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Egypt's energy reserves, and the role of the EU on a potential
Egypt-Israeli energy cooperation

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Abstract

The dissertation examines the energy outlooks and the ensuing challenges for Egypt, Israel and the European Union. The deterioration of EU relations with Russia and the recent gas discoveries in Eastern Mediterranean took place almost simultaneously. Each development has had a different implication on EU's energy policy. The tensions with Russia was the mobilizing force for the European policymakers to reduce the Union's dependence from Russian gas, while the new gas findings in Eastern Mediterranean can help EU to achieve a higher level of energy security. This dissertation assesses these new gas findings, in relation to the regional environment. Three possible options for gas transportation are captured, with the drawbacks and advantages of each one being examined thoroughly. My research suggests the transportation of gas to EU to be conducted through Egyptian LNG plants.

AFFIDAVIT

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The Author

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Table of contents

Abstract

1. Introduction	5
2. Egypt's energy outlook.....	10
2.1 Oil sector	10
2.2 Natural gas sector	12
3. Israel's energy outlook	17
3.1 Oil sector	18
3.2 Natural gas sector	19
3.3 Israel's challenges	21
4. EU energy outlook.....	25
4.1 Oil sector	26
4.2 Natural gas sector	27
4.3 EU challenges and dependence on Russia.....	28
4.4 The concept of energy security and the European action plan	29
5. Challenges for the transportation of Eastern Mediterranean gas to EU	31
5.1 Israel-Lebanon disputes.....	31
5.2 Egypt-Israel tensions	33
5.3 Turkey-Cyprus conflict	34
6. Possible ways of gas exportation.....	36
7. Conclusion.....	39
Bibliography.....	41

1. Introduction

The beginning of the 21st century cannot, in any case, be characterized as a tranquil period, without major developments globally. In just 17 years, IR scholars and analysts found themselves fortunate enough to be able to witness and analyze a large number of significant events that reshaped the world, as we know it today. Almost each and every region has experienced civil wars, terrorist attacks, military interventions alongside with political and economic upheavals.

In the USA, the events of 9/11 marked the beginning of a new era in world's fight against terrorism and set new standards on how global security had to be perceived. With 9/11 terrorist attacks having huge impact in American social coherence, USA intensified its imperialistic policy by intervening in Afghanistan, in Iraq, in Libya and maintaining significant military presence in other countries, such as Syria and Yemen.

Crossing the Atlantic Ocean and approaching the European continent, one can spot a totally different European Union, in comparison to its pre-2000 interpretation. EU has almost doubled its size after 2000, following an enlargement policy. Thirteen states have obtained the status of EU member state, with ten of them joining EU in 2004, two in 2007 and Croatia as the youngest member state in 2013.

During these first seventeen years of the 21st century, EU didn't have to deal with just positive developments. Eight European countries have taken advantage of EU's financial assistance mechanisms, in order to reach certain levels of financial stability¹. Bailout programs provided to some economies, led to the deterioration of political systems in these countries and to social fermentation.

A challenge that required EU's reaction as a whole body and not by allowing national strategies to prevail, was the tension between Ukraine and Russia, that resulted in the Russian annexation of Crimea. EU, via the statement of European Council on 20-21 March 2014, expressed its fully support to Ukraine's national and territorial integrity and condemned Russian actions, regarding Crimean referendum and military operations. EU's response was the adoption of restrictive measures and sanctions

¹European Commission. (n.d.). Which EU countries have received assistance?
https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-financial-assistance/which-eu-countries-have-received-assistance_en (Retrieved 13 July 2017)

against Russian Federation and Crimea. The measures are related to economic restrictions between EU and Russia, freezing of assets and travel bans as well as bans on imports and exports of goods from and to Crimea and Sevastopol. The restrictions touch also the energy sector, where the access is limited to three major Russian energy companies².

Crimean crisis sent the signal for the European mobilization, towards a comprehensive plan for a European Energy Strategy. Given the fact that according to 2013 data, 39% of its imported natural gas was coming from Russia, EU was more than obliged to construct a European Energy Security Strategy, in order to assure the energy security of its member states³.

The region with the most rapid changes in these first years of the 21st century, is the Middle East and North Africa (MENA) region. The outbreak of the Arab Spring events caught the international community looking at stable countries governed by strong regimes which started to change rapidly in many ways. From Tunisia to Egypt and from Libya to Syria the regimes failed to defend the label of “strong” and collapsed one by one within a few weeks. Transformation of these countries included revolts, violent events and in some cases, they marked the launch of civil wars. Libya and Syria became the most prominent examples of violence and instability.

Those countries’ vicinity to Europe and their significance for US interests rendered the proceedings in MENA region as a worldwide topic. My dissertation will attempt to cover the developments that are related to the topic of natural gas and especially what is taking place in the borders between Europe and MENA region, namely Eastern Mediterranean, regarding new gas findings. The region of Eastern Mediterranean attracted worldwide attention during last decade for its energy potential. A series of natural gas discoveries in the so called “Levantine Basin” created reasonable hopes for the countries of the region, as well as for neighboring

²Council of the European Union. (2014). *COUNCIL REGULATION (EU) No 692/2014*. Retrieved from <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02014R0692-20141220&qid=1444987014323&from=EN>

³European Commission. (2014). *European Energy Security Strategy. COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL*. Brussels.

powers, like European Union. The first discoveries in the region were the “Tamar” and “Leviathan” gas fields, in 2009 and 2010 respectively, in Israel’s Exclusive Economic Zone. “Aphrodite” gas field discovery in Cyprus EEZ followed in 2011, with the discovery of “Zohr” field in Egypt’s EEZ being the last one.

In order to acquire a better understanding of the importance of these natural gas fields, a brief presentation of their gas reserves is needed. According to Noble Energy, which is the predominant company in the consortiums that are operating Israel’s and Cyprus’s fields, “Leviathan” field holds natural gas reserves of around 9,4 trillion cubic feet⁴(tcf) and “Tamar” field around 10 tcf⁵. Noble Energy’s estimation for the reserves of Cyprus’s “Aphrodite” field reach the number of 5 tcf⁶. For the southern and most recent discovery, estimations take the number to even higher levels. Namely, “Zohr” field that lays in Egyptian Exclusive Economic Zone and be operated by Italian company “ENI”, is believed to hold around 30 tcf of natural gas. This estimation defines “Zohr” as the biggest gas field in Mediterranean so far⁷.

This dissertation is going to examine the Egyptian energy potential and gas capabilities inside the new environment of Eastern Mediterranean. It will also attempt to define the role and the benefits of the EU from a potential cooperation between Egypt and Israel in their energy sector. In order to demonstrate the usefulness of this study, we have to extract three key elements from the above sentence and clarify their usage.

First of all, we have to argue for the selection of Eastern Mediterranean as the region around which the survey will move. As quoted previously, the region brought into the

⁴Noble Energy. (2017). Noble Energy Sanctions Leviathan Project Offshore Israel. <http://investors.nblenergy.com/releasedetail.cfm?releaseid=1014140> (Retrieved January 5, 2018)

⁵Tamar Natural Gas Field - Offshore Technology. (n.d.). <http://www.offshore-technology.com/projects/tamar-field/> (Retrieved May 28, 2017)

⁶Cyprus Gas News the latest news about Easter Mediterranean Gas and Oil reserves. (n.d.). <https://www.cyprusgasnews.com/archives/3503> (Retrieved May 28, 2017)

⁷Eni discovers a supergiant gas field in the Egyptian offshore, the largest ever found in the Mediterranean Sea | Eni. (n.d.). https://www.eni.com/en_IT/media/2015/08/eni-discovers-a-supergiant-gas-field-in-the-egyptian-offshore-the-largest-ever-found-in-the-mediterranean-sea# (Retrieved May 27, 2017)

light three significant gas fields since 2010. Region's proximity to Europe, alongside with the presence of an EU member state (Cyprus), offer to EU an additional source of gas supply, in order to achieve higher levels of energy security by diversifying its suppliers.

The second element to address is why this study will focus on Egypt's energy potential. Egypt is worthy of being analyzed for two major reasons, apart from its important geographical position. One reason is that Egyptian Exclusive Economic Zone revealed the Zohr gas field, which is believed to be among the biggest globally and is definitely the biggest natural gas field in Mediterranean. Zohr's exploitation will offer Egypt the potential of regaining its old status as a producer/exporter country. Furthermore, Egypt host already two LNG plants. The presence of such infrastructure on its soil provides great flexibility both to Egypt and to its future energy trade partners in terms of gas transportation. What can also be considered as a feasible option is the connection of these LNG plants with the gas fields of Cyprus and Israel.

