; “Annual Report 2014,” Romgaz, April 9, 2018, <https://www.romgaz.ro/en/content/annual-report-2014>; “Annual Report 2016,” Romgaz, April 9, 2018, <https://www.romgaz.ro/en/content/annual-report-2016>.

second ranking company, Petrom is likely to have more influence than Romgaz, because it is both a gas and petroleum company while Romgaz is only a gas company. Our assessment is supported by the degree centrality results (Figure 11) indicating the most active companies in the energy sector, in which Petrom is ranked first.

We quickly learned that Romania is self-sufficient in the natural gas sector. Yet, within the petroleum sector, Russian giant Lukoil and Russian proxy majority shareholder, Kazakhstan's KazMunayGas (KMG) International of Romania's Rompetrol, control approximately 60 percent of the market.

When we visualized our relational data geospatially, the most significant insight was the ownership of petroleum infrastructure. Within the country, we identified five active oil refineries, three of which have been owned by Lukoil or Rompetrol. As we transitioned to our temporal and quantitative analysis, we analyzed refinery throughput in 2016. Lukoil and Rompetrol processed 8.45 of a total 13.38 million tons of petroleum products last year, which is about 63 percent. When looking at infrastructure ownership and refining capability combined, we conclude that Russian aligned companies control approximately 60 percent of the petroleum industry, giving Russia a significant potential for influence through the economy.

In conclusion, Russia controls sufficient petroleum industry infrastructure to leverage a "belts of insecurity" policy and create a resource buffer between the Russian Federation and NATO. This chapter has focused on the potential for Russian influence over Romania in supporting its own foreign policies, specifically in the energy sector. Our analysis highlights Russia's continued attempts to ensure and expand its position of influence over Romania within the energy sector. Romania is self-sufficient in the natural gas sector of the energy industry. Nevertheless, our research has highlighted a significant potential for Russian influence over Romania in the petroleum industry. This partially supports our initial hypothesis that Russia has the potential to influence the government of Romania through Romanian economic dependence in the energy sector.

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III. GREEK ENERGY SECURITY ANALYSIS

A. GREEK DIPLOMATIC, ECONOMIC, AND MILITARY SECURITY ENVIRONMENT

Energy is an important part of Russian hybrid warfare, which includes a wide variety of tactics. During the third conference of the Hellenic Association for Energy Economics (HAEE), Geoffrey R. Pyatt, the American ambassador to Greece, said “Russia has used its leverage over Europe’s energy as a political tool repeatedly. One study found 55 instances of Russia using supply cutoffs for political purposes over a 14-year period. Another study identified 41 examples in one year alone of Moscow linking political demands to energy deliveries.”⁹¹ Up until now, Greece has never been a victim of Russian energy blackmailing; however, we should remain aware of the fact that Russia could use energy as a political tool to influence Greece.

The goal of this chapter is to analyze the potential for Russia to influence the Greek energy sector. It contains four different analyses: a political analysis of Greek-Russian relations, a temporal analysis of Greek energy security, a social network analysis of the Greek energy companies’ network, and a geospatial analysis of Russian energy exports in relation to EU energy dependency and the Greek energy infrastructures. Based on the results of the analyses reported in this chapter, we have concluded that the Russian influence in the Greek energy field is multidimensional in that Russia holds sway based on controlling a vast portion of the Greek natural gas imports; it is well positioned regarding the current structure of the Greek energy infrastructures; and Russian companies maintain influential positions within the Greek oil network. By comparing the Russian influence in the oil and natural gas sectors, we conclude that Russia is capable of, and is in a good position to, influence the Greek natural gas sector due to its dominant role in Greek energy imports and the vulnerabilities of the Greek natural gas infrastructure. Even so, Russia has limited influence on the Greek oil sector.

⁹¹ U.S. Embassy and Consulate in Greece, 2018, “Ambassador Pyatt’s Remarks at HAEE Conference,” May 3, 2018, <https://gr.usembassy.gov/ambassador-pyatts-remarks-at-haee-conference/>.

1. Greek and Russian Relations

Traditionally, Greece and Russia have maintained a friendly relationship due to their common historical, cultural, and religious ties. During the 400-year Ottoman occupation of Greece (1453–1821), Russia supported the Orthodox populations of the Ottoman Empire. Having established official diplomatic relations in the early 19th century, Russia was one of the Great Powers that guaranteed the independence of Greece after the Greek War of Independence (1821) against the Ottoman Empire.⁹²

2. Political Relations

With embassies and several consulates in each country, strong diplomatic representation and frequent reciprocal visits attest to the friendly relations between Russia and Greece.⁹³ Since 2001, President Putin has visited Greece five times (2001, 2005, 2006, 2007, and 2016), while Foreign Minister Sergey Lavrov, Defense Minister Sergei Shoigu, and Deputy Foreign Minister Aleksey Meshkov, have each visited Greece once during the last decade. From 1979 until today, several Greek prime ministers have visited Russia as well. Three of these visits were made during the Cold War, and Prime Minister Kostantinos Karamanlis visited Moscow three times between 2005 and 2008.⁹⁴ A closer look at the agendas and the priorities of these visits reveals a major shift in Greek-Russian relations; that is, during the Cold War, bilateral relations were based on trade, but under Putin's leadership, energy has become a dominant issue.⁹⁵ The two countries have also developed other useful political tools to collaborate on foreign affairs, such as committees and forums.

⁹² The Great Powers (Britain, France, and Russia) and the Ottoman Empire signed the London Conference (1832) and the Treaty of Constantinople (1832) that established the creation of the Greek Kingdom.

⁹³ Greece maintains an embassy in Moscow and consulates general in Moscow, Saint Petersburg, and Novorossiysk; Russia's embassy is in Athens and its consulate general is in Thessaloniki; see Hellenic Republic Ministry of Foreign Affairs, "Greece Bilateral Relations with Russia," accessed July 2, 2018, <https://www.mfa.gr/en/blog/greece-bilateral-relations/russia>.

⁹⁴ Sofia Katsareli, "Οι Ρώσοι είναι φίλοι μας. Οι Έλληνες πρωθυπουργοί που πήγαν στη Ρωσία από το 1979 ως σήμερα." [The Russians are our friends. The Greek Prime Ministers that have visited Russia from 1979 till today.], *News 247*, April 8, 2015, <https://www.news247.gr/afieromata/oi-rosoi-einai-filoi-mas-oi-ellines-prothypourgoi-poy-pigan-sti-rosia-apo-to-1979-os-simera.6339512>.

⁹⁵ Athanasios Dokos and Loukas Tsoukalis, 2016, *Λευκή Βίβλος για την Ελληνική Εξωτερική Πολιτική* [*White Bible for the Hellenic Foreign Policy*] (Athens: Sideris Publications, 2016), 206–207.

For instance, the two countries have established a formal, Joint Inter-ministerial Committee that coordinates cooperation on issues such as economy, technology, and industry.⁹⁶ A memorandum of cooperation between the Greek Federation of Enterprises and Russia also exists.⁹⁷

Although Greece and Russia have traditionally enjoyed friendly diplomatic relations, recent developments indicate that there is a state of tension between them. In July 2018, the Greek government ordered the expulsion of two Russian diplomats and blocked the entrance of two others.⁹⁸ The Russian officials were accused of distributing sensitive information related to the Macedonia-naming dispute,⁹⁹ which led Russia to expel two Greek diplomats and Foreign Minister Sergey Lavrov to cancel a planned visit to Athens.¹⁰⁰

3. Cultural Relations

Greece and Russia also maintain positive relations based on shared cultural characteristics. For example, Greece and Russia made a joint decision to declare 2016 as a “Year of Friendship and Cooperation” for the two countries. Also, the Greek diaspora who live in the southern region of Russia, particularly in the areas surrounded by the Black Sea, help maintain friendly cultural ties. In addition, the Universities of Moscow, Lomonosov,

⁹⁶ Hellenic Ministry of Foreign Affairs, “Greece Bilateral Relations with Russia.”

⁹⁷ “Greek-Russian Memorandum of Cooperation,” Hellenic Federation of Enterprises, accessed July 5, 2018, <http://www.sev.org.gr/o-sev/sev-hellenic-federation-of-enterprises/>.

⁹⁸ Angeliki Koutantou and Michele Kambas, “Greece, Russia to Expel Diplomats in Macedonia Tussle ahead of NATO Summit,” Reuters, last modified July 10, 2018, <https://www.reuters.com/article/us-greece-russia-diplomats/greece-to-expel-two-russian-envoys-moscow-to-respond-in-kind-russia-lawmaker-idUSKBN1K10PU?feedType=RSS&>.

⁹⁹ According to the Hellenic Ministry of Foreign Affairs, “the name issue arose in 1991, when the Former Yugoslav Republic of Macedonia seceded from Yugoslavia and declared its independence under the name “Republic of Macedonia.” Historically, the term “Macedonia,” which is a Greek word, refers to the kingdom and culture of the ancient Macedonians, who belong to the Hellenic nation and are unquestionably part of Greek historical and cultural heritage.”; see Hellenic Republic Ministry of Foreign Affairs, “FYROM Name Issue,” accessed July 12, 2018, <https://www.mfa.gr/en/fyrom-name-issue/>.

¹⁰⁰ Niki Kitsantonis, “Tensions Escalate between Greece and Russia, With Macedonia in the Middle,” *New York Times*, last modified July 19, 2018, <https://www.nytimes.com/2018/07/19/world/europe/greece-russia-macedonia.html>.

and Kuban offer courses in Greek language, history, and culture.¹⁰¹ The most significant cultural ties, however, are based on the common religion since the Eastern Orthodox Church has been the main religious sect in both countries. President Putin, who has visited Mount Athos twice (2006 and 2016),¹⁰² mentioned during his most recent visit that “a very important and necessary act is undertaken on Holy Mount Athos. This act is about the preservation of the moral traditions of our society.”¹⁰³

Many scholars believe that Russia is using the Russian Orthodox Church (ROC) as a tool of foreign policy in many Eastern European nations, not just Greece. Daniel Payne states that, especially during Putin’s administration, the ROC and the Russian Foreign Ministry combined their efforts to achieve three goals: “spiritual security of the Russian diaspora, reacquisition of Russian property that was lost during the Communist period,” and “influence of the Russian government throughout the world.”¹⁰⁴ In addition, Victoria Hudson believes that the Russian Orthodox Church is being used as a vital part of the “hegemonic narrative” that protects Russia from malicious foreign influence.¹⁰⁵

4. Economy and Trade

The economic ties between Greece and Russia are also strong, though heavily in Russia’s favor. The percentage of Greek exports to Russia amounts to 0.81 percent of all of Russia’s imports while the percentage of Greek imports coming from Russia amounts

¹⁰¹ Hellenic Republic Ministry of Foreign Affairs, “Cultural Relations and Greek Community,” accessed July 25, 2018, <https://www.mfa.gr/en/greece-bilateral-relations/russia/cultural-relations-and-greek-community.html>.

¹⁰² Mount Athos is a semiautonomous region within Greece and a significant spiritual center for the Orthodox doctrine. More than 20 monasteries are located in Mount Athos and among them there is a Russian one.

¹⁰³ The Russian Orthodox Church Department for External Church Relations, “President Putin Visits Russian St. Panteleimon Monastery on Athos,” May 28, 2016, <https://mospat.ru/en/2016/05/28/news132255/>.

¹⁰⁴ Daniel P. Payne, “Spiritual Security, the Russian Orthodox Church, and the Russian Foreign Ministry: Collaboration or Cooptation?” *Journal of Church and State* 52, no. 4 (October 2010): 712–27, <https://doi.org/10.1093/jcs/csq102>.

¹⁰⁵ Victoria Hudson, “The Russian Orthodox Church under Patriarch Kirill,” *RUSSIALIST*, April 1, 2015, <http://russialist.org/the-russian-orthodox-church-under-patriarch-kirill/>.

to 6.8 percent of its total amount.¹⁰⁶ Figure 17 depicts Greek and Russian trade figures from 2013 to 2017. According to the Greek Statistical Authority, Greek exports decreased by 42.2 percent from 2013, the first year of the Russian sanctions against the EU, to 2016.¹⁰⁷ In particular, the Greek agrifood stuffs sector suffered the most from the embargo Russia imposed as a counter measure to the EU sanction; Greek agrifood stuffs exports to Russia were reduced by 80 percent over a four-year period (2013–2017).¹⁰⁸

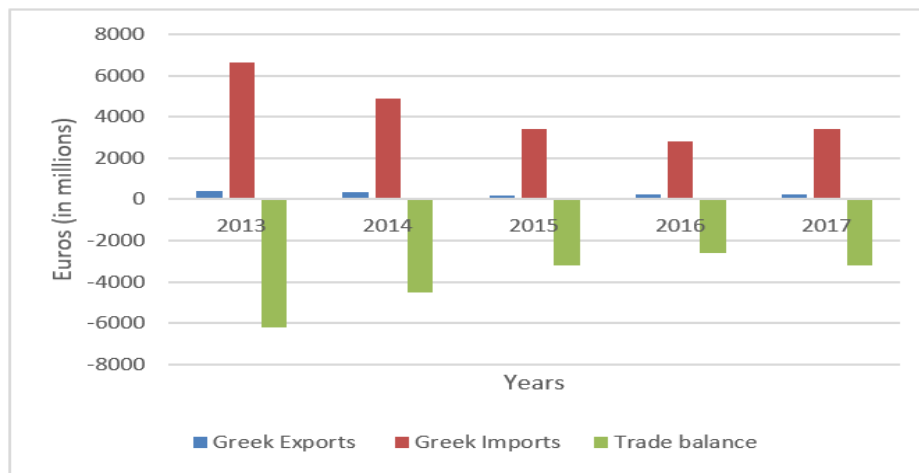


Figure 17. Greek-Russian Trade (2013–2017)¹⁰⁹

Greece’s primary imports from Russia are energy products, making the unbalanced trade relationship a potentially serious problem for Greece. In 2017, Russia was among the

¹⁰⁶ Athanasios Karapetsas, Christina Stefanidou, and Adamantios Karitianos, Έκθεση 2017 για την Οικονομία της Ρωσικής Ομοσπονδίας και την Ανάπτυξη των Οικονομικών και Εμπορικών Σχέσεων Ελλάδας-Ρωσικής Ομοσπονδίας [2017 Report on the Economy of the Russian Federation and Greek-Russian Economic and Trade Relations] (Moscow: Hellenic Office of Economic and Commercial Affairs in Russia, April 2018), 27, <http://www.agora.mfa.gr/infofiles-menu/infofile/63056>.

