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The greater strategic and economic significance that the eastern Mediterranean has gained is not linked to the discovery of vast natural gas reserves in its developing countries, nor to its proximity to resource-poor European countries, it is rather correlated with the fact that its countries whose borders were drawn in the aftermath of World War I continue to bear the brunt of border conflicts, pursue of primacy and influence peddling

## **Development of the Middle East Gas:**

Opportunities & Challenges

By

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## 1. Introduction

The greater strategic and economic significance that the Eastern Mediterranean has gained is not linked to the discovery of vast natural gas reserves in its developing countries, nor to its proximity to resource-poor European countries. It is rather correlated with the fact that its countries whose borders were drawn in the aftermath of World War I, continue to bear the brunt of border conflicts, pursue of primacy and influence peddling. Whilst the economic dimension of the gas wealth has become a major cause of dispute between Eastern Mediterranean countries, its geopolitical dimension remains the most important and the most dangerous. The new discoveries in this region have re-awakened dormant tensions; the Turkish occupation of Northern Cyprus is no longer a matter of political or military influence, the Lebanon-Israel maritime border issue is no longer a mere aspect of Israel's accustomed aggression policy, and the conflict between Egypt and Turkey is no longer a political conflict to eliminate the Muslim brotherhood in Egypt. Instead, the main determinants of the region's dynamics are rivalries to provide Western Europe with energy and secure the diversification of its resources.

The picture became clearer with Russia's military presence in Syria and the stationing of its forces in military bases in the Eastern Mediterranean, especially that gas supply to Europe is one of the cornerstones of Russia's European strategy and one of the strengths of the Russian-Turkish relationship. Securing the safety of gas exploration and the protection of maritime installations against all types of threats must – besides its technical aspect - take into consideration the seriousness of geopolitical challenges.

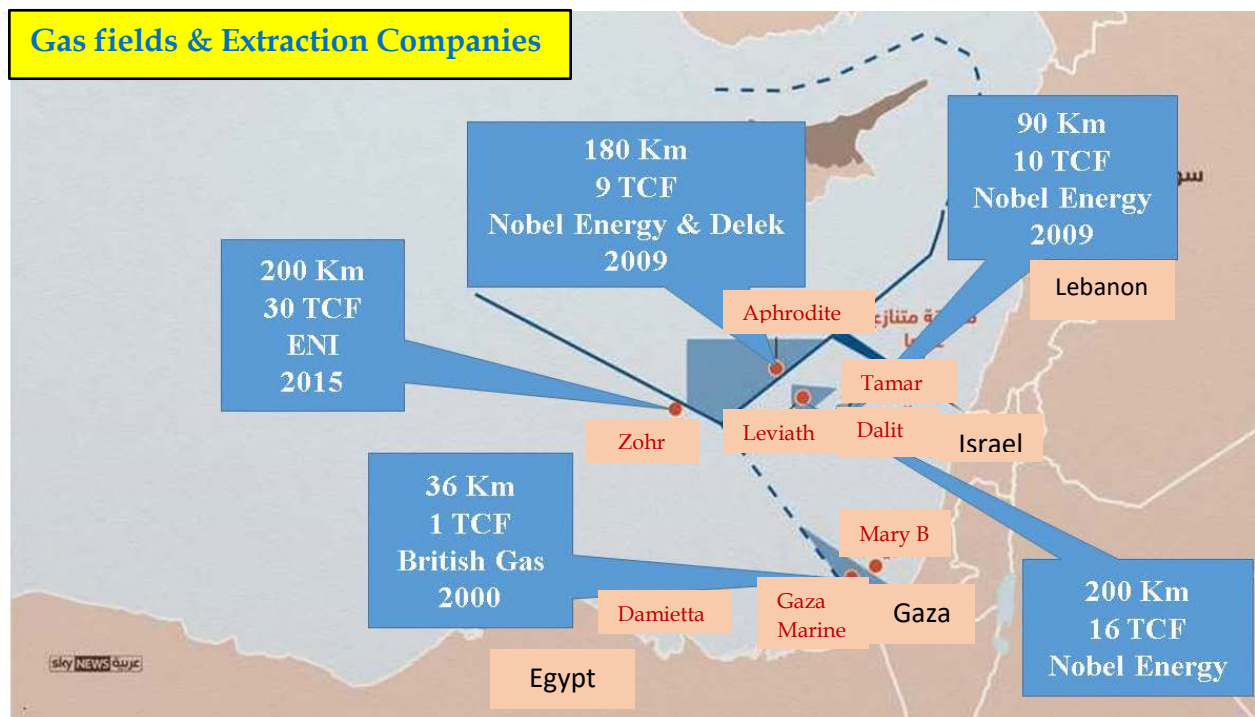
With the mounting concerns about the world energy security, maritime installations become attractive to attacks in countries lacking economic and political stability or suffering from tensions or conflicts compared to more stable countries. This landscape raises some questions about the seriousness of the opportunities that will be offered to the oil and gas sector to benefit from the existing resources and the nature of security challenges that are likely to impede these opportunities.