Last but not least, it is essential to justify the necessity of the examination of EU's role in a future Egypt-Israeli energy cooperation. The EU, as mentioned earlier, is in need of finding new sources of energy, while trying to cut its dependency from Russian gas. Eastern Mediterranean's gas offers this potential. However, long lasting conflicts place obstacles for the completion of this perspective. One example of countries with new gas finding but with old problems to overcome is Egypt and Israel. This dissertation will explore the limits and the capabilities of EU's role for the purpose of serving the interests of this triangular relation between EU, Egypt and Israel.

Concretely, European Union has to face two parameters that limit its role. First come the issue of distance. Compared to the many pipeline infrastructure that deliver natural gas to European countries, a pipeline from Levant Basin to European mainland would have to cross a big distance under the water. Additionally, a pipeline of more than 1900 km length and 2000 m depth would require such a cost that the whole project would turn economically unsustainable.

The political particularities of Levant Basin and Middle Eastern countries constitutes the second parameter for EU. A series of conflicts are present in the region,

threatening the undistracted supply of gas to EU. Specifically, European policymakers have to take into consideration the conflicts between Israel-Egypt, Israel-Lebanon and Cyprus-Turkey, each one for different reasons.

Despite the presence of serious limitations, three are the alternatives that can be spotted for the future transportation of gas from the new fields to European countries. The first alternative is the direct connection of the region with Greece via the construction of a new pipeline. The second option is the region's connection with Turkey and its already established pipeline network. The liquification of gas in Egypt's LNG plants and the direct transportation with ships appears as the third alternative.

After the evaluation of each and every alternative, my research proves that the third option is the more viable both in economic and also in political terms. The option of gas liquification and its transportation with ships does not contain the challenges of the two remaining options. Specifically, large pipeline projects, as the direct connection of the region with Greece, with doubted economic efficiency are avoided. In political terms, two are the issues that are avoided. Firstly, a pipeline to Turkey would cause problems regarding the Cyprus dispute and the conflict of Turkey with Cyprus about Cypriot EEZ. Secondly, further empowerment of Turkey's regional role is out of EU's interests. Therefore, the usage of the already established Egyptian LNG in order to liquify and transport the region's natural gas turns to be the solution with the lesser problems in economic and political terms.

2. Egypt's energy outlook

Egypt lays between two regions with high numbers of natural gas proved reserves. Concretely, the region of Middle East is in possession of the highest portion of world's natural gas reserves, with 2803,2 trillion cubic feet (tcf), while Africa holds also large amounts of natural gas, with 503.3 tcf⁸. Correspondingly, the same applies to the oil reserves of Egypt's adjacent regions. Data originated in 2016 show that Middle East countries possess 47.7% of world's proven oil reserves, namely 813.5 thousand million barrels. African countries have also a notable portion of world's proven oil reserves, namely 7.5% of world's reserves and 128 thousand million barrels⁹.

After decoding and elaborating where Egypt stands on the global energy map, data from the Egyptian Energy Policy have to be presented, in order to build the ground for a better view of the recent developments. Egyptian soil is full of both oil and natural gas fields. As the U.S. Energy Information Administration (EIA) indicates, oil and gas fields are spread throughout the whole Egyptian land. However, it can be noted that the major producing fields are located in the Gulf of Suez, the Nile Delta, in Desert and in Mediterranean. These fields make Egypt the largest non-OPEC oil producer in Africa¹⁰.

2.1 Oil sector

Petroleum sector in Egypt has passed through four noteworthy checkpoints that divide its petroleum history in four phases.

- The first period starts with the first oil discovery in Egypt. Gulf of Suez revealed "Gemsa" oil field in 1869. Egypt started to exploit its oil reserves from "Gemsa" and from other smaller fields almost 30 years later, in 1910.

⁸British Petroleum. (2017). *BP Statistical Review of World Energy 2017*. London. p. 26

⁹ibid p. 12

¹⁰ U.S. Energy Information Administration. (2015). *Egypt International energy data and analysis*. https://www.eia.gov/beta/international/analysis_includes/countries_long/Egypt/egypt.pdf (Retrieved September 3, 2017)

- The next tipping point in Egypt’s petroleum history can be found in the early 50’s and 60’s, as a result of a turmoil in Egyptian politics. Since the end of the Second World War, nationalistic sentiments and anti-foreign attitude have been present in Egypt, alongside with the demand of getting rid of the imposed policies, removing foreign troops and nationalizing companies of foreign interests. Following 1952’s revolution, the movement of “Free Officers” rose to power with Gamal Abder Nasser in charge. The impact of Nasser’s rule on the oil sector of Egypt was the nationalization of the Suez Canal and the establishment of the Egyptian General Petroleum Corporation (EGPC), with both actions taking place in 1956. Nasser’s next action was the nationalization of Anglo Egyptian Oil Company, in 1964, along with all the oil fields which were under its operational authority.
- The following period was marked by a series of oil fields’ discoveries. Nationalizations of Suez Canal, despite its side effects on geopolitical level (Suez Crisis 1956), and of Anglo Egyptian Oil Company had not stand as an obstacle for further cooperation between Egyptian EGPC and foreign oil companies. Joint operations in the Gulf of Suez between EGPC and BP revealed a series of oil fields that allowed Egypt to produce up to 500,000¹¹ barrels per day (b/d) and became a net exporter of crude oil in 1974.
- Population growth and rise of the country’s economic and industrial activity, alongside with the decline of its oil fields, led Egypt to the need of importing oil in order to meet its domestic demands. This phase in Egypt petroleum’s history started in mid-1990’s. According to data derived from International Energy Agency, 1993 was the year when oil production reached its peak, with 945 million barrels per day or 48.29 million of tonnes of oil equivalent (Mtoe). The same Sankey Diagram informs us that oil products’ imports jumped from 0.32 Mtoe in 1995, to 1.14 Mtoe in 1996 and touching the number of 16.53 Mtoe in 2015¹², rendering Egypt dependent on foreign supplies to serve its growing industrial and transportation sectors.

¹¹Bahgat, G. (2013). Egypt’s Energy Outlook: Opportunities and Challenges. *Mediterranean Quarterly*, 24(1), 12–37. <https://doi.org/10.1215/10474552-1895367>

¹²International Energy Agency. (n.d.). Egypt Balance <https://www.iea.org/Sankey/#?c=Egypt&s=Balance> (Retrieved September 30, 2017)

2.2 Natural gas sector

Natural gas has been discovered for the first time in 1967 (Nile Delta), and started to be exploited eight years later, in 1975. BP's "Statistical Review of World's Energy" shows a gradual increase of Egypt's proved gas reserves through the years. Specifically, at the end of 1990 Egypt's reserves were at 0,4 trillion cubic meters (tcm)¹³. The number was doubled (0,8 tcm) six years later and followed a constant increase, in total numbers, reaching the 1,4 tcm in 2000, 2 tcm in 2006 and 1,8 tcm at the end of 2016.¹⁴

A view on IEA's Sankey Diagram about Egypt informs us that the period of the reduction of oil production coincides with the increase of gas production from Egypt's gas fields. Three are the reasons behind Egypt's turn to gas industry:

- The first reason has to do with the maturity of Egypt's oil fields. As we saw previously, a steady reduction of country's annual oil production since mid-1990's left the once net exporting Egypt dependent on foreign imports.
- The second reason is government's initiative to save a percentage of 25% of annual oil production for exports. In order to achieve this purpose, industrial sector had to convert its energy source and start consuming natural gas. This strategy was part of a greater plan, called "Integrated Gas Strategy", that was inaugurated by Petroleum Minister in 1999.¹⁵
- However, Egypt wouldn't have the ability to concentrate on its gas sector, if it was not for new discoveries in the late 1990's¹⁶. The rise of its reserves was the crucial factor that gave the agility to the political personnel of the country to boost gas sector and recover losses from its dodderly oil sector.

¹³ British Petroleum. (2011). *BP Statistical Review of World Energy June 2011*. London. p. 20

¹⁴ British Petroleum. (2017) p. 26

¹⁵Mary E. Stonaker. (2010). Energy Infrastructure as A Diplomatic Tool: The Arab Gas Pipeline. http://ensec.org/index.php?option=com_content&view=article&id=270:energy- (Retrieved October 17, 2017)

¹⁶ Algarhi, A. S. (n.d.). *Oil and economic growth in Egypt*. Beirut. p. 5

The beginning of the new century found Egypt planning and adopting new strategies so as to maximize the utilization of its gas findings. Apart from production, basic pillar for the designation of every country's gas strategy is and should be the issue of distribution.