¹⁰⁷ In response to the Ukrainian crisis, EU has imposed sanctions on the Russian exports to the EU. These sanctions further worsen the already unbalanced trade between Russia and Greece in favor of Russia; see Hellenic Statistical Authority, Commercial Transactions of Greece: December 2017, (Athens: Hellenic Statistical Authority, 2018), <http://www.statistics.gr/en/statistics/-/publication/SFC02/2017-M12>.

¹⁰⁸ Karapetsas, Stefanidou, and Karitianos, Έκθεση 2017 για την Οικονομία της Ρωσικής Ομοσπονδίας και την Ανάπτυξη των Οικονομικών και Εμπορικών Σχέσεων Ελλάδας-Ρωσικής Ομοσπονδίας [2017 Report on the Economy of the Russian Federation and Greek-Russian Economic and Trade Relations], 29.

¹⁰⁹ Adapted from Karapetsas, Stefanidou, and Karitianos, 23.

top five countries from which Greece imported, while Greece was ranked 26th on Russian imports.¹¹⁰ In 2017, Russia's primary exports to Greece were petroleum products, amounting to 81.3 percent of total Greek imports from Russia, while other products of important value imported from Russia were metals such as aluminum (11.4 percent) and copper (2.2 percent).¹¹¹ Particularly in the field of energy, Russia is a great trading partner for Greece but not the opposite since Russia is the biggest energy exporter to the EU. In terms of importing energy from Russia, Greece is a medium market, scoring close to the EU average. Figure 18, which compares Russian energy exports to Greece, shows that the largest importer of Russian energy products, namely Germany, imports four to six times more Russian energy than Greece.¹¹²

¹¹⁰ World Bank, "Greece Trade at a Glance: Most Recent Values," April 29, 2018. <https://wits.worldbank.org/CountrySnapshot/en/GRC/textview>.

¹¹¹ Karapetsas, Stefanidou, and Karitianos, Έκθεση 2017 για την Οικονομία της Ρωσικής Ομοσπονδίας και την Ανάπτυξη των Οικονομικών και Εμπορικών Σχέσεων Ελλάδας-Ρωσικής Ομοσπονδίας [2017 Report on the Economy of the Russian Federation and Greek-Russian Economic and Trade Relations], 27.

¹¹² Germany is the largest importer of Russian energy products in the EU; see Eurostat/International Trade, "EU Trade since 1988 by SITC," accessed August 20, 2018, <https://ec.europa.eu/eurostat/data/database>.

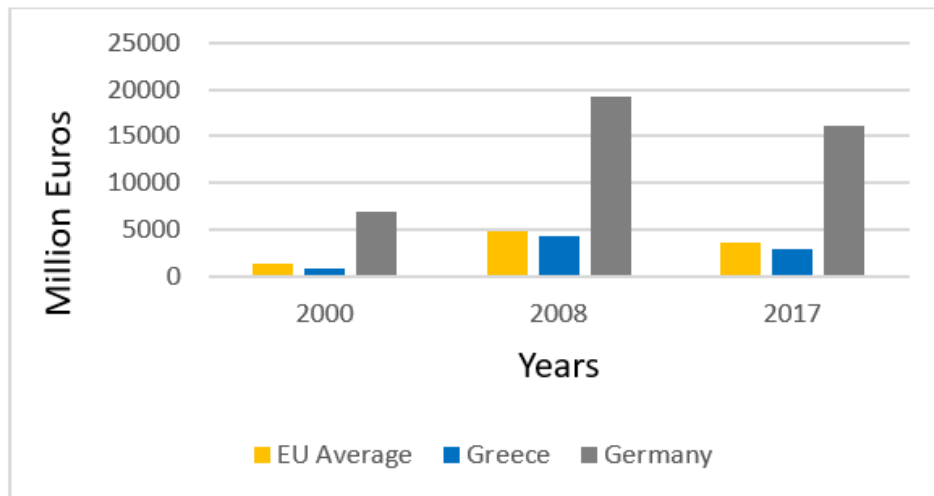


Figure 18. Russian Energy Exports: EU Average, Greece, and Germany (2000, 2008, and 2017)¹¹³

In the field of investments, the relations are unbalanced again; Russians invest in Greece approximately 15 times as much as Greeks invest in Russia. According to the Central Bank of Russia, Russian investments in Greece for 2017 amounted to US\$733 million, an increase of 7.3 percent compared to 2016.¹¹⁴ This amount accounts for 0.19 percent of total Russian foreign investment. Russian investments in Greece are mainly in the sectors of energy, finance services, telecommunications, tourism, and real estate. During the recent economic crisis in Greece, Russian investors were intensely interested in investing in Greek infrastructure.¹¹⁵ Russians have unsuccessfully tried to buy out infrastructure segments such as the port of Thessaloniki, DEPA (Public Gas Corporation of Greece), and TrainOSE.¹¹⁶ In addition, Rosoboronexport, a company which has the exclusive right to export Russian weapon systems, has established a subsidiary company

¹¹³ Adapted from Eurostat/International Trade, “EU Trade since 1988 by SITC.”

¹¹⁴ Karapetsas, Stefanidou, and Karitianos, Έκθεση 2017 για την Οικονομία της Ρωσικής Ομοσπονδίας και την Ανάπτυξη των Οικονομικών και Εμπορικών Σχέσεων Ελλάδας-Ρωσικής Ομοσπονδίας [2017 Report on the Economy of the Russian Federation and Greek-Russian Economic and Trade Relations], 28.

¹¹⁵ Karapetsas, Stefanidou, and Karitianos, 32.

¹¹⁶ The port of Thessaloniki is the second largest port in Greece after Piraeus; DEPA is the company that dominates the Greek natural gas market; and TrainOSE is the company that controls all the urban and suburban railways in Greece.

in Greece called ROSOBORON SERVICE—HELLAS. Greece exports to Russia, on the other hand, are quite minute. For instance, in 2017 the value of Greek investments in the Russian Federation amounted to US\$50 million, representing only 0.009 percent of all foreign investment in Russia.¹¹⁷ There are roughly 70 Greek companies active in Russia; in 2017, Greek investments in Russia were distributed across process manufacturing, transportation, logistics, financing services, real estate, scientific and technical services, and health.¹¹⁸

In the field of energy investments, the case of DEPA's privatization is notable. Following the third EU energy package, DEPA will have to adopt policies within the next few years that liberalize the gas market and promote healthy and effective competition.¹¹⁹ In 2013, the Greek government announced a privatization program of DEPA, and GAZPROM expressed its initial interest in buying DEPA. At the end, GAZPROM did not submit a binding offer for DEPA. After the withdrawal of GAZPROM, other prospective bidders who had previously signaled their interest for DEPA also failed to submit their offers. As Helena Smith stated, "there was speculation ... that Moscow's decision to pull out had been dictated by geopolitical pressure. The United States and the EU have both made clear their distaste for Russia further increasing its influence over the European energy market."¹²⁰

¹¹⁷ Karapetsas, Stefanidou, and Karitianos, Έκθεση 2017 για την Οικονομία της Ρωσικής Ομοσπονδίας και την Ανάπτυξη των Οικονομικών και Εμπορικών Σχέσεων Ελλάδας-Ρωσικής Ομοσπονδίας [2017 Report on the Economy of the Russian Federation and Greek-Russian Economic and Trade Relations], 33.

¹¹⁸ Karapetsas, Stefanidou, and Karitianos, 33.

¹¹⁹ According to the Public Gas Corporation of Greece (DEPA) the third EU energy package "contains Directives on common rules for the internal market in electricity and the internal market in natural gas, a Regulation establishing the Agency for Cooperation of the Energy Regulators (ACER), as well as Regulations on conditions for access to the network for cross-border exchanges in electricity and for access to the natural gas transmission networks"; see Public Gas Corporation of Greece (DEPA), "European Regulatory Framework," accessed May 25, 2018, <http://www.depa.gr/content/article/002001014002/293.html>.

¹²⁰ Helena Smith, "Greek Gas Supplier Selloff Fails to Draw Gazprom Bid," *Guardian*, June 10, 2013, <https://www.theguardian.com/business/2013/jun/10/greek-gas-supplier-selloff-gazprom>.

5. Tourism

Tourism is the leading industry for the Greek economy, and Russian tourism contributes substantially to it. Tourism brings in 27.2 million international tourists and employs roughly 900,000 people.¹²¹ The total contribution of tourism to the Greek GDP is estimated at around 27 percent, and makes up around 25 percent of the country's total employment.¹²² Figure 19 shows the number of Russian tourists and their expenditures in Greece. During the last decade, more than 400,000 Russian tourists arrived in Greece each year, spending more than US\$450 million yearly.¹²³ Relative to other countries, Russia is ranked among the top five for both arrivals and expenditures during the last decade.¹²⁴ In their effort to deepen their relations in the field of tourism, Greece and Russia declared the years 2017 and 2018 as a “Russia—Greece Year of Tourism” and, accordingly, they developed an action plan to increase the arrivals of the Russian tourists throughout the year.¹²⁵ There is also a Greek-Russian tourism forum that aims to facilitate tourist cooperation. In addition, the two countries have signed bilateral agreements in the fields of faith and wellness tourism.¹²⁶

¹²¹ “Statistical Data of Incoming Tourism,” Greek Tourism Confederation (SETE), accessed September 9, 2018, <http://www.insete.gr/en-gb/SETE-Intelligence/Statistics/Statistical-Data-of-Incoming-Tourism>.

¹²² Aris Ikkos and Serafim Koutsos, *The Contribution of Tourism to the Greek Economy in 2017*, (Athens, Greek Tourism Confederation (SETE), May 2018), http://www.insete.gr/portals/0/meletes-INSETE/01/2018_SymvolhTourismou-2017_EN.pdf.

¹²³ Greek Tourism Confederation (SETE), “Statistical Data of Incoming Tourism.”

¹²⁴ Bank of Greece, *Έκθεση του Διοικητή για το Έτος 2017 [Report of the Governor of the Bank of Greece, 2017]*, (Athens: Bank of Greece, 2017), 106, <https://www.bankofgreece.gr/BogEkdoseis/ekthdkt2017.pdf>.

¹²⁵ Hellenic Republic Ministry of Tourism, “Russia – Greece Year of Tourism,” accessed July 20, 2018, <http://www.mintour.gov.gr/el/search/?terms=percentu03C1percentu03C9percentu03C3percentu03B9percentu03B1>.

¹²⁶ Hellenic Republic Ministry of Tourism, “Russia – Greece Memorandum in Tourism.”

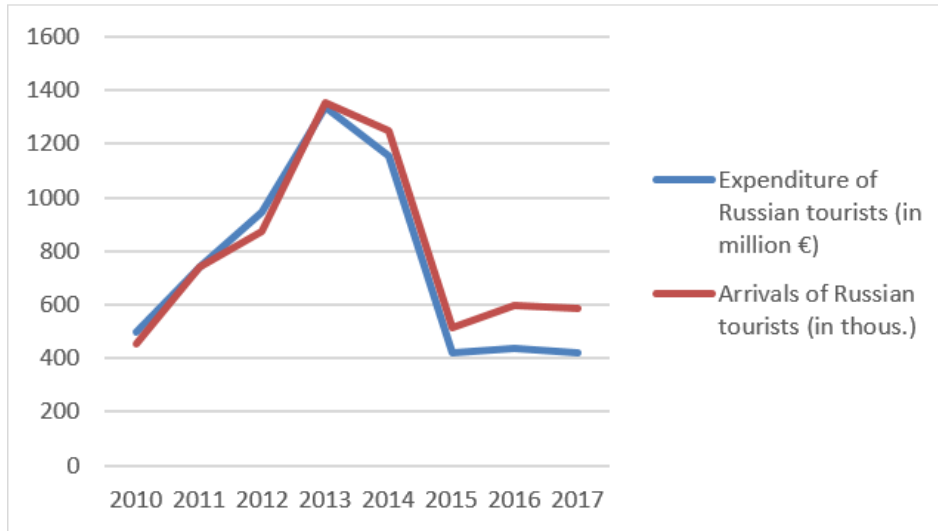


Figure 19. Russian Tourists Arrivals and Expenditures (2010–2017)¹²⁷

B. DATA ANALYSIS OF THE GREEK ENERGY SECTOR

This section contains three different analyses: a temporal analysis of Greek energy security, a social network analysis of the Greek energy companies’ network, and a geospatial analysis of Russian energy exports in relation to EU energy dependency and the Greek energy infrastructures.

1. Temporal Analysis

This section focuses on energy security as defined by prominent scholar Christian Winzer. There are many different ways to define energy security, but Winzer’s definition states, “energy security is the continuity of energy supplies relative to demand.”¹²⁸ With this definition as a guide, we focused on three aspects of Greek energy security: primary energy supply, energy production and self-sufficiency, and energy imports and exports. This approach aligns with the EU’s five key areas regarding energy security, which are “increasing energy efficiency, increasing energy production in the EU and diversifying

¹²⁷ Adapted from Greek Tourism Confederation, “Statistical Data of Incoming Tourism.”

¹²⁸ Christian Winzer, “Conceptualizing Energy Security and Making Explicit Its Polysemic Nature,” *Energy Policy* 38, no. 2 (February 2010):887–895, <https://doi.org/10.1016/j.enpol.2009.10.039>.

supplier countries and routes, completing the internal energy market and building missing infrastructure links, speaking with one voice in external energy policy, and strengthening emergency and solidarity mechanisms and protecting critical infrastructure.”¹²⁹ According to the EU’s five key areas, we focused on Greece’s supplier countries and the structure of the Greek energy market.