The purpose of this report is to highlight these problematics by a) assessing the security situation in the Eastern Mediterranean, b) identifying the risks facing the gas industry loop from exploration to extraction and exportation, c) forecasting expected realistic scenarios, and d) coming up with recommendations that could be valuable for decision makers in the public and in the oil and gas sector. The ultimate goal of this report is to contribute to the development of appropriate strategies, regulatory frameworks, and counter-measures for a safer oil and gas industry.

## 2. Discovered Gas Fields & Competing Oil Companies

Although the Eastern Mediterranean's gas reserves are estimated at 122 trillion cubic feet, the fields that have been exploited so far contain about 68 trillion cubic feet and are distributed as follows (Figure 1):

2.



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- **Gaza Marine field:** The field is located 36 km offshore Gaza Strip in waters 600 meters deep. Its gas reserves are estimated at one trillion cubic feet. It was discovered in 2000 by British Gas, a subsidiary of British Petroleum.
- **Tamar field:** The field is located 90 km offshore north (occupied Palestine) facing Haifa in waters 1650 meters deep. It holds 10 trillion cubic feet of gas reserves and was discovered in 2009.
- **Tanin field:** It holds 1.2 trillion cubic feet of gas reserves and is located 120 km west of Haifa in waters 5,500 meters deep. **Leviathan gas field**<sup>1</sup>: It holds 17 trillion cubic feet of gas reserves and is located roughly 135 kilometers west of Haifa in waters 1,500 meters deep. Tanin and Leviathan gas fields were discovered in 2012.
- **Aphrodite field:** The field is located 180 km off the south-western coast of Cyprus, in waters 1,700 meters deep, and holds gas reserves estimated at 9 trillion cubic feet. It was discovered in 2009 by Noble Energy<sup>2</sup>.
- **Zohr field:** The field was discovered in 2015 by the Italian energy company Eni and is to date the largest ever natural gas find in the Mediterranean Sea and is proven to hold around 30 trillion cubic feet of gas. It is located about 200 km off the Egyptian coast of Port Said. Eni estimates that it will extract about one billion cubic feet of gas in the first year of production, which will gradually rise to reach 2,5 billion cubic feet in 2019, thus accounting for around 40% of Egypt's gas production.

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<sup>1</sup> All Israeli gas fields were discovered by the American company Noble Energy in partnership with Israeli companies Delek Drilling and Avner.

<sup>2</sup> On Feb. 8, 2018 Eni (Italy) and Total (France) announced gas discoveries in the Calypso area offshore Cyprus.