Along with negotiations for the delimitation of its Exclusive Economic Zone (EEZ) with neighboring countries (an agreement was reached with Cyprus in 2003¹⁷), Egypt put also its infrastructure on track. The project of Arab Gas Pipeline (AGP) went operational on July of 2003, and its target was to fulfill two objectives. The forecast for AGP was to reach the Turkish soil and get connected with the proposed Nabucco pipeline, contributing and carrying Egyptian natural gas to European Union. The second objective was to export Egyptian gas to adjacent Arab states. Briefly, with Egyptian region of Arish as its starting point, AGP enters Jordan through the southern city of Aqaba. AGP continues its route crossing Jordan and reaching the Syrian city of Homs in the middle of Syria¹⁸.

A project that created a series of controversies about its purpose and underwent many functional difficulties is the undersea pipeline that is connecting Egyptian El Arish with Israeli Ashkelon. Despite the fact that the starting point of both pipelines is established in El Arish, the Arish-Ashkelon pipeline should not be considered as an extension of AGP. The notion for providing energy to the State of Israel can be traced in Egypt-Israeli Peace Treaty back in 1979, with a clear statement for future cooperation between the two countries in the oil sector¹⁹. Given that Egypt's oil sector has been in a constant decline, the Arish-Ashkelon pipeline came to fill the gap by delivering Egyptian natural gas to Israel.

¹⁷ Agreement between the Republic of Cyprus and the Arab Republic of Egypt on the Delimitation of the Exclusive Economic Zone, 17 February 2003. (2003). *Law of the Sea Bulletin*, 52, 45.
http://www.un.org/depts/los/doalos_publications/LOSBulletins/bulletinpdf/bulletin52e.pdf
(Retrieved November 26, 2017)

¹⁸ Ministry of Petroleum. (n.d.). Arab Gas Pipeline.
<http://www.petroleum.gov.eg/en/ProjectsandActivities/StrategicProjects/Pages/GasPipeline.aspx>
(Retrieved November 7, 2017)

¹⁹ Treaty of peace between the Arab Republic of Egypt and the State of Israel. (1979). p. 194
https://peacemaker.un.org/sites/peacemaker.un.org/files/EG_IL_790326_Egypt_and_Israel_Treaty_of_Peace.pdf (Retrieved November 11, 2017)

The hopes for the Arish-Ashkelon to facilitate as a bridge towards the peace between the two nations proved to be unworkable. Since 2008, when the pipeline started to deliver gas to Israel, numerous terrorist attacks led to the disruption of its operation. Especially, after 2011 events and the change in Egypt's political leadership, the attacks on the overland part of the pipeline had been intensified. Bedouin tribes have turned the whole Sinai Peninsula into a theatre for their actions, with the attacks on the Arish-Ashkelon pipeline aiming to take advantage of the Egyptian society's public unrest regarding the gas supplies to Israel²⁰. Inevitably, energy companies terminated their signed contracts that obliged them to provide the pipeline with gas.

While working on pipeline projects, such as AGP, Egypt undertook the creation of two projects, capable of liquifying its natural gas. Namely, two LNG plants have been settled on the shores of Idku and Damietta. These two LNG plants, both created in the dawn of the new century, gave Egypt more options for the transportation of its natural gas.

Additional benefits that can boost Egyptian economy and country's geopolitical significance can be spotted in two levels. Firstly, Egypt can emerge as an attractive seller for potential and willing buyers of natural gas. Direct agreements with countries for delivering LNG via ships, have much lower cost than the option of pipelines' construction. A second benefit, deriving from these plants, is Egypt's emergence as a hub for liquifying the gas that is produced in adjacent countries. Specifically, Egypt's LNG plants offer the perspective of a future energy cooperation with adjacent countries, that hold natural gas reserves but not a decent transportation network in place. Israel is such an example.

Despite its newly discovered gas fields, Israel continues to face challenges that constitute threats to its national and energy security. Region's instability warrants everything but safe passages for Israel's exports of its natural gas. The State of Israel has conducted negotiations and signed for the construction of new pipelines. Such an agreement has been reached with Jordan. Israel has agreed to supply gas to Jordan in a

²⁰Kahn, T. (2013). *The Sinai in the post-Mubarak era: Options, obstacles, and the dilemma of a dated peace treaty*. p 11

15-year contract²¹. However, the details and the expected dates of the project completion in relation to the launching procrastination reveal a situation of fear, deriving from the possibility of future terrorist attacks, similar to the Arish-Ashkelon case.

Cyprus is a country that may be attracted by Egypt's LNG facilities. Having discovered a 5 tcf field and not abandoning the efforts for further discoveries, Cyprus has to face two significant challenges, regarding the exportation routes of its gas.

Briefly, the Cyprus issue remains unresolved and Turkey continues to back the self-declared Turkish Republic of Northern Cyprus (TRNC), mentioning its sovereign rights on the island's natural resources. Despite the paradox of an internationally unrecognized State claiming rights from the official State, Turkish aggressive stance towards the official Republic of Cyprus is a factor whose extensions may concern the international community, as well as the big energy companies²².

Another challenge that Cyprus has to face is its position on the map. Located at the edge of what is known as the turbulent region of Middle East, its position can be described as the eastern window of the European Union. Among other directives about license granting and common rules for the internal market, its EU membership dictates that no custom duties are to be applied for exporting goods²³. The non-obligation for paying custom duties for exporting goods in a big market like the European Union is definitely an advantage for Cypriot gas exportation. Nevertheless, the island lays more than 1900 km away from the nearest European shore, something that is translated to a higher cost for the construction of an undersea pipeline.

²¹ Sharon Udasin. (2016). Israel to supply gas to Jordan in \$10 billion deal. *The Jerusalem Post*. Retrieved from <http://www.jpost.com/Business-and-Innovation/Environment/Israels-Leviathan-reservoir-to-supply-gas-to-Jordan-468742>

²² Gaunt, J., & Dolan, D. (2017). Turkey warns Greek Cypriots, oil companies against offshore energy grab. <https://www.reuters.com/article/us-cyprus-conflict-turkey/turkey-warns-greek-cypriots-oil-companies-against-offshore-energy-grab-idUSKBN19V0WL> (Retrieved November 26, 2017)

²³ Kyriakides, M., Alex-Giosa Penelope, & Kyriakides, H. (2014). Oil and gas regulation in Cyprus: overview | Practical Law. https://uk.practicallaw.thomsonreuters.com/Document/Id4af1a821cb511e38578f7ccc38dcbee/View/FullText.html?navigationPath=Search%2Fv3%2Fsearch%2Fresults%2Fnavigation%2Fi0ad6ad3c0000015ff8a5575d0efe1270%3FNav%3DKNOWHOW_UK%26fragmentIdentifier%3DId4af1a821cb5 (Retrieved November 26, 2017)

Pipeline projects for the connection of Cyprus with European shores are already on track. European Commission endorsed East Med pipeline is about to serve this purpose²⁴, but Cyprus has also expressed its intention and began designing an LNG facility at Vasilikos²⁵. However, both options have notable disadvantages that can dissolve every effort being made so far. Pipeline option's drawbacks are the distance under the water until the next European, which may end up very costly, as well as the Turkish nonrecognition of Cypriot EEZ. Concretely a project of EastMed size could cost more than EUR 15 billion and would be difficult to maintain its feasibility due to the limited size of its supplying gas fields²⁶. Regarding the LNG plant that Cyprus is planning to establish at Vasilikos, its operation would be viable if total Cyprus reserves would exceed the limit of 7 tcf²⁷.

In view of the above examples and justifications, the already established and operational LNG facilities in Egypt can work as the only certain and feasible option for the transportation of the natural gas that is produced in the adjacent countries of Israel and of Cyprus. The challenges these countries have to overcome work as a trammel for their exportation purposes. The usage of Egyptian LNG plants answers to the challenges of security, distance and the cost.

²⁴ Eastern Mediterranean Natural Gas Pipeline – Pre-FEED Studies - European Commission. (n.d.). <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/projects-by-country/multi-country/7.3.1-0025-elcy-s-m-15> (Retrieved November 27, 2017)

²⁵ Thomas, K. (2017). Cyprus to import LNG through Vasilikos FSRU. *LNG World Shipping*. Retrieved from http://www.lngworldshipping.com/news/view,cyprus-to-import-lng-through-vasilikos-fsru_49183.htm

²⁶Gürel, A., Mullen, F., &Tzimitras, H. (2013). *The Cyprus hydrocarbons issue: Context, positions and future scenarios*. *Peace Research Institute Oslo* (Vol. 1). p 84

²⁷ Thrassou, A., Vrontis, D., Tsakiris, T., & Hadjistassou, C. (2016). The Cyprus oil and gas industry's indirect business effects—A predictive real-time analysis. *Journal of Transnational Management*, 21(3), p. 132. <https://doi.org/10.1080/15475778.2016.1192915>

3. Israel's energy outlook

Israel, since its foundation, could be figuratively described as an unlucky country in a blessed region. That motto is to be applied to the energy reserves of the State of Israel in comparison to its adjacent countries. Middle East region, part of which is Israel, is the leading area of proved oil reserves globally. As we have seen previously, Middle East proved oil reserves represent the 47,7% of the world's findings. In particular, Iran, Iraq, Kuwait and mainly Saudi Arabia hold 158, 153, 101 and 266 thousand barrels respectively. Israeli reserves have not been found adequate to even be mentioned among the charts of BP Statistical Review of World Energy. The same goes for Israel's natural gas numbers. Despite located among countries whose gas reserves represent the 42,5% of world's findings, Israel is registered with 5,5 tcf or 0,1% of world's reserves. However, recent discoveries have created hopes to the Israelis for an improvement of these numbers²⁸.