Regarding Greek energy security policy, the priority and top objective of the Greek government (as described by the Ministry of Energy and Environment) “is to safeguard and manage energy resources in a manner which secures the smooth, uninterrupted and reliable supply of the nation’s energy needs and access for all users to affordable, secure energy.”¹³⁰ The IEA states that “the Greek energy mix is defined by high oil use in the heating and transport sectors, and, until recently, also high lignite use in power generation.”¹³¹ Both the National Renewable Energy Action Plan and involvement in international pipeline projects should assure an effective energy security policy in the future. Nevertheless, Greece is highly dependent on Russian imports of natural gas, though Russia has not yet used energy as a source of political pressure with Greece.¹³²

Primary Energy Supply

Despite the increase in renewables and the effect of the economic crisis, oil and coal are still the two most significant fuels for Greece. Figure 20 shows Greece’s Total Primary Energy Supply (TPES) from 1990 to 2015.¹³³ In 2005, the TPES reached its peak;

¹²⁹ European Commission, “Energy Security Strategy,” accessed July 18, 2018, <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/energy-security-strategy>.

¹³⁰ Hellenic Republic Ministry of Energy and Environment, “Energy,” accessed July 25, 2018, <http://www.ypeka.gr/Default.aspx?tabid=225&language=en-US>.

¹³¹ International Energy Agency, *Energy Policies of IEA Countries, Greece 2017 Review* (France: IEA Publications, 2017), 143, <https://www.iea.org/publications/freepublications/publication/EnergyPoliciesofIEACountriesGreeceReview2017.pdf>.

¹³² Sait Sonmez and Sedat Cobanoglu, “The Use of Energy Resources as Foreign Policy Tools: The Russian Case,” *European Scientific Journal* 12, no. 11 (April 2016): 78–100, <http://dx.doi.org/10.19044/esj.2016.v12n11p%25p>.

¹³³ International Energy Agency defines TPES as the sum of “production + imports – exports – international marine and aviation bunkers ± stock changes. This equals the total supply of energy that is consumed domestically, either in transformation (e.g., power generation and refining) or in final use.” See *International Energy Agency, Energy Policies of IEA Countries, Greece 2017 Review*, 19.

unfortunately, it then decreased 24 percent in the next ten years due to the economic crisis.¹³⁴ In 2016, almost 50 percent of the Greek energy supply concerned oil, which makes oil the most dominant fuel in Greece today. According to IEA, “the share of oil in TPES is the second-highest among IEA member countries, after Luxembourg, which is dominated by the transport sector and “fuel tourism” from its neighboring countries.”¹³⁵ The second most significant fuel in Greece is coal; in 2016, the TPES for coal amounted to 19 percent. Greece uses coal in the industry sector, mainly in generating electricity. During the last decade, there has been a significant reduction in the usage of coal, from 8.4 Million Tons of Oil Equivalent (Mtoe) in 2006 to 4.4 Mtoe in 2016.¹³⁶ The third most significant fuel in Greece is natural gas, accounting for 15 percent of TPES. Greece has been using natural gas since the late 1990s. After a peak in the supply (4.0 Mtoe) in 2011, the supply had fallen by 12 percent to 3.5 Mtoe in 2016.¹³⁷ Regarding renewable sources, there has been a significant increase during the last decade (5.9 percent in 2006 to 12.5 percent in 2016), but their share in the total energy mix is still small in comparison to coal and oil.¹³⁸ IEA states that “the growth in renewables in the last decade is a result of rapid increases in wind and solar power generation. The share of solar energy in TPES is the second highest among IEA member countries, after Spain.”¹³⁹

¹³⁴ During the economic crisis, there was a decline in the economic activity that affected the demand for and therefore the supply of energy.

¹³⁵ International Energy Agency, *Energy Policies of IEA Countries, Greece 2017 Review*, 19.

¹³⁶ International Energy Agency, 20.

¹³⁷ International Energy Agency.

¹³⁸ International Energy Agency.

¹³⁹ International Energy Agency.

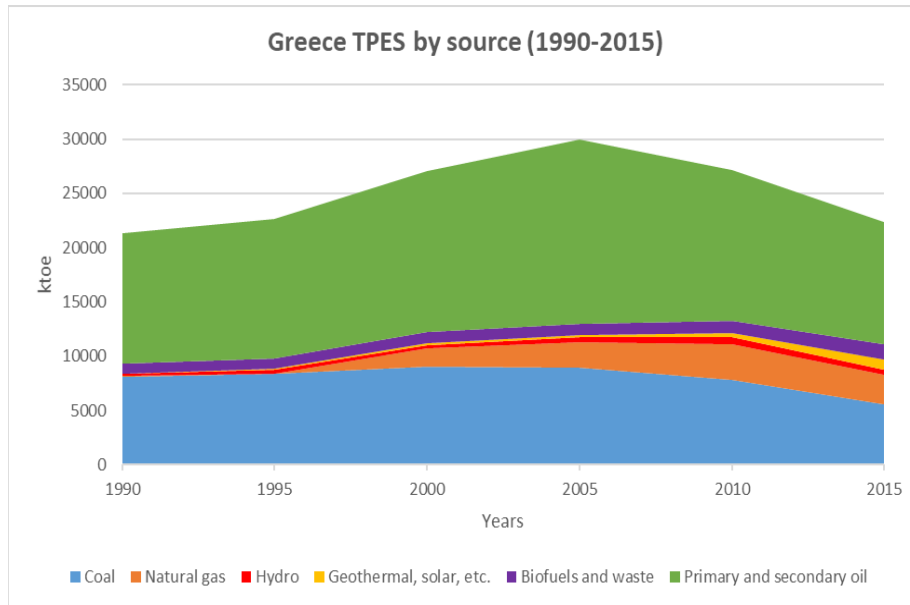


Figure 20. Greece: TPES by Source (1990–2015)¹⁴⁰

Energy production and Self-sufficiency

Greece lacks domestic oil and natural gas production, while coal production has been reduced due to environmental regulations. Figure 21 depicts Greece’s domestic energy production from 1990 to 2016.¹⁴¹ As indicated by the graph, there has been a decrease in the production of solid fuels (mainly coal), which still dominate total energy production in Greece. The remaining energy production is based on renewable energy sources; biofuels and waste production make up the highest portion of renewable energy sources, followed by solar, hydro, and wind. According to IEA, “insignificant crude oil and natural gas production leaves Greece reliant on imports for those fuels. The total energy production accounts for less than one-third of TPES in the country. The Russian Federation is the largest supplier of natural gas to Greece and the second-largest source of crude oil after Iraq.”¹⁴²

¹⁴⁰ Adapted from International Energy Agency, “Simplified Energy Balances - Annual Data, Primary Production,” Eurostat/Energy, accessed August 25, 2018, <https://ec.europa.eu/eurostat/data/database>.

¹⁴¹ “Simplified Energy Balances - Annual Data, Primary Production,” Eurostat/Energy, accessed August 25, 2018, <https://ec.europa.eu/eurostat/data/database>.

¹⁴² International Energy Agency, *Energy Policies of IEA Countries, Greece 2017 Review*, 21.

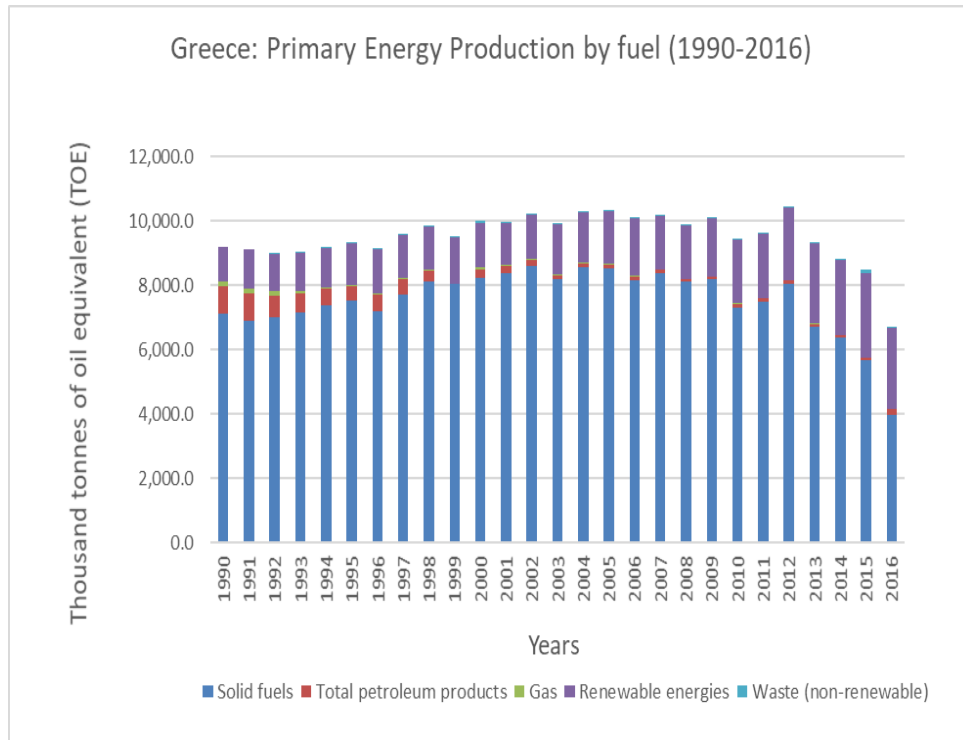


Figure 21. Greece: Primary Energy Production by Fuel (1990–2016)¹⁴³

To assess Greece’s ability to be self-sufficient in terms of energy, this analysis uses two different measurements. First, we compare energy production with consumption to calculate *energy balance*. During the last few years, there has been a deficit in all fuels, although Greece is almost self-sufficient in coal while remaining highly dependent in natural gas and oil.¹⁴⁴ Figure 22 depicts Greece’s energy balance from 2000 to 2016.

¹⁴³ Adapted from Eurostat/Energy, “Simplified Energy Balances - Annual Data, Primary Production.”

¹⁴⁴ Eurostat/Energy, “Simplified Energy Balances - Annual Data, accessed August 22, 2018,” <https://ec.europa.eu/eurostat/data/database>.

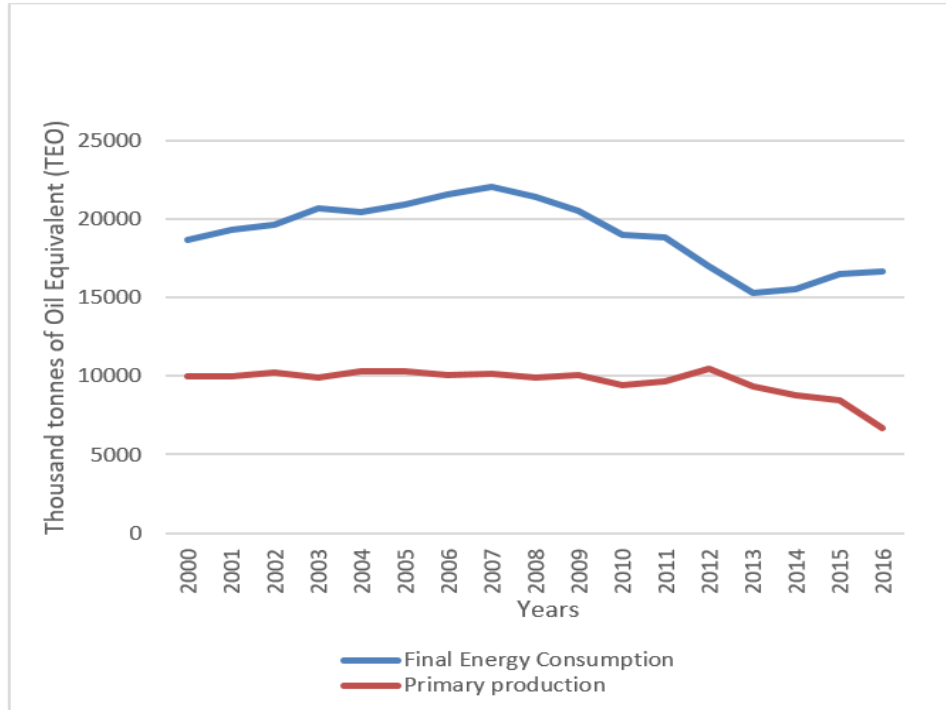


Figure 22. Greece Energy Balance (2000–2016)¹⁴⁵

Second, we used *energy dependence*, which the statistical office of the EU (Eurostat) defines as “the extent to which an economy relies upon imports in order to meet its energy needs; the indicator is calculated as net imports divided by the sum of gross domestic energy consumption plus bunkers.”¹⁴⁶ According to Eurostat, between 2010 and 2016 there was an increase in the rate of energy dependency in Greece, although it is less marked than in other countries.¹⁴⁷ Figure 23 shows the rate of energy dependency from 1990 to 2016; the rate amounted to between 60 percent and 70 percent, scoring the highest value in 2016 (73.6 percent).¹⁴⁸

¹⁴⁵ Adapted from Eurostat/Energy, “Simplified Energy Balances - Annual Data.”

¹⁴⁶ Eurostat, “Energy Dependence,” last modified October 17, 2018, https://ec.europa.eu/eurostat/web/products-datasets/-/T2020_RD320.

¹⁴⁷ Eurostat, “Energy Production and Imports,” last modified September 18, 2018, https://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_production_and_imports.

¹⁴⁸ Eurostat/Energy, “Energy Dependency Rate,” accessed August 22, 2018, <https://ec.europa.eu/eurostat/data/database>.