### 3. Oil Companies

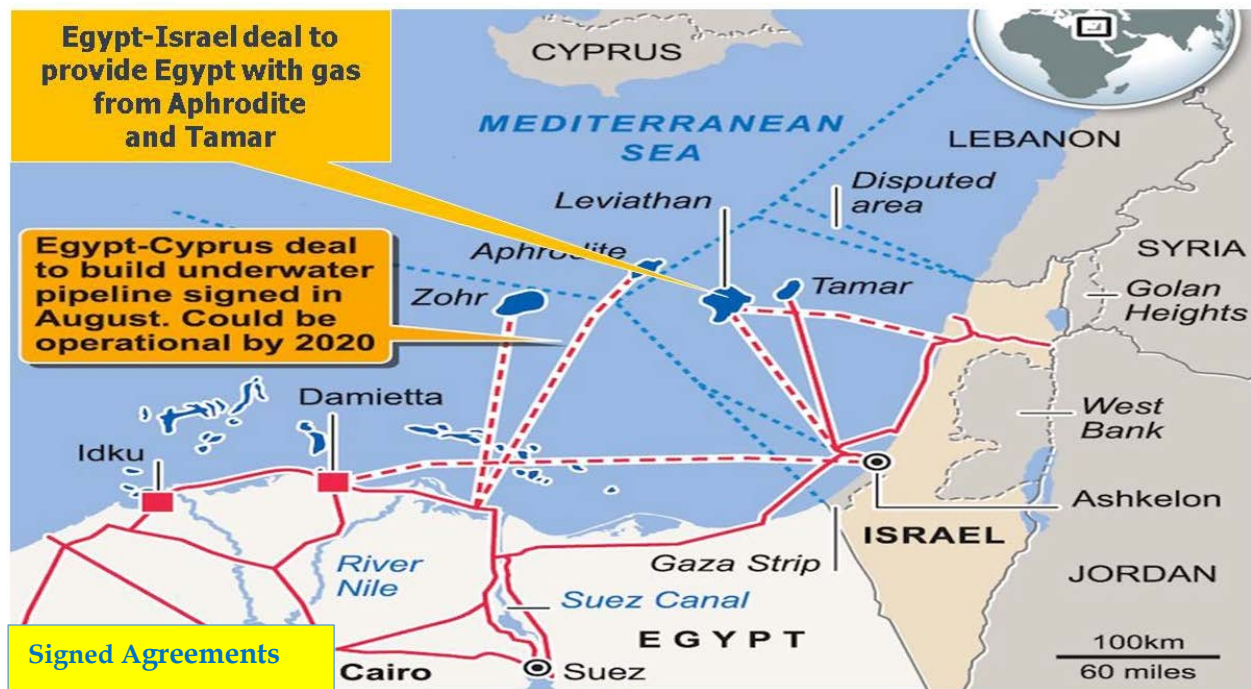
The soaring competition among international companies to acquire oil and gas fields in the Mediterranean and monopolize their production is one aspect of the intertwined international interests and a sort of security guarantee for this industry. The following section contains an overview of the main companies currently operating in the Mediterranean Sea's gas fields:

- **ENI (Italy)** has presence in more than 80 countries, including Iran, Kazakhstan and Iraq, and is among the companies that will explore gas in Lebanon. The Italian government owns 30% of Eni's shares. It operates in Cyprus in Blocks 2, 3 and 9, where it owns 80% of the shares and in Egypt's Zohr field.
- **Total (France)** operates in Central Asia, the Pacific, Latin America and the Middle East. It owns 30% of oil exploration shares in Saudi Arabia and 19% of production shares of the Halfaya field in Iraq. Its activities in the Mediterranean Sea are restricted in the Cypriot Block 11; it signed a cooperation protocol with Cyprus to prepare a feasibility study on the construction of a Liquified Natural Gas (LNG) plant.
- **Nobel Energy (USA)** operates in South America, Africa, Eurasia, North Sea, China and the Mediterranean region, and its activities are distributed between Israel, Egypt and Cyprus. It has acquired the concession of the Israeli Leviathan and Tamar fields and has signed import contracts with Egypt to import gas from Israel to Egypt. Nobel Energy owns 70% of Cyprus' Aphrodite pursuant to a joint venture with Delek Drilling and Avner.

### 4. Signed Agreements

- **Egypt-Israel Agreement:** The value of the contract is estimated at EUR 12 billion whereby Egypt purchases gas from Israel's Tamar and Leviathan fields. The U.S.-owned Noble Energy and the Israeli energy group Delek Drilling declared their intentions to sell gas to Egypt's Dolphin Energy Limited by 2020.