Before moving on to the analysis of the recent developments, it is essential to have a picture of how the country's energy outlook has been formatted so far. The State of Israel has been, officially, created in 1948. Its controversial status, as an imposed state among several Arab countries, has a major impact in many levels of its security. Years of tense diplomatic relations and armed confrontations with its neighbors have created an environment of isolation within its regional context. Apart from dangers for the boundary integrity of the newly formatted State, these tense diplomatic relations have caused an impact on Israel's energy security, from the beginning of its existence.

The lack of energy resources left Israel with the import of oil and gas as the only remaining option. However, the more unstable its regional environment was, the more Israel had to swift its suppliers. Concretely, despite the discovery of a small number of oil fields, Israel's first adequate oil production came from lands that Israel acquired and occupied through war. The period, when Israel had the capacity to fulfill its own demands by domestic production started after the Six Day War, in 1967. The

²⁸ British Petroleum. (2017)

aftermath of the war found Israel to have the control of the oil-fertile Sinai Peninsula and raising its production to 43.2 million barrels²⁹.

Another war, that of 1973 signaled the end of Israeli control over the Sinai Peninsula and its return to the declined oil production and to major imports. The country which became the main oil supplier of Israel was Iran. Iran at that time was governed by the pro-western Shah's regime of Reza Pahlavi. However, Pahlavi had been overthrown in 1979 by one of the more significant events of the 20th century. The Islamist Revolution of Iran, led by Ayatollah Khomeini and backed by the country's Shia clergy, brought major changes not only to Iranian domestic affairs but was also an event that shocked the status quo of its regional level. Among other implications, one of the first actions of the new regime was the suspension of oil trade with Israel³⁰.

3.1 Oil sector

Despite its bad luck with its oil-poor soil and the hostile and unstable regional environment, Israel had from the beginning of its establishment launched several exploration efforts. The number of 470 wells that had been drilled until 2004³¹, is indicative for the Israelis' long commitment to this cause. The results, though, have not proved them right. Prior to the occupation of Sinai Peninsula in 1967, Israel was in position to exploit the oil fields of Heletz-1, Kokhav, Brur, Ashdod and ZukTamrur. After the decade of self-efficiency (control of Sinai) and oil imports from Iran, Israel went on the hunting for additional oil findings, that could lift the country to the desirable levels of energy security. These levels were never reached from the perspective of domestic oil production.

²⁹ Bahgat, G. (2014). Alternative energy in Israel: Opportunities and risks. *Israel Affairs*, 20(1), p 3. <https://doi.org/10.1080/13537121.2013.863078>

³⁰ Bahgat, G. (2010). Israel's energy security: The Caspian Sea and the Middle East. *Israel Affairs*, 16(3), p 413. <https://doi.org/10.1080/13537121.2010.487729>

³¹ Pierce, S. (2004). Pace speeds up in exploration for Triassic targets in Israel - Oil & Gas Journal. <http://www.ogj.com/articles/print/volume-102/issue-25/exploration-development/pace-speeds-up-in-exploration-for-triassic-targets-in-israel.html> (Retrieved December 22, 2017)

Israel's proved oil reserves, in 2016, were at 14 million barrels³². Given the numbers of production, imports and consumption, one can assume that energy security is not something relevant to the State of Israel, so far. Concretely, starting the observation from 1973, when Israel still had the control of Sinai Peninsula, its annual oil production was a 6.10 Mtoe, almost the double of the country's overall consumption, which at that time was at 3.61 Mtoe. This ratio did not last for long, as the withdrawal of Israel from Sinai began gradually after 1974³³. The biggest number of oil production in Israel's history can be spotted in 1975 with 6.52 Mtoe. After that period and till now the imports of oil have dominated the charts, that show the Israel's oil balance. A sudden decrease of production and a stepwise increase of imports, brought Israel to import 15.06 Mtoe, while producing just 0.80 Mtoe of oil in 2015.³⁴ The numbers of 2015 oil production in relevance to the final consumption of 13.84 Mtoe prove the statement about a country with its energy security at risk.

3.2 Natural gas sector

As for its gas sector, the country followed the reverse path. Despite a small number of gas discoveries, annual gas production was at very low levels, until the beginning of the 21st century. The annual gas production of Israel, for almost fifty years, did not exceed the level of 0.05 Mtoe for an average 5 Mtoe of the country's energy demands. The dawn of the 21st century meant, also, a turnaround for Israeli gas outlook. Two pairs of discoveries, each one occurred at the beginning of each decade, brought an alteration both to the domestic energy outlook as well as to the status of Israel in the international energy context.

³² Israel - International - Analysis - U.S. Energy Information Administration (EIA). (n.d.).
<https://www.eia.gov/beta/international/analysis.cfm?iso=ISR> (Retrieved December 28, 2017)

³³Shipler, D. (1982). Israeli completes pullout, leaving Sinai to Egypt. *New York Times*. New York.
Retrieved from <http://www.nytimes.com/1982/04/26/world/israeli-completes-pullout-leaving-sinai-to-egypt.html?pagewanted=all>

³⁴ International Energy Agency. (n.d.). Israel Balance.
<https://www.iea.org/Sankey/#?c=Israel&s=Balance> (Retrieved December 30, 2017)

Mari-B and Noa gas fields, which started their production in 2004³⁵, contributed around 1.5 tcf to Israel total gas reserves during the first decade of the new century, helping the country to raise its production levels to 3.51 Mtoe annually. However, the turning point in the country's gas sector was the discovery of Tamar and Leviathan fields in 2009 and 2010, respectively. The two fields' inclusiveness alongside with the country's position on the map, can turn Israel's energy fate both for its internal consumption as well as for its exports' potential.

Speaking about the size of each gas field, revised estimations for Tamar, communicated officially by Noble Energy, rise its reserves to 10 tcf³⁶. Leviathan field, which is also operated by the Houston-based Noble Energy, is reported to overcome Tamar's reserves by double and contain 22 tcf³⁷. In the level of domestic energy demands, Tamar is capable of meeting Israel's energy consumption for 10 years, according to Israeli Ministry of Energy³⁸. However, the percentage of Tamar that is directed to domestic consumption is set to 90%. The remaining 10% is scheduled to be exported to Jordan and Egypt. Interesting part in our case is the promising option of potential exports from Tamar to Egyptian LNG facilities³⁹.

The even bigger Leviathan field is about to serve mainly the country's ambitions for gas exports. Scheduled to start producing in 2019, its gas has already been part of trade deals. Concretely, Jordan has signed a USD 10 billion contract for gas deliveries from Leviathan field over the next 15 years, starting from 2019⁴⁰.

³⁵ The Economist. (2010). What a gas! | The Economist. <http://www.economist.com/node/17468208> (Retrieved January 5, 2018)

³⁶ Noble Energy. (2013). Noble Energy Announces Production from Tamar And an Increase in Resource Estimate. <http://investors.nbleenergy.com/releasedetail.cfm?ReleaseID=754266> (Retrieved January 5, 2018)

³⁷ Noble Energy. (2017). Noble Energy Sanctions Leviathan Project Offshore Israel. <http://investors.nbleenergy.com/releasedetail.cfm?releaseid=1014140> (Retrieved January 5, 2018)

³⁸ Ministry of National Infrastructures, Energy and Water Resources of Israel. (n.d.). The Natural Gas Sector in Israel. <http://energy.gov.il/English/Subjects/NaturalGas/Pages/GxmsMniNGEconomy.aspx> (Retrieved January 8, 2018)

³⁹Herzo, C., Shalabna, N., &Maor, G. (2017). *Israel Natural Gas Demand Forecast*. p. 89, <https://www.delek-group.com/wp-content/uploads/2017/09/BDO-Gas-Market-Forecast-2-07-2017-for-Delek-Group-with-final-letter-1.pdf> (Retrieved January 8, 2018)

⁴⁰Baconi, T. (2017). Pipelines and pipedreams. *European Council on Foreign Relations*, 1–18. Retrieved from http://www.ecfr.eu/page/-/ECFR211_-_PIPELINES_AND_PIPEDREAMS.pdf

Recent discoveries have brought two significant changes to the Israeli energy policy. Firstly, the discovery of a huge amount of natural gas in Israel's EEZ worked as the mainspring for the country's steady transition to natural gas instead of oil as the main source of energy. Secondly, Israel has the chance to convert its status as a net gas importer to a net exporting country. Having its domestic needs covered mainly, as we saw by Tamar field, Israel can use much of Leviathan's field for exportation purposes. It is more than clear, though, that no export policy can be sustainable if the buyers are not diversified, and if the selling contracts are not coming from big markets.