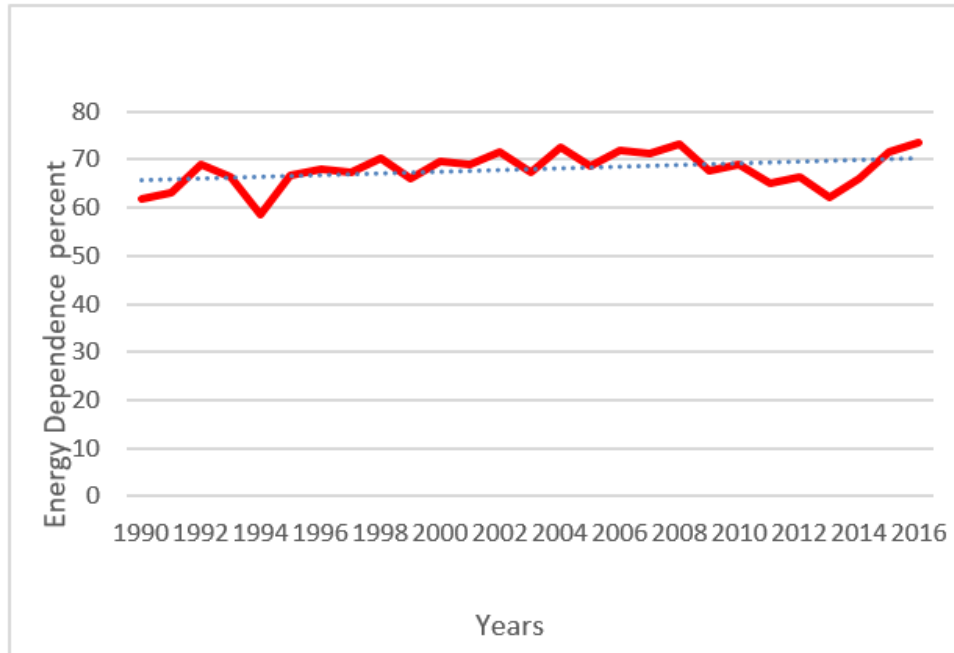


Figure 23. Greece: Energy Dependence (1990–2016)¹⁴⁹

Energy Import and Exports

As noted previously, Greece depends on oil and natural gas imports to satisfy domestic energy consumption. Figure 24 shows Greek crude oil imports over the last 16 years indicating that the oil market is more open and competitive than it is in gas.¹⁵⁰ Russia still has a significant role, but other competitors such as Kazakhstan, Iran, and Iraq have equal, if not bigger, shares in the market. Upon closer examination, we observed that since 2013, there has been a significant decline in Russian crude oil imports. Figure 25 shows Greek natural gas imports over the last 16 years, revealing the dominant role of Russian gas imports in the Greek market; however, the use of Algerian Liquefied Natural Gas (LNG) in conjunction with Turkey’s entry into the Greek market in 2008 partially mitigates the Russian influence.¹⁵¹

¹⁴⁹ Adapted from Eurostat/Energy, “Energy Dependency Rate.”

¹⁵⁰ Eurostat/International Trade, “EU Trade since 1988 by SITC.”

¹⁵¹ Eurostat/International Trade.

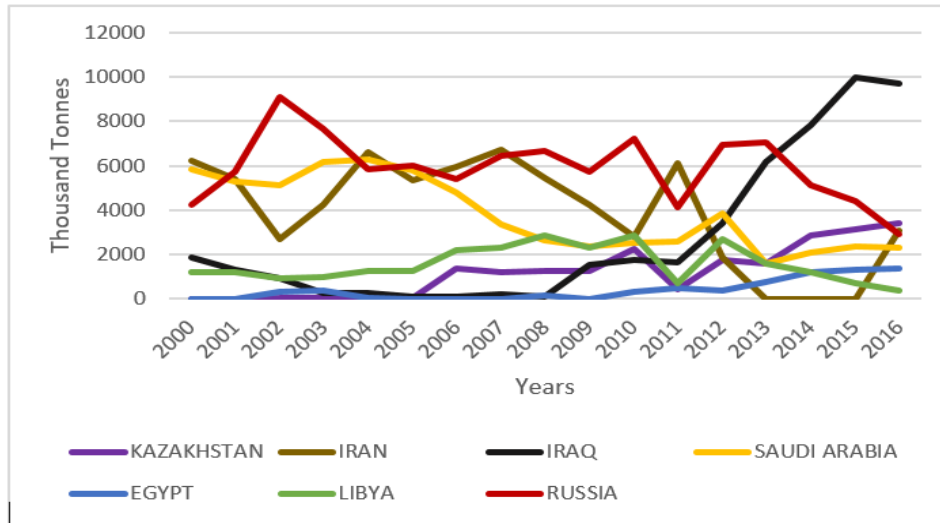


Figure 24. Greece: Crude Oil Imports (2000–2016)¹⁵²

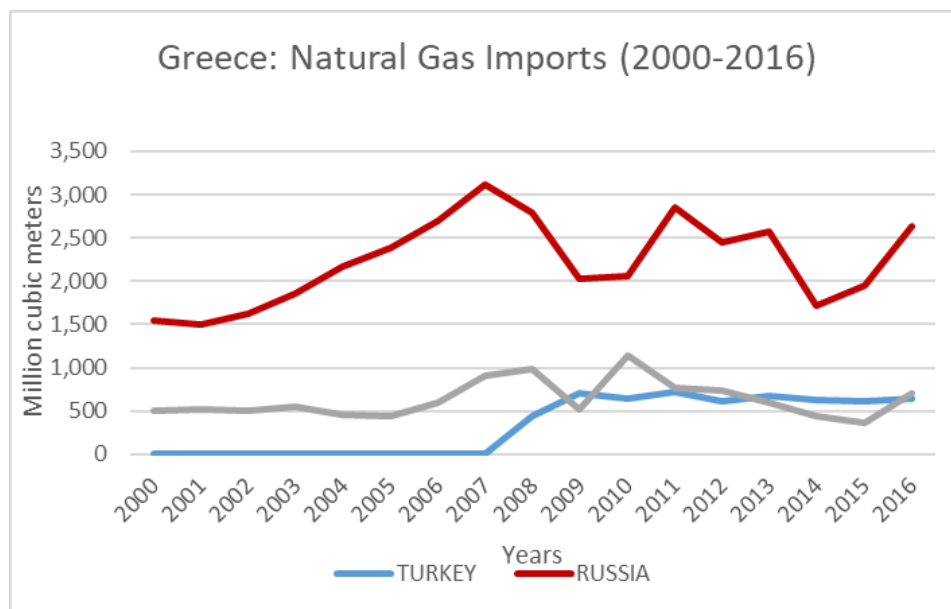


Figure 25. Greece: Natural Gas Imports (2000-2016)¹⁵³

Figures 24 and 25 suggest that since 2013, and in comparison to other countries, Russia's relative influence is greater in the gas sector than it is in the oil sector. Russia can

¹⁵² Adapted from Eurostat/International Trade.

¹⁵³ Adapted from Eurostat/International Trade.

infiltrate the oil sector either by acquiring one of the two Greek oil companies or by investing in the construction of a new refinery. Considering the small size of the Greek market, neither is likely to happen in the near future. On the other hand, Russia could have more success in the gas sector in which Greece heavily depends on Russian imports. For instance, Greece imports 67 percent of its gas from GAZPROM, which is essentially a Russian state entity. It appears two factors explain Greece’s great dependency on Russia for natural gas. First, Russia maintains a dominant role in the European natural gas market. According to Eurostat, “Russia was the largest supplier of natural gas to the EU, both in 2016 and 2017, and that the only other partners with a significant share in total extra-EU imports were Norway and, at some distance Algeria and Qatar”¹⁵⁴ (Figure 26). Second, Greece lacks alternatives mainly because it lacks natural gas infrastructures such as LNG fueling stations and pipelines that would allow alternative suppliers.

Extra-EU imports of natural gas, shares in value of main trading partners, 2016 and 2017

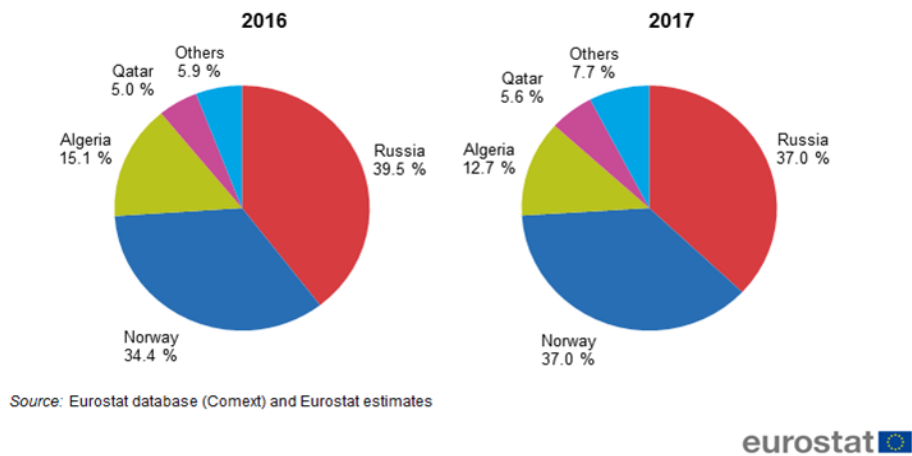


Figure 26. Extra-EU Imports of Natural Gas, Shares (Percent) of Main Trading Partners, 2016 and 2017¹⁵⁵

¹⁵⁴ Eurostat, “EU Imports of Energy Products - Recent Developments,” last modified July 4, 2018, https://ec.europa.eu/eurostat/statistics-explained/index.php/EU_imports_of_energy_products_-_recent_developments.

¹⁵⁵ Eurostat, “EU Imports of Energy Products - Recent Developments.”

Oil and Natural Gas Emergency Reserves

Retaining emergency reserves is vital for countries such as Greece that lack domestic energy production, and Greece currently needs to improve gas reserves. To secure the oil supply, Greece follows IEA's stockholding obligations. IEA states that "all oil importers and large end users (such as power plants) are required to hold oil stocks equivalent to 90 days of their net imports made during the previous year."¹⁵⁶ At the end of March 2017, Greece held stock equivalent to 145 days (35.6 million barrels).¹⁵⁷ To secure the natural gas supply, however, Greece depends on the tanks located in the Revithoussa LNG Terminal. Their storage capacity is equivalent to only 14 days, but an ongoing upgrade aims to increase the capacity to 24 days.¹⁵⁸ Additionally, while the Hellenic Gas Transmission Operator (DESFA) does have a four-fold emergency plan, Greece is limited in its ability to cope with an emergency that affects natural gas supply.¹⁵⁹ The IEA also points out that "the existing gas infrastructure does not meet the N-1 standard."¹⁶⁰ In summary, Greece retains oil emergency reserves for 145 days and gas reserves for 14 days; the lack of gas emergency reserves weakens Greece's bargaining position in a potential supply crisis and furthers dependency on Russia.

The Greek Oil and Natural Gas Market

The state-owned company DEPA is Greece's exclusive importer of gas and owns the gas pipeline network and the LNG facilities located in Revithoussa Island (near Athens). To ensure the security of the country's supply, DEPA has signed long-term

¹⁵⁶ International Energy Agency, *Energy Policies of IEA Countries, Greece 2017 Review*, 40.

¹⁵⁷ International Energy Agency, 48.

¹⁵⁸ Hellenic Gas Transmission System Operator S.A. (DESFA), "LNG Facilities," accessed June 5, 2018, <http://desfa.gr/en/national-natural-gas-system/lng-facility>.

¹⁵⁹ According to DESFA, alert Status 3 is activated "in the event of extremely high demand for gas, significant supply disruption and in the event that all relevant market-based measures have been implemented but the supply of Natural Gas is not sufficient to meet the remaining Natural Gas demand"; see Hellenic Gas Transmission System Operator S.A. (DESFA), "Emergency Plan," 16 and 19, accessed August 28, 2018, http://desfa.gr/userfiles/pdf/eishghsh-desfa-031115_rev2_english.pdf.

¹⁶⁰ According to International Energy Agency, "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 gas demand"; see International Energy Agency, *Energy Policies of IEA Countries, Greece 2017 Review*, 53.

contracts with the state-owned natural gas companies of Russia (GAZPROM), Turkey (BOTAS), and Algeria (SONATRACH). The contract with the Russian GAZPROM ensures the supply of natural gas to the Greek market up to 2026. The contract with the Turkish BOTAS concerns supplying natural gas up to 2021. Likewise, the contract with SONATRACH (LNG) ensures supplying LNG to the Greek market up to 2021. Figure 27 shows DEPA’s contractual quantities (percentages) of the natural gas supply.¹⁶¹

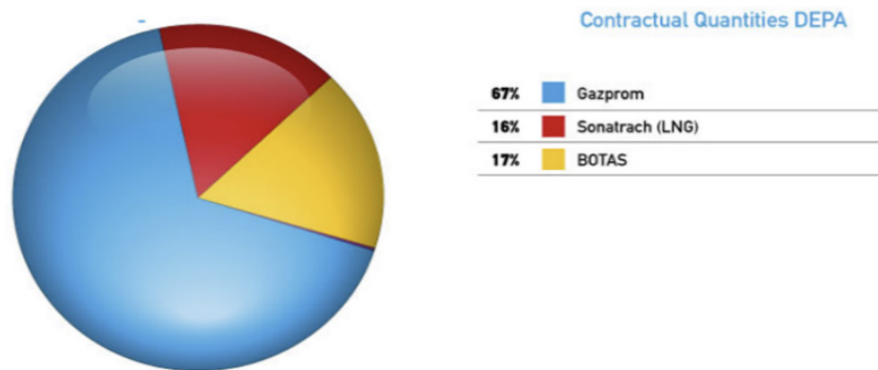


Figure 27. Natural Gas Supply, DEPA’s Contractual Quantities¹⁶²

In Greece’s oil market, the dominant role belongs to refineries; their location (coastal) and their complexity (processing all types of crude oil available in the region) give them a competitive advantage against any other companies that import oil products. In fact, only a few other companies import finished oil products (such as lubricants) while the refineries totally control the market of diesel fuel and gasoline. At the moment, four refineries are operating in Greece; HELPE (Hellenic Petroleum) owns three of them and Motor Oil owns one. HELPE’s key shareholders are Paneuropean Oil (45.5 percent) and the Hellenic Republic Asset Development Fund (35.5 percent), while Motor Oil is a

¹⁶¹ “Natural Gas Supply,” Public Gas Corporation of Greece (DEPA), accessed June 10, 2018, <http://www.depa.gr/content/article/002003006/160.html>.

¹⁶² Adapted from Public Gas Corporation of Greece (DEPA), “Natural Gas Supply,” Public Gas Corporation of Greece (DEPA), accessed June 10, 2018, <http://www.depa.gr/content/article/002003006/160.html>.

completely private company. HELPE’s domestic refineries cover 65 percent of the country’s total refining capacity, leaving the remaining 35 percent to Motor Oil’s refinery.¹⁶³ Figures 28 and 29 show the crude oil supply sourcing for HELPE and Motor Oil. In the case of HELPE, 17 percent of the crude oil comes from Russia, while Motor Oil imports 6 percent of its crude oil from Russia.¹⁶⁴ To obtain a more complete understanding of Greece’s energy sector, it is necessary to examine Greece’s energy sector network.