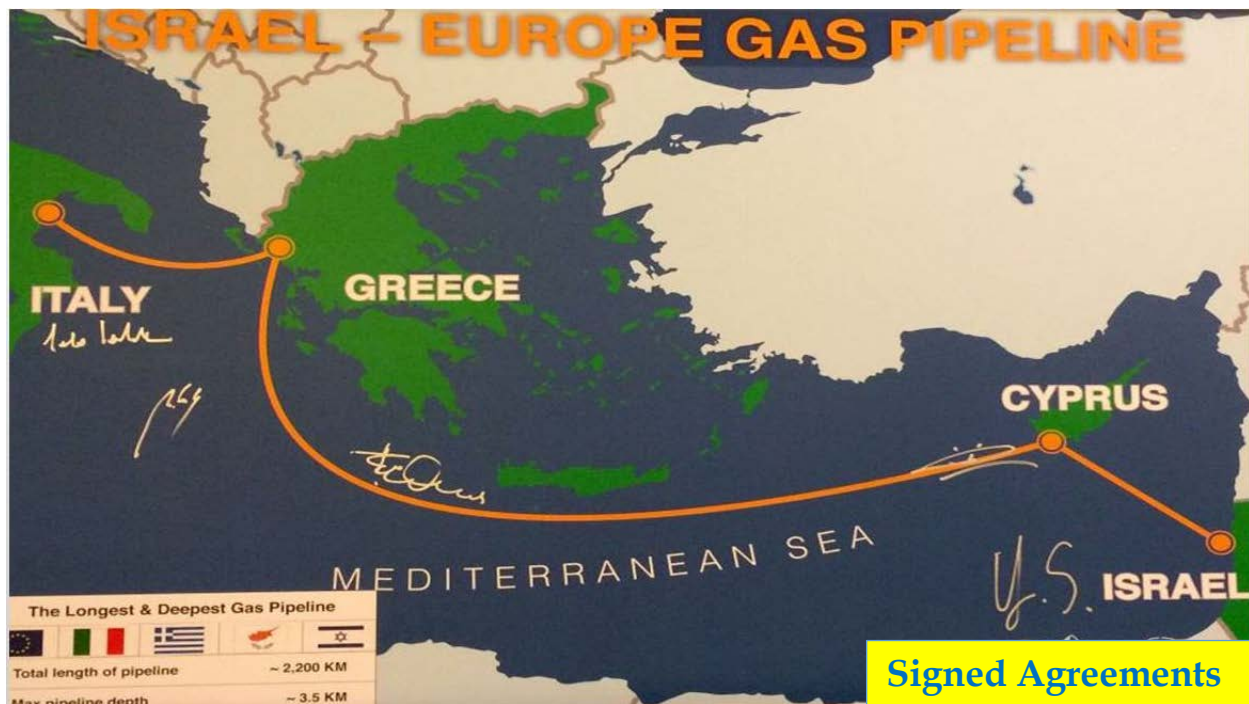
- Egypt-Cyprus Agreement:** The agreement was signed on September 19, 2018 to supply Egypt with gas from the Aphrodite field which was discovered by Noble Energy. Cypriot Energy Minister Georgios Lakkotrypis told Bloomberg's reporters that Cyprus is about to sell natural gas that will be directed to Egypt's Idku and Damietta LNG export plants, located 400 miles (645 km) south of Cyprus. Noble Energy and Royal Dutch Shell Plc own 35% of the Aphrodite field while the remaining shares are owned by Delek Drilling (Figure 2).