3.3 Israel's challenges

Apart from the positive facts of the last decade for Israeli gas sector, there are still problems and issues to be arranged if the country is to acquire its promising future as a major net gas exporter. Both of the main issues to be arranged have to do with Israel's position on the map:

- The first is the Arab-Israeli conflict, which generated many armed confrontations with regional powers, have had its own impact on Israel's energy outlook, as it was mentioned before. Lack of diplomatic recognition from some states, hostile sentiments from Arab societies towards Israel and a growing uncertainty about oil and gas flows are some of the main impacts of the Arab-Israeli conflict.
- The second is Israel's long distance from big energy markets, where the desirable target of "diversification of buyers" can secure its gas exports. Such a market is European Union, with almost half a billion people, and its declared strategy of gaining levels of independence from Russian natural gas by finding alternative suppliers.

To start with, Israel may exercise diplomatic relations with the majority of UN members but does not enjoy the recognition of crucial Arab states of its periphery. According to an agreement signed in Khartoum in 1967, eight Arab states adopted the three 'NO's. Thus, the eight Arab countries agreed to follow a policy of "no peace with Israel, no recognition of Israel and no negotiations with Israel"⁴¹ This hard

⁴¹ The Khartoum Resolutions. (1967). http://www.mfa.gov.il/mfa/foreignpolicy/peace/guide/pages/the_khartoum_resolutions.aspx (Retrieved January 9, 2018)

directive may have not been followed by Egypt and Jordan, which later signed peace treaties and trade deals with Israel, but is still active for a batch of counties consisting of Lebanon, Iraq, Saudi Arabia, UAE, Kuwait, Qatar, Syria. Undoubtedly, hard policies from neighboring countries that impinge on its right to exist affect Israel's ambitions for exporting Leviathan's gas eastwards, with the exception of Jordan.

Apart from problems of diplomatic recognition from some of its neighbors, another obstacle for Israel is the sentiments of neighboring populations towards Israel, which is predominantly negative. This may be a secondary issue if the primary issue with a country is the diplomatic recognition. When it comes, though, to countries with restored diplomatic relations (Egypt) or to countries with a steady hostile behavior towards Israel (Turkey), the issues have to be examined through a different perspective.

About Egypt, the problems derive from their shared past of armed confrontations inside the main framework of Arab-Israeli conflict. Their relations have been restored with a peace treaty since 1979, with provisions for trade deals and energy supplies from Egypt to Israel. More steps have been taken during the first decade of the new century. As we saw, 2008 was the year when Egyptian natural began its journey to Israel, via the newly constructed Arish-Ashkelon pipeline. Notwithstanding, the ostensible viable project was the target of numerous attacks by Bedouin groups living in Sinai Peninsula. Bedouins' actions seem to have enjoyed the support of Egyptian public opinion, due to the argument that gas trade with Israel is not economic feasible for Egyptian interests⁴². The gas supply had been disrupted many times until the complete cancellation of the pipeline's operation in 2012 by the Egyptian government. Despite the fact that Egyptian authorities attributed the disruptions and the cancellation of the supply contracts to terrorist attacks, such a development was certainly supported by the Egyptian population's feelings towards Israel⁴³.

Another example of a country with turbulent diplomatic relations during the last years is the one of Turkey. Despite the clear backing of Arab interests in UN resolutions and crucial events by Turkey, the two countries enjoyed a large-scale cooperation in

⁴² Kahn, T. (2013) p 10

⁴³ Shaffer, B. (2013). Natural gas supply stability and foreign policy. *Energy Policy*, 56, p 122.
<https://doi.org/10.1016/j.enpol.2012.11.035>

various fields. Their cooperation was mainly of military nature, and it included fighter jets' upgrades, intelligence sharing and joint military exercises⁴⁴. The Islamist turn of Turkey, though, alongside with the crucial event of Mavi Marmara, led to the deterioration of the two countries' relations. Indicative are the expressions used by the leaders of both countries. Turkish President Recep Tayyip Erdogan refers to Israel a "terrorist and child murderer state", while Israeli Prime Minister Benjamin Netanyahu accuses him of "bombing Kurdish villages, jailing journalists and helping Iran"⁴⁵. It is more than obvious that this environment is far from fertile for future gas exports of Leviathan field to the big market of a country with 80 million inhabitants, as Turkey.

Based on the aforementioned justifications, one can assume that the option of turning eastwards for exporting the vast amount of its newly discovered gas, it's an excluded option for Israel. Exception to the above assumption is Jordan. However, neither the existence of just one buyer can guarantee a secure exporting activity, nor the size of Jordanian market can absorb the reserves of Leviathan field.

Consequently, Israel's orientation for exporting its gas should be westward, namely the European Union. According to European Energy Security Strategy of 2014, European Commission admits two facts and set a target, all of which have a relevance to Israeli exporting interests. Firstly, Commission predicts that energy demand will increase globally by 27% until 2030, meaning that EU in particular will be in need of producing or importing additional energy, compared to current levels. Secondly, EU has imported 39% of its natural gas from Russia, while the rest of its imported gas is coming from just three countries. The target set by the Commission is the ultimate need for finding new sources of energy, in an attempt to diversify its suppliers⁴⁶.

This is where Israel can play a role and take advantage of the EU needs, by promoting the export of its gas reserves. The difficult part of this option is definitely the long sea distance from Leviathan and the other gas fields until the European mainland. In order

⁴⁴Uzer, U. (2013). Turkish-Israeli Relations: Their Rise and Fall. *Middle East Policy*, 20(1), p 98. <https://doi.org/10.1111/mepo.12007>

⁴⁵Wedeman, B., Balkiz, G., Tuysuz, G., & Sariyuce, I. (2017). Turkey's Erdogan calls Israel a "child-murderer" state. <http://edition.cnn.com/2017/12/10/middleeast/mideast-tension-trump-jerusalem/index.html> (Retrieved January 10, 2018)

⁴⁶European Commission. (2014). *European Energy Security Strategy*. European Commission Website. Brussels. <https://doi.org/10.1007/978-3-531-19201-7>

for the Leviathan project to stay competitive and attractive for its operators and for its buyers, it should be viable economically. Apart from the issues of exploration, exploitation and production another major factor is the transportation potential. An investment project for a gas pipeline connecting Israel with the nearest point of European mainland, which is Greece, would take into account long distance but mostly the subsea depth, which is calculated at 2.000 meters in some cases. According to a survey conducted for the cost of such a pipeline from Cyprus to Greece, the amount of money needed for its construction exceeds the EUR 15 billion⁴⁷. With Israel being located further from Greece than Cyprus, the cost for a subsea gas pipeline would be significantly bigger. Therefore, Israeli policymakers should focus their efforts on improving their relations with Egypt, particularly for energy reasons. Egypt offers the choice for the liquification of Israeli natural gas. Trade deals with certain provisions, could offer the Israelis a window for exporting their natural gas and the Egyptian the relaunching of the established LNG plants of Idku and Damietta.

⁴⁷ibid

4. EU energy outlook

The consecutive announcements for new gas findings in the Eastern Mediterranean Basin have created a series of hopes to Egypt and Israel, about meeting a decent self-efficiency level on energy demands and also about exporting large amounts of their newly discovered gas. Developments like these, though, never affect just a single aspect of a country (economic), as the dynamic derived from the possession of gas resources affect also its international stature and relations with neighboring countries. Direct is the interest for regional players, too. Discoveries, like the Israeli Leviathan field of 22 trillion cubic feet and the Egyptian Zohr field of 30 trillion cubic feet, can have an impact on how regional superpowers look react to these developments.