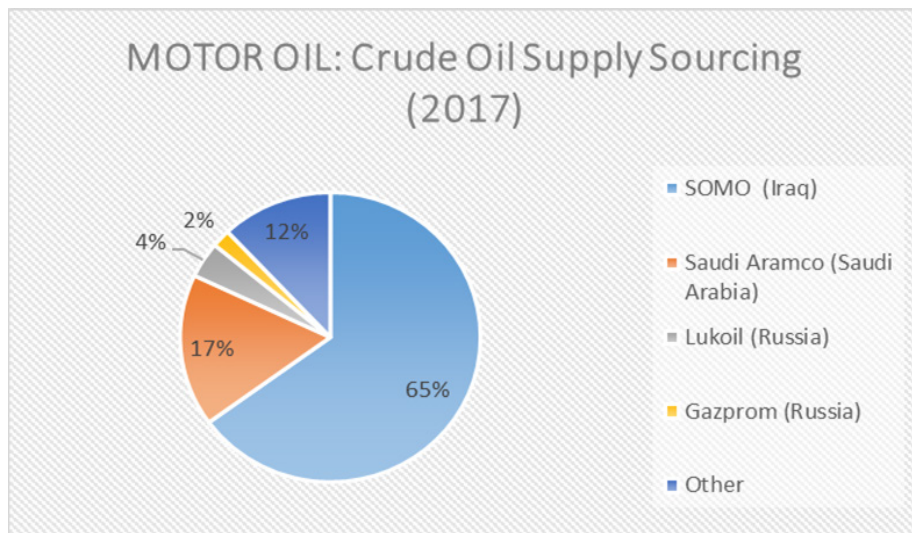


Figure 28. Motor Oil: Crude Oil Supply Sourcing (2017)¹⁶⁵

¹⁶³ “Refining, Supply and Trade,” Hellenic Petroleum (HELPE), accessed May 25, 2018, <https://www.helpe.gr/en/investor-relations/key-data/our-businesses/refining-supply-and-trading/>.

¹⁶⁴ “Annual Report 2017,” Hellenic Petroleum (HELPE), accessed May 25, 2018, https://www.helpe.gr/userfiles/8ea1f0cb-9e62-48e4-b947-a27b00fb14bb/Annual_Report_web-160517.pdf; Motor Oil, “Annual Report 2017,” accessed May 25, 2018, http://www.moh.gr/media/PDF_inside_texts/MOH_Annual_Report/MOH_percent20ANNUAL_percent20REPORT_percent202016.pdf.

¹⁶⁵ Adapted from Motor Oil, “Annual Report 2017.”

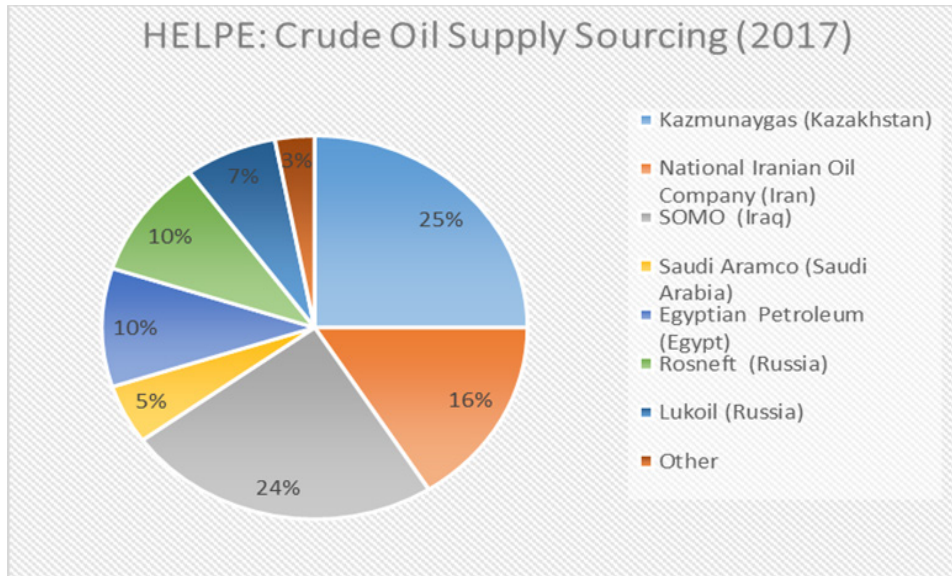


Figure 29. HELPE: Crude Oil Supply Sourcing (2017)¹⁶⁶

2. Social Network Analysis

As mentioned in Chapter I, according to a Dinu Patriciu Eurasia Center report for the Atlantic Council, Russia is building networks across Europe as part of the Kremlin’s influence strategy. The authors argue that “whereas the ultimate goal in the near abroad is to control the government or ensure the failure of a pro-Western leadership, in Europe, the goal is to weaken NATO and the EU.”¹⁶⁷ In its effort to influence Europe, the Kremlin uses a wide variety of networks, such as political parties, the Russian diaspora, civil organizations, the Moscow Patriarchate, companies, political advisors, businessmen, the media, and forums. Because Russia relies so heavily on networks, this section conducts an SNA of Greece’s energy companies’ network. This section visualizes and analyzes the network to determine whether the network itself is vulnerable to Russia’s influence.

Data Sources

We focused our research on Greece’s oil and gas energy companies due to Russia’s significant role in these energy sectors (albeit oil to a lesser extent). The vast majority of

¹⁶⁶ Adapted from Hellenic Petroleum (HELPE), “Annual Report 2017.”

¹⁶⁷ Alina Polyakova et al., *The Kremlin’s Trojan Horses*, 4.

the data collected to build the Greek companies' energy network were unstructured and obtained primarily from news articles, company websites, and annual financial reports. Once the data were structured, they account for intercompany relations that fall between 2016 and 2018, thereby capturing the most recent picture of Greece's energy network. Greece's network is a one-mode network, with direct organization-to-organization ties.¹⁶⁸ The aggregated network (i.e., comprised of all relationship types) is composed of 28 energy companies (nodes) and it contains 32 ties, each falling into one of the four different networks: associate, collaboration, competitor/enemy, and superior/subordinate.

Similar to the Romanian case, the network was built under two main assumptions. The first is an inside out approach in which we started with Greek energy companies and then followed the links outward to determine potential influential actors. The second is the network's limited expansion in which the network includes only the organizations that might be directly or indirectly linked to Russia and that influence the Greek energy sector. In other words, the network includes only the part of the Russian network that affects Greece and not the whole Russian network.

Exploratory Analysis of Greek Energy Network

To examine the overall structure of the network, which highlights its potential strengths and vulnerabilities, this analysis applies three measures of network topography: density, degree centralization, and betweenness centralization.¹⁶⁹ Table 2 shows the statistical results of this analysis.

¹⁶⁸ One-mode relational data consists of a single set of actors, which in our case is energy companies.

¹⁶⁹ Network topography is used in order to describe the overall structure of the network. It is important because it indicates tradeoffs and highlights strengths and potential vulnerabilities. Using topography measures we can indicate how a network is growing or shrinking, and we can measure how interconnected and centralized or decentralized the network is.

Table 2. Greek Energy Companies Network: Topographic Measures¹⁷⁰

Density	Degree centralization	Betweenness centralization
0.042	0.254	0.016

Density

As described for the Romanian case, density indicates how interconnected a network is. In our network, the density score (.042), which indicates that our network is sparse.¹⁷¹ With a sparse density, the Greek network does not favor the development of new alliances, which suggests a Russian strategy of infiltrating the network by creating alliances with the dominant Greek companies is unlikely to be effective. As Vanitha Swaminathan and Christine Moorman state, denser networks favor the creation of new alliances because “all partners are connected and high-quality information can be easily disseminated,” and it also “reduces the likelihood that the new partner will behave opportunistically.”¹⁷²

Degree Centralization

As with the Romanian case, degree centralization is used to measure the extent to which the network is built around specific companies; a low score suggests that there is not a single company in position to influence the overall activity of the network.¹⁷³ In our network, the degree centralization score (.254) indicates that the network is decentralized, and that it is unlikely a single company dominates the network. Because the Greek network is decentralized, it appears the Russians do not have a dominant company to gain control over and influence the network.

¹⁷⁰ Adapted from references in Appendix B using ORA, table values extracted from the Energy Network SNA Report generated by ORA using the references in Appendix B.

¹⁷¹ The density score (.042) indicates that out of all potential ties only 4.2 percent are present in the network.

¹⁷² Vanitha Swaminathan and Christine Moorman, “Marketing Alliances, Firm Networks, and Firm Value Creation,” *Journal of Marketing* 73, no. 5 (September 2009): 52–69, <https://www.jstor.org/stable/pdf/20619046.pdf>, 55.

¹⁷³ Sean Everton, “Network Topography, Key Players and Terrorist Networks,” *Terrorist Networks* 32, no.1 (June 2009): 12–19, <http://hdl.handle.net/10945/46760>, 16.

Betweenness Centralization

Betweenness centralization is used for the same purposes as it was in Chapter II; that is, to measure the extent to which a single company (or a few companies) controls the flow of information and resources in the network. In our network, the betweenness centralization score (.016) indicates that the network is decentralized in terms of brokerage potential and that the responsibility for exchanging information and resources is extensively distributed across the network. The absence of an indispensable center for the transmission of information and resources presents an obstacle to Russian interference. Because Greece's energy network has no indispensable center for the transmission of information and resources, Russian strategies that involve the spread of misleading information and the disruption of resources are unlikely to succeed with ease.

In summary, Greece's small energy network, comprised of 28 organizations, is fairly sparse and decentralized as indicated by both centralization indices. The overall structure of the network reveals that the network is resistant to external influence. Even if the Russians were able to infiltrate the network successfully, the distributed nature of the companies' network should mitigate the effects of Russian leverage.

In terms of company centrality, we utilized the following three centrality measures: total degree centrality, eigenvector centrality, and betweenness centrality. Table 3 shows the scores of the top five companies in the aggregated network in each of the three centrality measures.

Table 3. Greek Energy Companies Network: Centrality Measures¹⁷⁴

Total degree centrality		Eigenvector centrality		Betweenness centrality	
Company	Value	Company	Value	Company	Value
HELPE	0.278	HELPE	0.868	HELPE	0.016
DEPA	0.167	MOTOR OIL	0.548	KAZMUNAYGAS	0.001
MOTOR OIL	0.130	SOMO	0.409		
SOMO	0.056	LUKOIL	0.409		
LUKOIL	0.056	SAUDI ARAMCO	0.318		

Degree Centrality

As a review, we define degree centrality as the number of direct ties each actor has. According to Stephen P. Borgatti, Martin G. Everett, and Jeffrey C. Johnson, degree centrality describes “an actor’s level of involvement or activity in the network.”¹⁷⁵ In his research, Daniel J. Brass states that degree centrality is an indicator of a firm’s power and ability to influence.¹⁷⁶ In addition, Andrew V. Shipilov and Stan Xiao Li argue that firms with a high degree centrality perform better financially.¹⁷⁷ Looking at the scores of degree centrality of the Greek network, we observed that HELPE, DEPA and Motor Oil scored the highest values. These three companies are important Greek companies that serve as producers or maintain a refinery. From their high scores we suggest that they are the most powerful within the network and, therefore, the most resistant to external influence. Furthermore, we assume that the three major Greek companies are taking advantage of their position in the network to ensure their respective financial stability and prosperity. Regarding the foreign influence, State Organization for Marketing of Oil (SOMO), the

¹⁷⁴ Adapted from references in Appendix B using ORA, table values extracted from the Energy Network SNA Report generated by ORA using the references in Appendix B.

¹⁷⁵ Stephen P. Borgatti, Martin G. Everett, and Jeffrey C. Johnson, *Analyzing Social Networks* (Los Angeles: SAGE Publications Ltd, 2013), 164.

¹⁷⁶ Daniel J. Brass, “Being in the Right Place: A Structural Analysis of Individual Influence in an Organization,” *Administrative Science Quarterly* 29, no. 4 (1984): 518–39, <https://doi.org/10.2307/2392937>.

¹⁷⁷ Andrew V. Shipilov and Stan Xiao Li, “Can You Have Your Cake and Eat It Too? Structural Holes’ Influence on Status Accumulation and Market Performance in Collaborative Networks,” *Administrative Science Quarterly* 53, no. 1 (March 2008): 73–108, <https://doi.org/10.2189/asqu.53.1.73>.

state-owned oil company of Iraq, and LUKOIL are both ranked fourth in total degree centrality, which makes them the most powerful foreign companies within the Greek network. Interestingly, SOMO and LUKOIL are also connected to each other, and therefore, SOMO might be vulnerable to Russian influence.¹⁷⁸ We suggest that SOMO and LUKOIL, being the most powerful foreign companies, are the organizations through which Russia can influence the Greek market.

Eigenvector Centrality

Unlike the Romanian case, we also utilize eigenvector centrality to highlight relatively important companies.¹⁷⁹ Eigenvector centrality weights an actor's centrality by the centrality scores of its neighbors. In other words, eigenvector centrality "assumes that ties to highly central [nodes] are more important than are ties to peripheral ones, so it weights an [node's] initial degree centrality by the degree centrality of its neighbors."¹⁸⁰ Scholars use eigenvector centrality as a proxy for status and prestige. Toby E. Stuart states that prestige is related to an actor's ability to make alliances and increase profits.¹⁸¹ Looking at the scores of eigenvector centrality in Table 3, we observed that HELPE and Motor Oil scored the highest values, meaning that apart from being powerful, they are also prestigious, and therefore, they can use their status to enhance their performance. SOMO and LUKOIL again scored high, meaning that they can also take advantage of their status to increase their influence within the network. Figure 30 depicts the gas and oil companies' aggregated network by their respective role.

¹⁷⁸ SOMO and LUKOIL's cooperation involves Iraq's upstream sector and a trading joint venture of Iraqi crude oil; see LUKOIL, "PJSC LUKOIL President Met Prime Minister of Iraq," last modified March 5, 2018, <http://www.lukoil.com/en/PressCenter/Pressreleases/Pressrelease?rid=205598>.

¹⁷⁹ We decide to use this measure for the Greek case to look for additional avenues through which Russia can influence the energy sector. Little variation exists in the degree and betweenness scores, so this measure can supplement these results.

¹⁸⁰ Stephen P. Borgatti and Martin G. Everett, "A Graph-Theoretic Perspective on Centrality," *Social Networks* 28, no. 4 (October 2006): 466–84, 474, <https://doi.org/10.1016/j.socnet.2005.11.005>.

¹⁸¹ Toby E. Stuart, "Network Positions and Propensities to Collaborate: An Investigation of Strategic Alliance Formation in a High-Technology Industry," *Administrative Science Quarterly* 43, no. 3 (1998): 668–98, <https://doi.org/10.2307/2393679>.

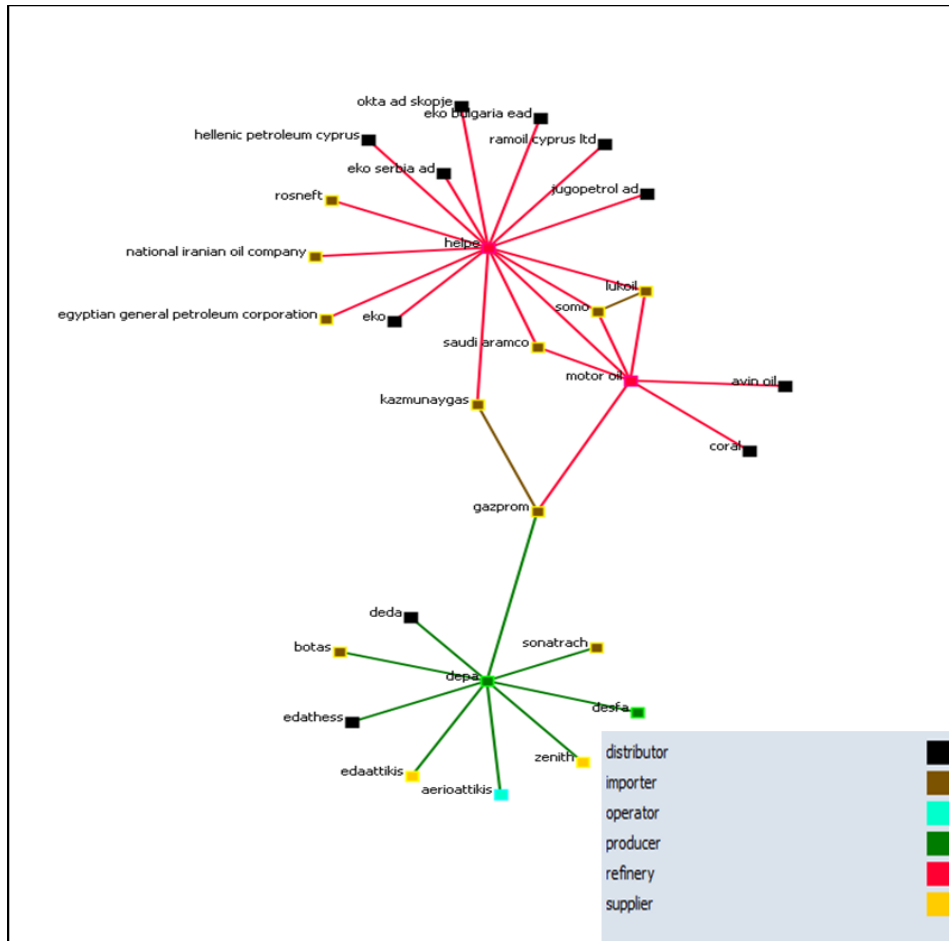


Figure 30. Aggregated Network by Role (Importer, Refinery, Operator, Supplier, and Distributor)¹⁸²

Betweenness Centrality

Betweenness centrality indicates potential brokers in social networks. As shown by the results in Table 3, HELPE scored the highest value, meaning that it may be considered a potential broker in the network. It is likely that HELPE's score is the result of its location between many highly connected actors such as SAUDI ARAMCO (Saudi Arabian-American Oil Company), Motor Oil, SOMO, and LUKOIL. One must also consider, however, the nature of the relationships when assessing the real-world brokerage potential of these companies. Though HELPE is structurally important, as indicated by betweenness

¹⁸² Adapted from references in Appendix B using ORA.

centrality, HELPE is also a state-owned oil company, which probably reduces its true ability to act as a long-term broker. Following a strategy of diversifying and shifting its main suppliers, HELPE probably does not have the stable ties that would enable it to continue to serve as a broker in the future. Motor Oil, which scored highly in other centrality measures, could draw our attention but it follows a similar strategy of diversifying and shifting its main suppliers. On the other hand, DEPA has signed long-standing contracts with its suppliers, and therefore, we can reasonably assume that it has the highest potential to be a broker within the Greek energy network. Figure 31 depicts the gas and oil companies' aggregated network by type, and the nodes' size varies in terms of betweenness centrality.

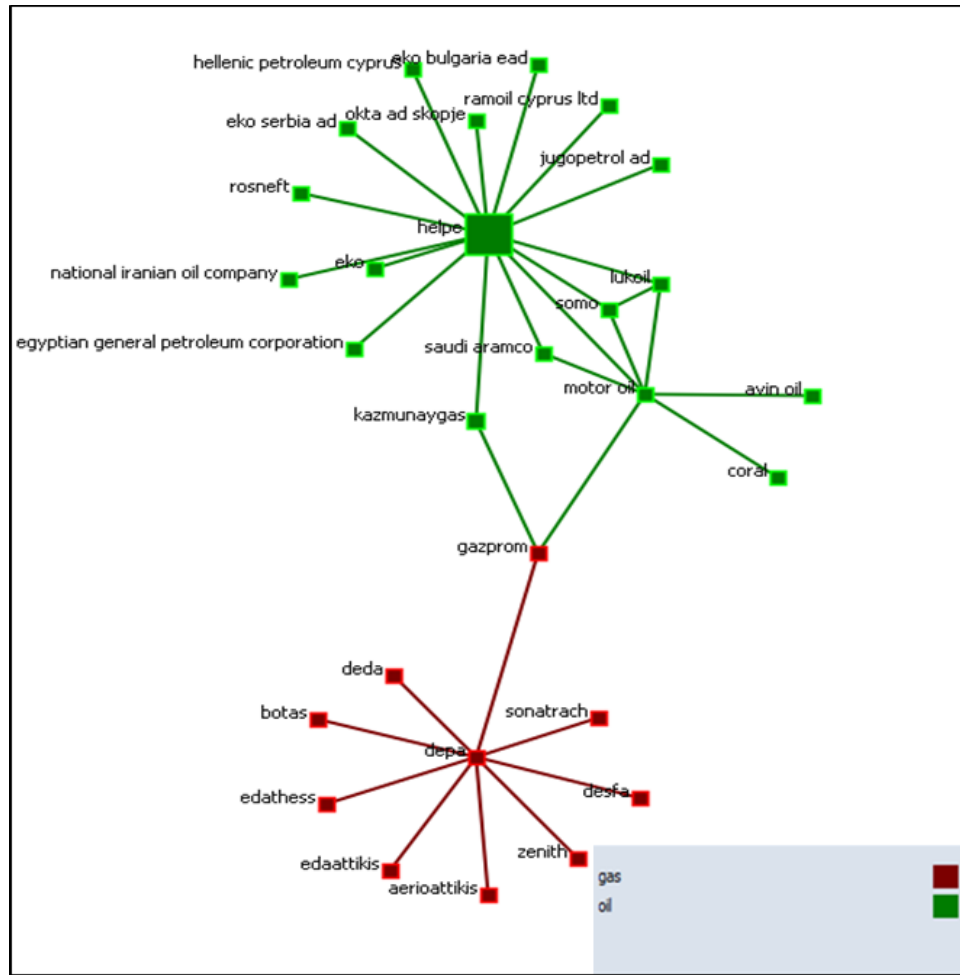


Figure 31. Aggregated Network by Type (Nodes' Size Varies in Terms of Betweenness Centrality)¹⁸³

In summary, HELPE and Motor Oil scored high values in the degree centrality and eigenvector centrality measures; therefore, they appear to be structurally important companies in the energy sector. Their number of ties is mainly due to their high number of subordinate companies. As for the Russian companies, GAZPROM and LUKOIL seem to play the most important role. As noted previously, Greece imports 67 percent of its natural gas from GAZPROM; this provides Russia with leverage despite the SNA analysis that reveals GAZPROM has only a small number of ties in the Greek energy network and its influence is limited. On the other hand, the Russian LUKOIL scored high in both degree

¹⁸³ Adapted from references in Appendix B using ORA.

centrality and eigenvector centrality, meaning that LUKOIL can be used by Russia to break into the network. In terms of betweenness centrality, HELPE has the highest value (.016) and, therefore, possesses the highest potential of indirect influence inside the Greek energy sector, thus leading us to conclude that potential of indirect influence coming from foreign companies is low.

3. Geospatial Analysis

Along with examining the network itself, this thesis examines a broader regional and global picture to determine what potential vulnerabilities to Russia Greece's energy network may have. Greece is part of the EU, and the EU member states have developed a common energy policy.¹⁸⁴ This section analyzes the geographical aspect of the Russian influence on the European energy sector in the fields of oil and natural gas. It reveals potential vulnerabilities arising from the pipeline network's structure.

For the purpose of our analysis, we created several maps related to the energy sector of EU member states. Specifically, we created three sets of maps depicting the overall EU energy network: one set of maps of EU members' energy dependency rates in 2000, 2008, and 2017; a second set of maps of the Russian share (percentage) of natural gas and oil imports in 2017; and a third set of the Greek and the European Union gas infrastructures. Our two main conclusions are the following: First, distance from Russia is a significant factor related to Russian influence in the energy sector. Second, most of the EU member states, including Greece, face the problem of potential Russian influence.

A comparison of the maps of energy dependency (Figure 32) suggests that most of the EU member states are highly dependent on energy imports to meet their national energy needs. During the last 20 years, most of the EU state members fell into classes of either 40 to 60 percent or 60 to 80 percent ranges of total energy dependency. In 2017, all the EU member states imported energy, with Estonia scoring the lowest energy dependency rate (6.8 percent) and Malta the highest (100 percent). The comparison also reveals that there

¹⁸⁴ Robert Larsson, *Russia's Energy Policy: Security Dimensions and Russia's Reliability as an Energy Supplier*, Report number FOI-R--1934--SE (Stockholm: Swedish Defence Research Agency, 2006), 215, <https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/PB2007106453.xhtml>.

has been a decline in the overall EU energy dependency rate starting in 2008, while Greece's energy dependency rate has remained relatively stable for the last 20 years, scoring between 60 and 75 percent. In 2017, Greece scored 73.6 percent and it was ranked above the EU average (53.6 percent).

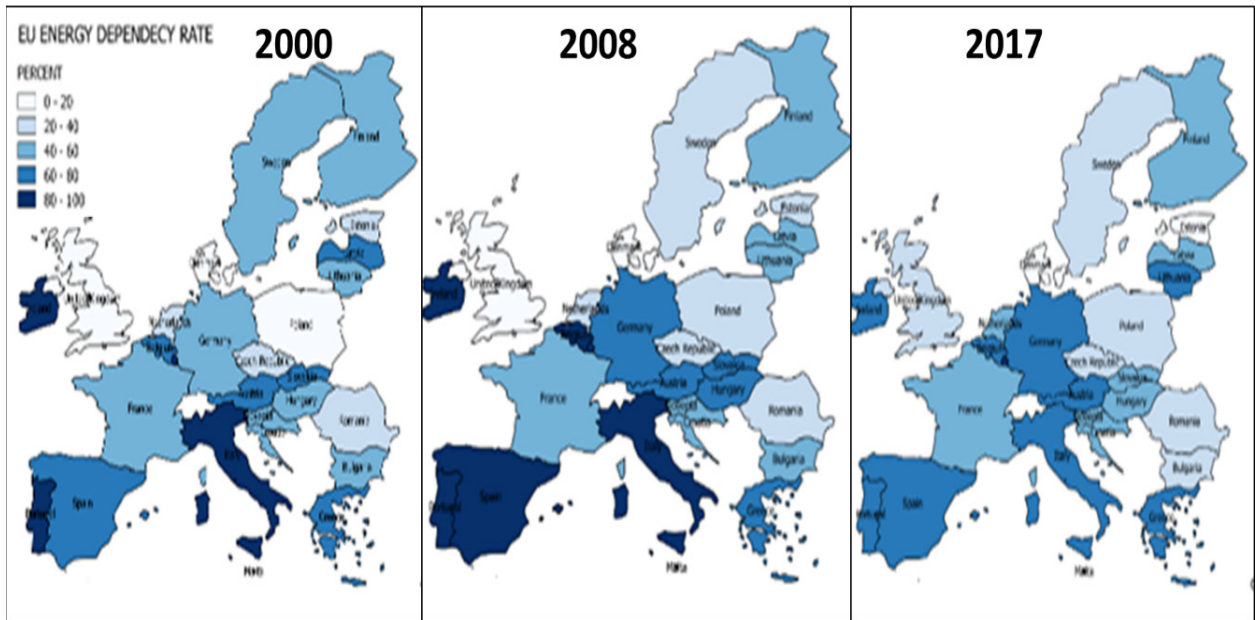


Figure 32. EU Energy Dependency Rate (2000, 2008, 2017)¹⁸⁵

To capture the degree of Russian influence in the field of oil, we created a map based on the shares of Russian oil imports by member states (Figure 33). The map of Russian oil import shares suggests that the distance from Russia is a key factor for the oil imports. EU member states that are closer to Russia import more Russian oil than the others. The two maps (Figures 32 and 33) show that Lithuania, Finland, and Belgium are the most vulnerable states in the field of oil.

¹⁸⁵ Adapted from DIVA-GIS and Eurostat using QGIS; see DIVA-GIS Database (Spatial Data Download); and Eurostat/Energy (Energy Dependency Rate).