There is no other superpower with its energy interests more linked to what is going on with the gas of Eastern Mediterranean than European Union. The validity of the above sentence is supported by the following arguments:

- i. The issue of proximity stands as the more obvious and as the strongest argument at the same time. The Levant Basin is not only just out of EU's window but a part of it is located inside. Cyprus, a member state of EU, has had also notable gas discoveries (Aphrodite gas field) in its EEZ at very close distance with Egypt's Zohr and Israel' Leviathan.
- ii. European Union, as a union of 28 member-states, constitutes the largest economy globally with its GDP per capita at EUR 25.000 and a population of almost half a billion⁴⁸. The size of its economy in terms of industrial growth, as well as its population, demands a high annual energy bill. Given that, the newly discovered gas in Levant Basin should be incorporated to European system in order to serve the Union's demanding energy requirements.
- iii. The majority of the energy sources consumed by the EU member states is imported. Namely, the percentage of the energy imported by EU countries is at 53%. This percentage may differ among different member-states, with some countries reaching levels of energy dependency close to 90% (Malta, Cyprus,

⁴⁸ European Commission. (2015). EU position in world trade - Trade - European Commission. <http://ec.europa.eu/trade/policy/eu-position-in-world-trade/> (Retrieved January 13, 2018)

Bulgaria)⁴⁹. The numbers go even higher, when it comes to natural gas imports. The dependency of EU on imported natural gas was 69,1% in 2015. However, 18 out of 28 member-states are dependent on gas imports for more of 90% of their annual gas consumption⁵⁰. EU's energy security is, also, threatened by the lack of a number of suppliers, especially in the gas sector. Russia stands as the sole supplier for many member states and its gas represents a large proportion of the gas consumed by EU. The gas findings in Levant Basin can definitely improve EU's energy security, helping the Union to diversify its suppliers.

4.1 Oil sector

A more detailed depiction of the overall oil and gas figures of European Union is required, so as the objective of connecting EU with the Eastern Mediterranean gas to be equipped with more ammunition. Being, still, the primary source of energy worldwide and in the European continent, oil sector has to be explained first.

To start with, oil production coming from EU member states in 2015 was 0.075 million of tones of oil equivalent (Mtoe). The countries with the higher production numbers are UK (0.046 Mtoe), Denmark (0.008 Mtoe) and Italy (0.006 Mtoe)⁵¹. A problem that may appear in the near future for EU is the forthcoming UK withdrawal from EU. UK produces the majority of the already declined EU's oil production and its withdrawal will mean further problems for EU's problematic energy sector.

The numbers of EU's annual consumption are the first sign for the vulnerability of its oil sector. In 2015 EU consumed 0.56 Mtoe of petroleum products⁵², exceeding by far

⁴⁹ Eurostat. (2017). Energy dependence by country.
http://ec.europa.eu/eurostat/tgm/web/download/Eurostat_Table_t2020_rd320HTMLDesc_4c05f9e7-9457-4556-b994-4409549a62a0.htm (Retrieved January 13, 2018)

⁵⁰ Eurostat. (2017). Gas dependence by country.
http://ec.europa.eu/eurostat/tgm/web/download/Eurostat_Table_t2020_rd320HTMLDesc_18840dbd-55cb-4709-af6f-8519b3d4cb9b.htm (Retrieved January 13, 2018)

⁵¹ Eurostat. (2017). Primary production by country.
<http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do#> (Retrieved January 14, 2018)

⁵² Eurostat. (2017). Gross inland consumption.
<http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do> (Retrieved January 14, 2018)

its annual production. Thus, EU is dependent on oil imports for around 87% of its annual demands. For 2016, its main oil suppliers were the Russia (30.28%), Norway (11,45%), Iraq (7,73%) and Saudi Arabia (7.53%)⁵³.

4.2 Natural gas sector

Natural gas figures may seem more decent than oil's, but specific aspects of European Union's gas sector require further analysis and caution by the European policymakers. The ratio of production to consumption shows a lower level of dependency than the oil's sector. However, the lack of a large number of suppliers, as well as the absence of reliable partners, are the issues of concern for the European gas sector.

Specifically, the natural gas produced by European member states in 2015 was approximately 0.11 Mtoe, whereas the consumption of the same year was 0.36 Mtoe.⁵⁴ EU's dependency rate reached its peak in 2011 at 67%⁵⁵ and had a slight decline by 1% in 2013. As of 2012 the member states with the highest natural gas production were the Netherlands and UK, with 39 and 36 Mtoe respectively⁵⁶. On the other side, the most significant non-EU suppliers for 2015 were Russia with 42% of the imported gas and Norway with 35%⁵⁷.

⁵³ European Commission. (2017). *Registration of Crude Oil Imports and Deliveries in the European Union (EU28)*.

⁵⁴ Eurostat. (2017). *Energy balance sheets*. Luxembourg: Publications Office of the European Union. <https://doi.org/10.2785/032728>

⁵⁵ Commission, E. (2014). *In-depth study of European Energy Security* (Communication from the Commission to the Council and the European Parliament: European energy security strategy). p. 43, Brussels.

⁵⁶ Eurostat. (2017). *Supply, transformation and consumption of gas - annual data*.

⁵⁷ Ruble, I. (2017). European Union energy supply security: The benefits of natural gas imports from the Eastern Mediterranean. *Energy Policy*, 105(November 2016), 342. <https://doi.org/10.1016/j.enpol.2017.03.010>

4.3 EU challenges and dependence on Russia

This brief presentation of the numbers of EU's gas sector is enough to spot a number of challenges for EU's gas future. These problems can be summarized in the following issues:

- The decision of the United Kingdom to stop being part of the European Union, will have an important impact on EU's dependency on gas imports, among other political, economic and trade issues. UK is the first oil and second gas producer, contributing the 62% of the produced petroleum products 33% of the produced gas.
- EU's dependency on gas imports from Russia constitutes the main issue of concern that requires further actions. The reliance on just one supplier for many of its member states threatens the Union's energy security, especially if this supplier is Russia, with all its challenges and its relations with the West.

As we saw, Russian Federation is ranked among the first suppliers of European Union, both for petroleum products, as well as natural gas. When it comes to gas, especially, Russia stands not only as the biggest gas supplier to EU, but the rest of the countries doing the same job and sharing notable rates are just three (Norway, Algeria, Libya). Russian superiority through major oil and gas exports to European member states, has motivated the European system towards the need of reducing the imports from Russia and strengthening trade and energy partnerships with adjacent powers. Such a decision is based on the following arguments:

- Originated in Soviet times, the 80% of the network that delivers Russian gas to Europe passes through Ukraine⁵⁸. During the recent past, even before the Crimean Crisis of 2014, disputes between Russia and Ukraine had led to disruptions and suspension of Russian gas supplies. These gas interruptions occurred in 2006 and 2009, officially due to disagreements over gas prices and Russia's demand for prices' increase⁵⁹. European

⁵⁸ Kramer, A. (2006, January 2). Russia Cuts Off Gas to Ukraine in Cost Dispute. *The New York Times*. Retrieved from <http://www.nytimes.com/2006/01/02/world/europe/russia-cuts-off-gas-to-ukraine-in-cost-dispute.html>

⁵⁹ Henley, J. (2014). Is Europe's gas supply threatened by the Ukraine crisis? <https://www.theguardian.com/world/2014/mar/03/europes-gas-supply-ukraine-crisis-russia-pipelines> (Retrieved January 15, 2018)

countries were part of the repercussions with six member-states reporting a 30% decline on their pipelines' flow⁶⁰.

- The tensions in Ukrainian territories and the annexation of Crimea by the Russian Federation in 2014 has led to a series of reactions by the West and especially by European administrative bodies. The Russian intervention in and annexation of Crimea was strongly condemned by the Council of the EU, both verbally as well as by concrete actions⁶¹.
- The Russian state energy company Gazprom is reported to exercise control over the one fifth of the gas reserves globally⁶², giving the Russian Federation the ability to use its power for political purposes and manipulation of gas prices. The latter became obvious recently during the 2006 and 2009 gas interruptions, which were mentioned earlier. Gazprom decided to overhaul the gas prices. Concretely, in 2005, the demanded price went from USD 50 per 1000 cubic meters to USD 230 and three years later from USD 250 to USD 400⁶³. As a political entity that encourages the competition over markets, further cooperation with Gazprom is out of European Union's norms and directives.

4.4 The concept of energy security and the European action plan

The concept of energy security as defined by European Commission itself is “the ability to ensure that future essential energy needs can be met, both by means of adequate domestic resources worked under economically acceptable conditions or maintained as strategic reserves, and by calling upon accessible and stable external sources supplemented where appropriate by strategic stocks”⁶⁴. The current situation in EU denies any compliance with this definition, due to declined domestic

⁶⁰ *ibid*

⁶¹ Council of the European Union. (2014). *COUNCIL REGULATION (EU) No 692/2014*. Retrieved from <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02014R0692-20141220&qid=1444987014323&from=EN>

⁶² *ibid*

⁶³ *ibid*

⁶⁴ Bahgat, G. (2009). North Africa and Europe: energy partnership. *OPEC Energy Review*, 33(3-4), 156. <https://doi.org/http://dx.doi.org/10.1111/j.1753-0237.2009.00164.x>

production and lack of stable external sources. A more plain and short definition by the International Energy Agency (IEA) perceive the energy security as the “uninterrupted availability of energy sources at an affordable price”⁶⁵. Recent gas interruptions as well as the absence of market competition confute both prerequisites of IEA’s definition.