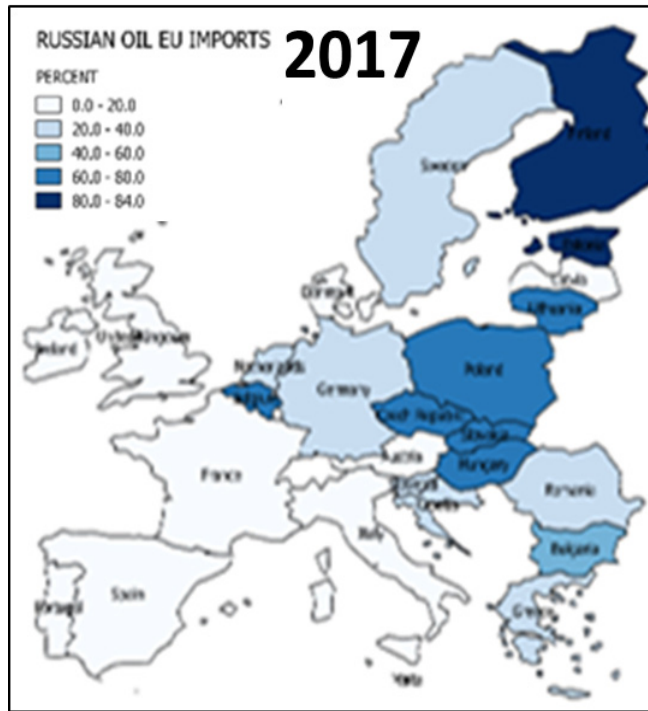


Figure 33. Share (Percent) of Russian Oil EU Imports (2017)¹⁸⁶

To capture the Russian influence in the field of natural gas we created a map based on the share of Russian natural gas imports by member state (Figure 34). Looking at the map of Russia’s share of natural gas imports, distance from Russia again appears to be as significant a factor as it was in the oil imports. In the case of natural gas, the exposure to the Russian influence is even greater than in oil. In fact, most of the countries of Central and Eastern Europe import more than 60 percent of their natural gas from Russia.¹⁸⁷ Of these countries, Greece, Germany, Austria, Lithuania, and Finland also scored high in their energy dependency rate, and, therefore, they are the most vulnerable ones.

¹⁸⁶ Adapted from DIVA-GIS and Eurostat using QGIS; see DIVA-GIS Database (Spatial Data Download); and Eurostat, “EU Imports of Energy Products - Recent Developments.”

¹⁸⁷ Eurostat, “EU Imports of Energy Products - Recent Developments.”

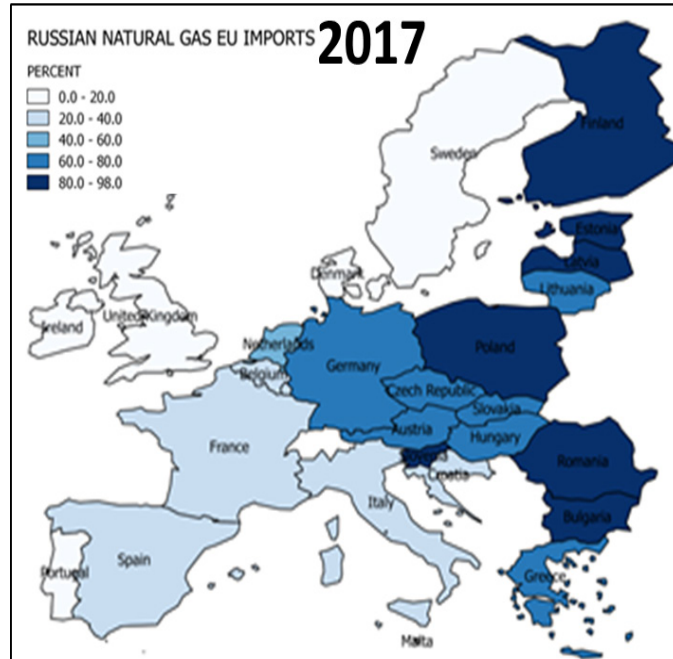


Figure 34. Share (Percent) of Russian Gas EU Imports (2017)¹⁸⁸

The lack of natural gas infrastructure and the structure of the existing European pipeline network are two of the most crucial problems that Greece’s energy security policy faces. Before we proceed to the aforementioned problems, we have to point out that, oil products (imports and distributions) in Greece are transported by ships and trucks and not via pipelines, which means that problems arising from pipelines concern only the natural gas sector. Greece’s imports of natural gas are mainly made through pipelines, and thus, Greece is dependent on other countries. Figure 35 shows that there are three entry points for natural gas in Greece: the Greek-Bulgarian border (Sidirokastro), which connects Greece with a pipeline that starts in Russia and crosses Ukraine, Moldova, Romania, and Bulgaria; the Greek-Turkish border (Kipi), connecting Greece with the Turkish network and giving access to natural gas coming from Central Asia, the Middle East, and the Caspian region; and a port in Athens (Agia Triada), giving access to LNG transported by ships. Because roughly 70 percent of the imported natural gas that flows through the

¹⁸⁸ Adapted from DIVA-GIS and Eurostat using QGIS; see DIVA-GIS Database (Spatial Data Download); and Eurostat, “EU Imports of Energy Products - Recent Developments.”

pipeline starts in Russia, Greek energy security can be affected by crises in Ukraine, Moldova, Romania, or Bulgaria (Figure 35). As Robert L. Larsson states, “during the row with Ukraine in 2006, Russia also cut supply to Moldova, which affected Bulgaria, Greece and Turkey.”¹⁸⁹ In addition, Table 4 shows the annual capacity of the current entry points calculated on a load factor of 95 percent.¹⁹⁰ In 2016, the Greek net import of natural gas amounted to 4.1 billion cubic meter (bcm), and therefore, none of the three entry points alone is capable of covering the domestic needs.¹⁹¹ A cut-off in either the Russian natural gas network or the LNG network would cause a significant crisis in the supply of natural gas in Greece.

Table 4. Current Entry-Point Capacities (Calculated on a Load Factor of 95 Percent)¹⁹²

Entry Point	Annual Capacity (bcm)
Sidirokastro (Russian Natural Gas Network)	3.8
Kipi (Turkish Natural Gas Network)	1.5
Agia Triada (LNG terminal of Revithoussa)	4.4
Total	9.7
Net annual imports of natural gas	4.1

¹⁸⁹ Robert L. Larsson, *Russia’s Energy Policy: Security Dimensions and Russia’s Reliability as an Energy Supplier*, 212.

¹⁹⁰ According to SCANA Energy Marketing, load factor is the “average capacity utilization by a customer relative to total or maximum available capacity (peak utilization). Expressed as a percentage of average to maximum. Customers with a 100% load factor use their maximum capacity every day. A customer with a 50% load factor uses their capacity only half of the time”; see “An Introduction to Natural Gas,” SCANA Energy Marketing, accessed October 25, 2018, <https://www.scanaenergymarketing.com/docs/librariesprovider11/default-document-library/naturalgas101nomaps.pdf>.

¹⁹¹ International Energy Agency, *Energy Policies of IEA Countries, Greece 2017 Review*, 43 and 49.

¹⁹² Adapted from International Energy Agency, 49.

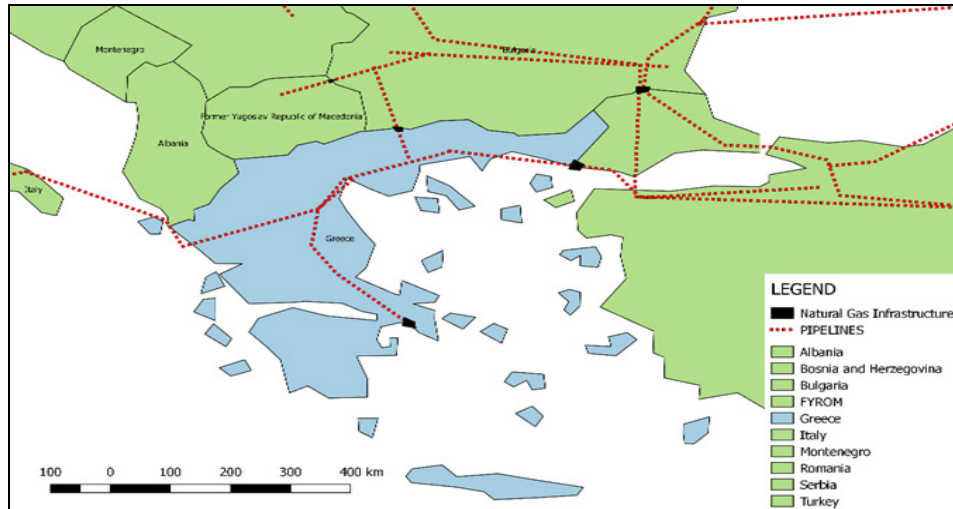


Figure 35. Greek Natural Gas Infrastructure¹⁹³

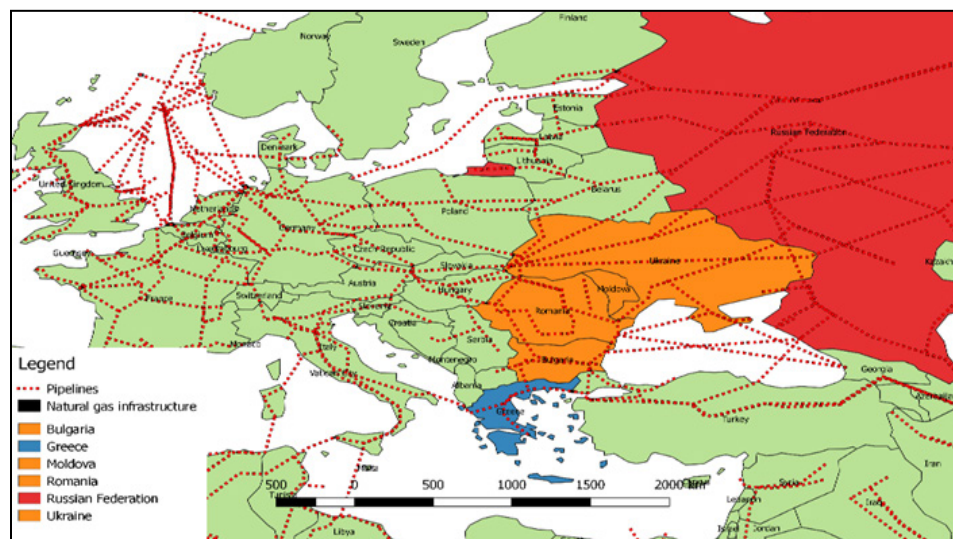


Figure 36. European Natural Gas Infrastructure¹⁹⁴

¹⁹³ Adapted from DIVA-GIS and Eurostat using QGIS; see DIVA-GIS Database (Spatial Data Download); and Enipedia Database (NaturalGasInfrastructure).

¹⁹⁴ Adapted from DIVA-GIS and Eurostat using QGIS; see DIVA-GIS Database (Spatial Data Download); and Enipedia Database (NaturalGasInfrastructure).

C. CONCLUSIONS

Greece and Russia enjoy friendly relations based on their historical and cultural ties. Nonetheless, their economy and trade relations are unbalanced and favor Russia, and both energy and tourism provide Russia with additional leverage. Moreover, Russian investors are interested in buying out infrastructures in several sectors of the Greek economy, including energy. Recent developments indicate that there is a growing tension between the two countries, but their relations remain stable. While Russia is trying to incorporate Greece in its strategy to weaken Western institutions (NATO and EU), it faces major challenges both because of its economic limitations and because Greece is strongly committed to the Western camp.

This chapter has revealed that Greece's domestic energy production cannot meet its domestic energy needs, and therefore, Greece has to import energy and Russia is a major trade partner in energy. Oil and coal are the two most significant fuels for Greece, totaling together almost 70 percent of the Greek energy mix. Natural gas is the third most significant fuel, scoring 16 percent. While Greece is almost self-sufficient in coal, it has to import oil and natural gas. Almost 70 percent of the Greek natural gas imports come from Russia while the Greek market for procuring oil is more open and competitive. Russia still has a significant role in Greece's oil market, but, since 2013, Greece's crude oil imports from Russia have significantly declined. As for emergency stocks, Greece holds enough oil for 145 days while the analogous stocks in natural gas are enough for 14 days, a symptom of the lack of natural gas storage facilities. In accordance with the EU energy security stress tests in 2014, Greece followed a combination of policies that allowed it to experience the smallest shortfall amongst the southeast European countries group despite its high-energy dependency rate.

This chapter has utilized SNA to examine Russian influence on the Greek energy sector. As expected, the major Greek companies scored high in centrality measures, which is an indicator of their dominant position in the Greek energy network. The Russian oil company LUKOIL, however, also proved to be a significant actor despite its representing a limited portion of the Greek imports.

Finally, the chapter provided a geospatial analysis, which enabled a comparison between Greece and other EU member states in terms of energy infrastructure. Consistent with its overall strategic vision, the geospatial analysis revealed that distance from Russia is correlated with Russian energy exports. In both natural gas and oil, we observed that the zones of high-energy dependency correlate with the strategic zones of insecurity and instability that Russia seems to be maintaining (see Chapter II). Although there has been a decline in the overall energy dependency rate among the EU member states since 2008, this is not the case in Greece. Yet, Europe still depends on Russian energy exports, especially in natural gas. As discussed in this chapter, Greece's energy infrastructure includes three entry points for natural gas; comparing their capacity with the Greek net import of natural gas, we can conclude that cutting off the Russian pipeline directly to Greece would create a supply crisis. Furthermore, Greece remains vulnerable to crises between Russia and the countries that the pipeline crosses.

IV. INTERVENTION STRATEGIES ANALYSIS AND CONCLUSION

A. ROMANIAN AND GREEK ENERGY SECURITY SIMILARITIES AND DIFFERENCES

Greece's diplomatic relations with Russia are friendly while Romania's scarred relationship with Russia still needs to heal. Romania's December 1989 revolution ended 45 years of communism under the influence of the Soviet bloc. Due to Russia's relatively more robust economy and stronger military resources, its relations with Greece and Romania are highly unbalanced, and this will likely continue as Russia pursues its national interest in maintaining its post-soviet bloc spheres of influence. As such, Russia perceives any NATO expansion as a threat to its interests. Within this context, this thesis has analyzed Russian influence in the Romanian and Greek energy sectors with the goal of identifying courses of actions that these countries can take to prevent Russia from exerting control over their respective energy sectors.

The energy sectors of both Greece and Romania are fairly decentralized, which suggests they might remain resilient against Russian efforts to control them. No single company dominates either network. As indicated by social network analysis, Russia may be able to infiltrate the network successfully and leverage some companies, but the distributed characteristics of the network of companies should reduce that likelihood. Yet, the removal of energy resources nodes within these networks without alternative solutions to replace them will cause energy prices to rise and create instability in the energy market.

In the gas sector, while Romania is almost self-sufficient, Greece is highly dependent on Russia. Over 70 percent of Greece's gas resources are imported from Russia. Because of Greece's geographic proximity to Russia, and the latter's attempts to maintain its sphere of influence, Greece is at risk of Russia directly cutting off the gas pipeline. Furthermore, Greece remains vulnerable if Russia's relations with a country through which one of its pipelines passes deteriorates.

Because the oil market offers more supply alternatives than the gas one, the oil market in both Greece and Romania is more open and competitive. In Romania's case,

though, three out of five oil refineries within the country are owned by Russian companies Lukoil and Rompetrol, which control approximately 60 percent of the market. As our social network analysis of Greece's energy sector indicated (see Chapter III), Lukoil is also a central player in Greece and has influence within the oil market.

Therefore, both the petroleum and the gas sectors are susceptible to influence from outside companies either owned by or aligned with Russia and can be utilized as means of Russia's "belts of insecurity" policy in order to create a buffer between the Russian Federation and NATO. In addition to their commitment to both NATO and the EU, Romania and Greece will need to take proactive security measures to limit Russia's ability to pursue its strategy.

B. INTERVENTION STRATEGIES

Our analysis has highlighted Russia's continued attempts to ensure and expand its position of coercive influence over Romania and Greece via the energy sector. As a result of this analysis, we propose three distinct courses of action for each country (Romania and Greece) to prevent further Russian control over their energy sectors.

We compared our three courses of action according to five criteria (see Tables 5 and 6), scoring each of them from 1 to 3, with 3 being the best score. The five criteria evaluated are feasibility, time, cost, effectiveness, and perception. We define feasibility as the probability that the governments of Romania and Greece could actually execute the course of action; Time is how long a course of action would take to succeed, with the shortest being best; Cost is how much money a course of action would cost the Romanian and Greek governments, with the cheapest being best; Effectiveness is the likelihood that a course of action would actually succeed in solving the problem; and Perception is how positively or negatively a course of action would be viewed by both the public and the international community. We did not weight any of the criteria, as we felt that none was more important than the others, and any one of them alone could render a course of action impossible for the Romanian and Greek government.

1. Romanian Courses of Action and Decision Matrix

In this subsection we propose three distinct courses of action for Romania to prevent further Russian control over its energy sector.

Course of Action 1: Targeted Sanctions against Russian Companies

Leveraging NATO and international condemnation and resolutions against Russia following its actions in the Ukraine, Romania might be able to level sanctions against Russian-owned or connected companies such as Lukoil and KMG International. Preventing those companies from doing business in Romania or freezing their assets may open up the market for greater expansion from Romanian or Western European companies to fill the void. This course of action is perhaps the most discriminate way to target only Russian-owned or connected corporations without hindering foreign investment from the rest of Europe. Yet, direct actions against such companies would have significant immediate effects on the price of oil and gasoline in the Romanian economy. Moreover, we are not experts on international law, and it is possible that imposing sanctions against private companies such as Lukoil might not have a very strong legal basis.

Course of Action 2: Go Green

While Romania is currently a leading producer of natural gas in Europe, its reserves are limited. If Romania wants to remain energy independent from Russia, it needs to embrace other forms of energy production, either through solar, wind, hydro, or nuclear power production. This course of action proposes a long-term solution that is already being pursued by most of Europe and, to some extent, Romania. It will take the longest to implement, however, as infrastructure needs to be built, and it may not be cost effective to shift from natural gas energy production to renewables in the short term. Additionally, without sanctions or government interference, a free market economy legally would allow Russian companies to become or take over the green energy producers and maintain or expand their influence within the Romanian energy market.

Course of Action 3: Nationalization of the Energy Industry

The Romanian government could decide to nationalize the energy. This would likely require the purchasing of all privately owned infrastructure that falls within Romanian territory. While this course of action would potentially provide the most direct, sudden impact to solve the problem of Russian influence in the energy industry, the massive cost could potentially bankrupt the government and cause severe public or international backlash. Additionally, Russia would most likely consider the move an act of hostility and possibly use it to justify aggressive actions toward Romania.

Decision Matrix

Table 5. Romanian Intervention Strategies Decision Matrix

	Feasibility	Time	Cost	Effectiveness	Perception	Totals
Sanctions	2	3	3	1	1	12
Go Green	3	1	2	3	3	12
Nationalization	1	2	1	2	2	8

Ranked 1-3. 3 being the best COA within that criteria. No criteria is weighted more than another.

Upon adding up the scores, Course of Action 1 (Targeted Sanctions) and Course of Action 2 (Go Green) tied for the highest score, with each earning 12 out of a possible 15 points. Examining the results more closely reveals that the Go Green option is the preferable of the two options; even though it scores lowest on time, it provides a long-term solution to accomplish the task, and scores highest for feasibility, effectiveness, and perception.

2. Greek Courses of Action and Decision Matrix

In this subsection, we propose three distinct courses of action for Greece to prevent further Russian control over its energy sector.

Course of Action 1: Increasing Domestic Production

A strategy based on the increase of inland energy production would be a sustainable solution. During the recent economic crisis, Greek energy consumption decreased;

however, due to the downturn in the energy production, Greece's energy dependency is still high. Energy is the foundation for economic growth and stability; a further decline in consumption will undermine the Greek effort for sustainable growth. Therefore, one option is for Greece to develop its own upstream potential. The recent energy developments in the southeast Mediterranean Sea are extremely ambitious for Greece. Kostis Oikonomopoulos, George Makrodimitras, and Yannis Bassias state that "the oil and gas discoveries offshore Albania and Italy are valid indicators of a working petroleum system in the northwest Ionian Sea."¹⁹⁵ Furthermore, the discoveries offshore of Egypt have attracted companies to the region south of Crete. As a result, Greece's oil and Gas Resources Management Company (HHRM) have announced that Exxon and Total, each with 40 percent stakes, and HELPE have jointly bid to explore off Crete, while Spain's REPSOL (Refinería Española de Petróleo Sociedad Limitada) and HELPE have submitted a joint bid for a block in the Ionian Sea.¹⁹⁶

This strategy could be an ideal solution for Greece, but it involves high risks. First, financial, environmental, and quality-related parameters should be examined during the exploration and exploitation of hydrocarbons. Furthermore, Greece's ability to explore the sea for energy resources is restricted because Turkey issued a *casus belli* against Greece in case Greece decides to expand its territorial seas.¹⁹⁷ Also a consideration is the dispute

¹⁹⁵ Kostis Oikonomopoulos, George Makrodimitras, and Yannis Bassias, "Greece Offers New Offshore Exploration Opportunities," *Oil and Gas Journal* 116, no.2 (Feb 2018): 37–41, <https://www.ogj.com/articles/print/volume-116/issue-2.html>, 40.

¹⁹⁶ Karolina Tagaris, "Exxon, Total, Repsol among Bidders for Oil Exploration off Greece," Reuters, last modified March 5, 2018, <https://www.reuters.com/article/us-energy-greece-tenders-interest/exxon-total-repsol-among-bidders-for-oil-exploration-off-greece-idUSKBN1GH2O0>.

¹⁹⁷ The Greek Ministry of Foreign Affairs states that "According to customary international law, which is also codified in the UN Convention on the Law of the Sea (UNCLOS), Greece has the right to extend its territorial waters to 12 nautical miles. Turkey itself already extended its territorial waters to 12 nautical miles in the Black Sea and the Mediterranean since 1964. During ratification of the United Nations Convention on the Law of the Sea (Law 2321/1995), our country stated explicitly that it reserves the right to exercise this right at any point in time. In reaction to this legitimate position of Greece, the Turkish National Assembly issued a resolution on June 8, 1995 granting the Turkish government full and perpetual competence to declare war (*casus belli*) (authorizing it to use military means against Greece), should Greece decide to extend its territorial waters over 6 nautical miles"; see Hellenic Republic Ministry of Foreign Affairs, "Territorial Sea- Casus Belli," accessed June 15, 2018, <https://www.mfa.gr/en/issues-of-greek-turkish-relations/relevant-documents/territorial-sea-casus-belli.html>.

between Turkey and Greece about determining the Greek and Turkish Exclusive Economic Zone (EEZ).

Course of Action 2: Seeking Alternative Suppliers

Recent developments reveal that Greece has great potential for seeking alternative providers in both natural gas and LNG: within the next two years, three major energy projects capable of changing the Greek energy map will be completed. First, Greece has joined the Trans-Adriatic Pipeline (TAP) project, which aims to give Europe access to energy resources located in the Caspian region.¹⁹⁸ At the moment, TAP is under construction and the project is expected to be finished in 2020. With an annual capacity of 25 bcm, TAP may provide Greece and Europe with a significant amount of natural gas, which should help them in their effort to partially mitigate the Russian influence. Second, the Revithoussa LNG terminal, is going to be upgraded. By the end of the year, the LNG facility will have almost double its capacity and be able to dock larger LNG carrier ships.¹⁹⁹ Third, a new LNG terminal near Alexandroupoli is under construction and is expected to be finished in 2020. The Alexandroupoli LNG terminal will have an annual capacity of 6.1 bcm and a storage capacity of 170,000 cubic meters of LNG.²⁰⁰ The completion of the LNG facilities will reduce Greece's dependency on natural gas imports via pipelines where Russia has a more influential role. Apart from the aforementioned projects, DEPA has recently entered into a long-term supply contract with the Azeri Gas Supply Company (AGSC) for gas to be produced at the Shah Deniz II reserve, which will undoubtedly reduce the portion of Russian imports.²⁰¹

¹⁹⁸ According to the Trans Adriatic Pipeline project team, "the Trans Adriatic Pipeline (TAP) will transport Caspian natural gas to Europe. Connecting with the Trans Anatolian Pipeline (TANAP) at the Greek-Turkish border, TAP will cross Northern Greece, Albania and the Adriatic Sea before coming ashore in Southern Italy to connect to the Italian natural gas network." See Trans Adriatic Pipeline, "Tap at a Glance," accessed June 2, 2018, <https://www.tap-ag.com/the-pipeline>.

¹⁹⁹ Hellenic Gas Transmission System Operator S.A. (DESFA), "LNG Facilities."

²⁰⁰ "The Project," GASTRADE S.A., accessed June 10, 2018, <http://www.gastrade.gr/en/the-company/the-project.aspx>.

²⁰¹ Public Gas Corporation of Greece (DEPA), "Natural Gas Supply."



Figure 37. Trans-Adriatic Pipeline (TAP)²⁰²

Course of Action 3: Imports Renegotiation

Greece is also capable of partially mitigating the Russian influence in its energy sector by following a combined strategy, meaning negotiations on natural gas and restrictions on the oil sector. Considering the exposure of the Greek energy sector to the Russian imports (natural gas: 67 percent, oil: 12.5 percent), Greece could follow different tactics in the oil and natural gas sector. First, Greece is capable of reducing Russian influence on its oil sector to the point of elimination. The Greek market for procuring oil is already open and there is a variety of supplier countries; apart from Russia, another six countries (Kazakhstan, Iran, Iraq, Saudi Arabia, Egypt, and Libya) export crude oil to Greece. In addition, oil products are transported via trucks and ships, and therefore, Greece is not dependent on Russian means to import its crude oil. The two Russian companies involved with the Greek energy companies' network are LUKOIL and ROSNEFT, and the SNA reveals that LUKOIL is far more influential than ROSNEFT. If it does not eliminate the Russian oil imports, Greece could at least reduce or eliminate the imports coming from LUKOIL.

Second, in the field of natural gas, Greece is not capable of eliminating the Russian influence, but it is still capable of negotiating. There is already evidence of successful negotiations: in 2014, DEPA took advantage of the European Union's agreement with

²⁰² Trans Adriatic Pipeline, "TAP at a Glance."

GAZPROM and achieved a beneficial renewal of its agreement with GAZPROM. As DEPA pointed out in its announcement, “with this agreement, which was completed with the contribution of the Greek Government and particularly the Ministry of Environment, Energy and Climate Change, the supply price of natural gas is decreased by 15 percent. This price level is now approaching the European average gas supply price, agreed to by GAZPROM EXPORT and the countries of continental Europe, through long-term contracts.”²⁰³

In light of the upcoming developments in the natural gas infrastructures (upgrading Revithoussa’s LNG terminal, building Alexandroupoli’s LNG terminal, and joining the TAP project) Greece has increased its bargaining power. We can reasonably assume that a new round of negotiations between Greece and Russia over the price of natural gas would lead to a further decrease in the natural gas price.

Decision Matrix

Table 6. Greece Intervention Strategies Decision Matrix

	Feasibility	Time	Cost	Effectiveness	Perception	Total
Increase domestic production	1	1	1	3	1	7
Seek alternative suppliers	3	2	2	3	2	12
Imports Renegotiation	2	2	3	1	2	10

Ranked 1-3. 3 being the best COA within that criteria. No criteria is weighted more than another.

Upon adding up the scores, for Greece, Course of Action 2 (Seek for alternative suppliers) emerged as the recommended course of action because it appears to be the most feasible and effective, and it also scores in the middle for cost, time, and perception.

²⁰³ “Agreement DEPA – GAZPROM Was Signed,” Public Gas Corporation of Greece (DEPA), accessed June 10, 2018, <http://www.depa.gr/press/002009001/page3.html>.

C. HYPOTHESES FOR FUTURE EXPLORATION

Our research highlighted a significant potential for Russian coercive influence over Romania in the oil industry, and over Greece in the gas sector, partially confirming our initial hypothesis; however, we have only scratched the surface on the topic.

Further exploratory research should be conducted to map and assess the Balkan states' green energy industry's vulnerability for Russian control or dependence, and assess other industries for potential coercive Russian influence. Sample hypotheses for this research could be:

- Russia is infiltrating the green energy industry to create the potential for coercive influence over European states as they attempt to diversify away from dependence on natural gas and oil.
- Russia uses economic control of European states' media to influence public opinion in support of the Russian Federation interests.

Evaluating these hypotheses will help build a more complete picture of the many pathways of coercive influence that Russia maintains in an attempt to accomplish its political objectives. Considering that Russian actions in recent years have relied extensively on influence to coerce the governments of states along its periphery, illuminating Russian pathways of influence over Romania and Greece could provide a useful model for identifying similar vulnerabilities throughout Eastern Europe. Through accurately identifying these vulnerabilities, and mapping out the networks that sustain them, the governments of Europe can develop policies and strategies to counter coercive Russian influence throughout the region.

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