Given the above arguments, it is more than clear why European Union should reduce its level of dependency from Russian oil and gas imports. The European Energy Security Strategy, which was introduced by the Commission just after the crisis in Crimea, has set specific targets and procedures for the accomplishment of the Union’s energy security. These steps can be included in the following bullets:

- Increase the oil and gas stocks, in order to deal with a possible disruption similar to 2006 and 2009.
- Build a well-functioned internal market and coordinate the national energy policies.
- Increase the energy production within the European countries.
- Diversify the external supplies⁶⁶.

⁶⁵ Energy Security. (n.d.). <https://www.iea.org/topics/energysecurity/> (Retrieved January 16, 2018)

⁶⁶ European Commission. (2014). *European Energy Security Strategy. Communication from the Commission to the European Parliament and the Council*. Brussels.

5. Challenges for the transportation of Eastern Mediterranean gas to EU

The recent developments in Eastern Mediterranean can offer the option for the diversification of European Union's. Checking the numbers, not from the perspective of production which is sometimes a floating issue, but from the perspective of reserves, the region turns attractive for the European energy market. Concretely, the discovery in 2015 of the giant Zohr field rise the gas reserves of Egypt to from 65 trillion cubic feet (tcf) to 95 tcf. Moreover, Israel's Leviathan field which is lined for exportation adds 22 tcf to the region's gas reserves aggregate. In relation to UK, the 7,3 tcf of which will not be part of the EU in the foreseeable future, Eastern Mediterranean's gas can answer to this challenge.

Before proceeding on the analysis and the recommendations of policies that EU can follow for the integration of Eastern Mediterranean gas, one must take into account the particularity of the broader region. Eastern Mediterranean is next to one of the most turbulent regions of the world, namely the Middle East. A series of conflicts, some occurred in the past and others are ongoing, have created a hostile environment among the Middle Eastern countries. Concrete conflicts, though, affect the issues of gas exploitation and transportation, which are vital both for the countries hosting the reserves but also for European Union, that looks these reserves as a tool for its diversification project. The conflicts which pose problems in gas exploitation are mainly between Israel and Lebanon over their EEZs and the hostile past relations between Israel and Egypt. The conflict between Cyprus and Turkey can also be included in this section. The reason is not so much about the gas reserves and exploitation but mainly due to Turkish possible key role for the gas's route to EU.

5.1 Israel-Lebanon disputes

Israel and Lebanon share a history of conflicts and interventions, which ended only in the very recent past. The two countries had been engaged in war between each other two times during the last 35 years. Israel first invasion of Lebanon took place in 1982 as an effort to eliminate PLO bases from Lebanon's territory. Total withdrawal of

Israeli forces from Lebanese soil achieved 18 year later, in 2000. The second time that the two countries fought each other was just 11 years ago. Israeli Armed Forces invaded Lebanon in 2006, in response to a rocket attack launched by Lebanese paramilitary organization Hezbollah⁶⁷.

Undoubtedly, this intense past that Israel and Lebanon share cannot be seen as a fertile ground, on which their unsettled issues about their EEZ, can be easily solved. In addition, there are two more elements, making their in between conflict even harsher to be resolved.

- Firstly, Israel is one of the countries that haven't signed the UNCLOS and therefore is not obliged to follow the procedures, as defined in the texts.
- Secondly, Lebanon does not recognize the State of Israel. Thus, bilateral talks are difficult to be achieved.

Lebanon was the second country, after Egypt, that signed an agreement with Cyprus on their Exclusive Economic Zones. However, the law, which delimited its EEZ, passed from the Lebanese Parliament on July of 2010 and was submitted to UN one year later, on October 2011. According to Lebanese official interpretation, Lebanon delayed to ratify and submit Lebanon-Cyprus Agreement, as well as the bill passed from Parliament, in order to maintain diplomatic relations and economic interests with Turkey⁶⁸.

The disputed area between Lebanon and Israel is an area of 850 km² in Lebanon's southern maritime borders. USGS (US Geological Survey) estimations for high reserves of natural resources in Levant Basin⁶⁹, as well as the discoveries of Tamar and Leviathan gas fields, incited Lebanon's interest to boost its damaged economy by

⁶⁷ Secretary-General on the United Nations Interim Force in Lebanon. (2006). *Report of the Secretary-General on the United Nations Interim Force in Lebanon*. Retrieved from <https://web.archive.org/web/20150107080734/http://domino.un.org/unispal.NSF/fd807e46661e3689852570d00069e918/87e2508779d8ec83852571b6004c761f>

⁶⁸ General Nizar Abdel-Kader. (2011). Potential Conflict between Lebanon and Israel over Oil and Gas Resources – A Lebanese Perspective | Official Website of the Lebanese Army. *National Defense Magazine*, (78). Retrieved from <https://www.lebarmy.gov.lb/en/content/potential-conflict-between-lebanon-and-israel-over-oil-and-gas-resources---lebanese>

⁶⁹ Schenk, C. J. (2010). *Assessment of Undiscovered Oil and Gas Resources of the Levant Basin Province, Eastern Mediterranean*. Retrieved from <https://pubs.usgs.gov/fs/2010/3014/pdf/FS10-3014.pdf>

exploring the subsoil of its Exclusive Economic Zone. The fact that Israel's declaration of its EEZ overlap these 850 km² of disputed area has led the two countries in the submission of a number of letters to UN, with each one accusing the other of violation of national interests.

What is worth mentioning for the Lebanon-Israel dispute, is that one party does not pay recognition to the other. Namely, Lebanon refuses to recognize officially the State of Israel, to which is referred as the Government of Israel⁷⁰. On the other hand, Israel is trying to take advantage of their conflict in order to push Lebanon in accepting to enter into bilateral talks with Israel and legitimize its authority. The above claim has been communicated officially through a letter to the Secretary General of UN⁷¹.

5.2 Egypt-Israel tensions

As the most populous country in the Arab world, Egypt plays a prominent role in Middle Eastern affairs. As such, it was involved in the Arab-Israeli since the first years, always backing the Palestinians. This involvement was expressed through a number of armed conflicts with Israel. Officially, their relations entered a peace era after their peace treaty of 1979. Actions since then had signaled the impression of mutual cooperation in various fields. However, the feelings of suspicion towards Israelis has never been erased totally from the Egyptian society. Recent years' developments have demonstrated this very claim. Concretely, Arish-Ashkelon pipeline, which has facilitated as a project of mutual cooperation has survived only for four years after public sentiment's unrest and attacks by Bedouin extremists⁷². Another sign was the strongly Egyptian opposition for the recognition of Jerusalem as Israel's capital by the US.

⁷⁰ Permanent Mission of Lebanon to the UN. (2017). Communication from the Permanent Mission of Lebanon to the UN to the Secretary-General of the UN.
http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/communications/2017_03_20_lbn.pdf (Retrieved May 31, 2017)

⁷¹ Permanent Mission of Israel to the UN. (n.d.). Communication from the Permanent Mission of Israel to the UN to the Secretary-General.
http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/PDFFILES/communications/isr_n v_02022017.pdf (Retrieved May 31, 2017)

⁷² *ibid*

5.3 Turkey-Cyprus conflict

The island of Cyprus constitutes a complex political foundation, the history of which started in 1960 as an independent country, after years of being under British rule. The complexity of island's political history has to do mainly with two factors. Firstly, the island is inhabited by two ethnic communities. Greek-Cypriots and Turkish-Cypriots share the island, with 78% of the population belonging to Greek-Cypriot community and 18% to the Turkish-Cypriot Community, as in 1959 and the London-Zurich Agreement⁷³. The second factor that has complicated the situation, even since the first days of island's independence, is the regime of guarantor countries. The status of guaranteeing countries has been provided to Greece, Turkey and UK in order to "secure independence, territorial integrity and security of the Republic of Cyprus". Moreover, Article 4 of the Treaty of Guarantee recognize to each one of the guaranteeing countries the right to take action in case of Treaty's noncompliance⁷⁴.

Turkey took advantage of the above provision and invaded the island, after a coup attempt led and sponsored by the Greek junta. Turkish invasion resulted in island's division and to the occupation of island's northern 36% by Turkish Armed Forces, till today. This northern part of Cyprus has been self-declared as a sovereign state under the name "Turkish Republic of Northern Cyprus", recognized officially only by Turkey.

These short details about the political history of Cyprus are essential in order to move on to the issue of island's Exclusive Economic Zone. Republic of Cyprus declared its EEZ in 2004 by enacting a relevant law and submitting it to the UN. Cyprus chose the path of consultation and managed to come to agreement with its neighboring countries and delimitate their EEZ in the median line between Cyprus and each one of them. Namely, Cyprus signed agreements with Egypt in 2003, with Lebanon in 2007 and with Israel in 2010.

⁷³ Heraclides, A. (2006). *The Cyprus Issue 1974-2004, From Enosis to Partition*. p 94, Athens: I. Sideris.

⁷⁴ Treaty of Guarantee. (1960). [http://peacemaker.un.org/sites/peacemaker.un.org/files/CY GR TR_600816_Treaty_of_Guarantee.pdf](http://peacemaker.un.org/sites/peacemaker.un.org/files/CY_GR_TR_600816_Treaty_of_Guarantee.pdf) (Retrieved June 1, 2017)

Despite their vicinity, Turkey and Republic of Cyprus have not agreed on their EEZ delimitation. Additionally, Turkey does not accept the agreements that Cyprus has conducted with Egypt, Lebanon and Israel⁷⁵. Turkish stance can be explained by the following reasons:

- Turkey, like Israel, is not a signatory of UNCLOS. Therefore, it does not accept the regulations about EEZ, as given by the articles of the Convention.
- Turkey does not recognize Cypriot Government as the legitimate body that is accountable for the whole population of the island. According to Turkey, Turkish-Cypriot population is not represented, and EEZ delimitation should be a part of the Cyprus Question resolution⁷⁶.

Turkey considers that 5 out of 13 research blocs of Cyprus EEZ cascades its own EEZ. Furthermore, Turkey has granted licenses to its state owned TPAO to conduct offshore explorations in the disputed blocs.

⁷⁵ Çubukçuoğlu, S. S. (2014). The EEZ Delimitation Dispute Between Cyprus and Turkey – Part I. *Fletcher School*.

⁷⁶ Rep. of Turkey Ministry of Foreign Affairs (n.d.). Greek Cypriot's Unilateral Activities in The Eastern Mediterranean. http://www.mfa.gov.tr/greek-cypriot_s-unilateral-activities-in-the-eastern-mediterranean.en.mfa (Retrieved June 1, 2017)

6. Possible ways of gas exportation

Since the region and its problems have been explained, the options of European Union for the region can be put in a clearer perspective. As we saw earlier, one out of the two fields discovered in Israeli offshore can be listed for exportation purposes. Leviathan gas field with 22 tcf can be regarded as one of EU's potential sources. The same applies to Egyptian Zohr field which contain around 30 tcf. Apart from the exploitation of these resources, the issue with the same significance is the transportation. If EU is about to implement its commitments for the diversification of its suppliers, three are the options that should be examined regarding the transportation and the imports of these gas resources. The gas from Eastern Mediterranean could be transferred to European member states either by a pipeline connecting Cyprus with Greece, or by a pipeline that will transfer the gas to Turkey's pipeline network. A third option for EU is the import of gas in liquified version via ships. The positive and the negative aspects of each choice are examined below.

- The first option for transporting gas from Levant Basin to EU is the construction of a pipeline, that will connect Cyprus with the mainland of Greece. The idea is supported officially by the European Commission and is part of the “Energy Priority Corridor 7” as EastMed pipeline⁷⁷.
 - The project seems as the most secure way of transporting 10 bcm per year to European gas system through Greece, avoiding unnecessary political arrangements, as both the countries involved are EU members.
 - The negative part of this project is its extremely high cost which would risk is economic viability. As mentioned earlier, estimations about EastMed rise its cost to EUR 15 billion. Furthermore, Egypt has not declared any interest in participating or exporting its gas through EastMed pipeline.

⁷⁷ Eastern Mediterranean Natural Gas Pipeline – Pre-FEED Studies - European Commission. (n.d.). <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/projects-by-country/multi-country/7.3.1-0025-elcy-s-m-15> (Retrieved November 27, 2017)

- The second option is the construction of a pipeline that would connect the gas fields with Turkey.
 - The distance is much shorter, giving this option the advantage of affordability.
 - Additionally, Turkey is already equipped with a large network of pipelines that deliver gas to EU.
 - However, energy issues are not dealing with just technical details, but are mainly of political nature. From this point of view, Turkey's option carries a series of drawbacks. Firstly, a contingent selection of Turkey as a transit country would violate EU's declarations for energy security. Switching from one unreliable partner (Russia) to a more unreliable one (Turkey) is incompatible with all the definitions of energy security that were mentioned previously.
 - Secondly, Turkey's involvement in the Cyprus problem prevent its selection. Cyprus is a member state of EU and is part of every development in the region.
 - Thirdly, the relations between EU and Turkey have included the handling of the sensitive refugee issue. Turkey's role is vital in hosting millions of refugees and preventing them from entering EU. Therefore, the entitlement of Turkey to hold also the energy keys of EU, would make the country stronger and more unpredictable towards EU interests.
- The third option is the transportation of liquified gas with ships. Such an option removes the need of the construction of a new pipeline and adds the LNG plants in the equitation.
 - The case for this option is that there is no need for the construction of new LNG plants, as there are already two established in the region. Egypt, while developing its gas sector, sought to build the LNG plants of Idku and Damietta in the beginning of the century.
 - This option could serve the interests of all the three states with offshore gas reserves. Natural gas from their respective fields could be transferred first to Egypt's plants for liquification and then shipped to European member states through trade deals. Such an action is the only

step that would require further constructions. However, the cost required for a pipeline from Zohr and Leviathan to Idku/Damietta is much smaller, due to the shorter distance, in comparison to EastMed.

7. Conclusion

It is essential to summarize the elements of each section, before presenting the final outcome of the survey. The research got involved in the energy outlooks of three entities. Starting from Egypt, it was shown that the decline of its petroleum sector was followed by a rise of its gas reserves. Egypt grabbed this opportunity and implemented a national policy with large infrastructures. Namely, two pipelines have been built since 2000 and two LNG plants have been established in Egyptian land. However, serious damages and political turmoil have led the pipelines to suspend their operations. As for the LNG plants, they stand as the only solution that would turn beneficial for liquifying the gas from the newly discovered giant Zohr field.

Regarding Israel's case, it seems that the gas fields discovered in its EEZ can transform totally its energy outlook. The Jewish state has never learned what it is to have a decent level of energy self-efficiency. The recent years' developments, though, have offered to Israel the ability to meet a certain level of self-efficiency and also to export vast gas amounts of its Leviathan field. However, Israel's tense relations with many of its neighbors create a difficult environment for the exportation of its gas. The case of Arish-Ashkelon pipeline predicts that a pipeline connection with Egypt would be difficult to stand, while the common harsh feelings with Turkey rule out any joint operation for the exportation of Israeli gas to the big Turkish market.

Concerning the EU's position in the recent developments, it is obvious that new gas findings at the edge of its backyard could only be positive for its interests. The research has demonstrated the Union's lack of self-efficiency both in petroleum products and in natural gas. It has also demonstrated the significant levels of dependency from Russian gas. For the purpose of reducing the dependence on Russian gas and achieving greater levels of energy security the European Commission has already constructed an energy policy. Egyptian and Israeli gas can work as additional suppliers for European Union and its effort to diversify its suppliers.

The analysis of every possible way and the tracing of the drawbacks and advantages of each option allow certain outcomes to be extracted. Firstly, European Union was in a rush about the selection and the promotion of the EastMed project. The quantity of the gas discovered in Eastern Mediterranean may be of large numbers, but the fields

are divided between three states. Egypt, which is the country that hosts the largest field of the Mediterranean, has not shown any intention in participating in EastMed, either financially or by providing gas to the pipeline. The extremely high cost of EUR 15 billion is likely to make EastMed a noncompeting project, unless new gas findings appear in Cyprus or Israeli offshore.

The fate of a pipeline that would connect the gas fields with Turkey, passes inevitably from Cyprus. This option seems to be the less costly among the other two alternatives. However, as we said earlier, energy issues are mainly a matter of politics. The longstanding conflict between Turkey and Cyprus would block any effort towards that choice, mainly due to the Turkey's nonrecognition of Cyprus's right to its EEZ and the legitimate authority of the Greek-Cypriot administration over the island. The drawbacks of this option, don't stop in Cyprus. Turkey's relations with EU pass through an intense period of mutual insults and threats. Thus, it is natural for EU that the selection of another unreliable partner is out of the table.

The advantages of the third option seem to overcome its drawbacks. The question of competitiveness is answered, alongside with the question of energy security. Specifically, there is no need for constructing new sublime projects. LNG plants are already in Egyptian soil for more than 10 years. Both Israel and Cyprus could benefit from this infrastructure, by negotiating deals for the liquification and immediate export of their natural gas. EU would also gain more advantages, as the co-funding for constructing grand projects and pipelines could be saved.

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