RFCS DOCUMENT

- A preliminary agreement for the construction of a pipeline extending from Cyprus to Egypt was signed on Feb. 22, 2018.
- A trilateral Memorandum of Understanding (MoU) was signed between Cyprus, Greece and Israel to build a pipeline that will carry natural gas from the Eastern Mediterranean to Europe; also, an MoU was signed with the European Union to exploit Egypt's gas to diversify energy supply sources and lessen dependence on Russia. (Figure 3)





www.hadfnnews.ps

- Bilateral cooperation frameworks and measures are ongoing between Egypt and Jordan under a Memorandum of Cooperation signed between Egypt, Jordan and Iraq to transport gas and crude oil from Iraq to Egypt via Jordan. (Figure 4)



TEKMOR Monitor: Oil pipeline agreement. tekormonitor.blogspot.com



## 5. Geopolitical Risks

The discovery of the Eastern Mediterranean gas has set the scene for rivalry to dominate export routes toward Europe and have put Cyprus at the very center of geopolitical debates. Whilst Ankara sought to assert its right to Northern Cyprus' gas and its readiness for a new conflict, Egypt responded firmly by defending Cyprus' rights, amidst exacerbating tensions between Tel Aviv and Turkey. Continuous gas discoveries have led to the emergence of the two Egyptian and Turkish polarization poles around which the Eastern Mediterranean countries rally while preserving the Russian role to maintain the balance between the two.

Cyprus' maritime borders now seem a battleground for Turkey - as a rising regional power- Tel Aviv and Cairo. Turkey has intensified its military activity in the region since the discovery of gas off Cyprus' coast. Additionally, the Maritime Boundary Delimitation Agreement signed between Egypt and Cyprus in 2013 created unprecedented tensions between Cairo and Ankara. Tensions soured on Feb. 5, 2018, when Turkish Foreign Minister Mouloud Gawish Oglu declared that his country does not recognize the delimitation agreement signed between Egypt and Cyprus, describing it as void of any legal status: "No foreign country, company or even vessel has the right to conduct any illegal scientific research or oil and gas exploration in the continental shelf of Turkey and the maritime areas falling under its jurisdiction", he warned.

On Feb. 9, 2018, the Acting Chief of Turkish General Staff Hulusi Akar said during an inspection tour in the Eastern Mediterranean region of the Aegean Sea: "Turkey is fully capable of conducting the "Olive Branch" operation in the Afrin district of northern Syria and simultaneously control the Aegean region".

### 5.1 Turkey - Reactions to Retain Role

Turkey, which always wants to position itself as a bridge between gas producers in the East and gas consumers in the West, felt that its role was threatened by the Egypt-Cyprus agreement. Its response came days after the announcement of the agreement; Turkish warships blocked the Cyprus contracted deep water drilling rig Sapiem (owned by Italian oil Giant Eni) on its way to

the drilling site in Cyprus' EEZ<sup>3</sup> Block 3, based on the consideration that the Turkish Republic of Northern Cyprus awarded exploration rights in Block 3 to the Turkish firm TPAO in 2011, which means that this agreement is invalid and encroaches on the rights of Turkish Cypriots. Subsequently, there were many warnings about a new resource war on the doorstep of Europe.

Turkish President Recep Tayyip Erdogan stated that if Greece, Cyprus and foreign companies continue gas exploration off the coast of Cyprus, they would be transgressing the sovereignty of Turkey. He threatened that his country will not hesitate to respond militarily, if necessary.

The Turkish Minister of Energy Fatih Dönmez compared the Ottoman conquest of Istanbul to the launch of the drill vessel 'Fatih': "The conquest of Istanbul opened a new era in the history of the world, and the launch of the first drill vessel marks the beginning of a new era in Turkey's oil and gas discovery plan," he said. Concerns rose in Greece, Cyprus and their EU-partners, because Turkey's official stance toward oil exploration in Cyprus was associated with the support of military presence in the northern part of the island.

On Feb. 13, 2018 Turkish President Recep Tayyip Erdogan said: "We are warning those who overstep the mark with miscalculations in Cyprus and the Aegean (referring to Greece and Cyprus), taking advantage of our focus on developments at our southern border." "Our rights to defend national security in Afrin are the same in the Aegean Sea and in Cyprus." Turkey asserts some areas of Cyprus offshore maritime zone fall under the jurisdiction of Turkey or Turkish Cypriots.

The deepening relations between Turkey and Russia led to the emergence of a new factor that gave an exceptional impetus to Turkey's role in supplying Western Europe with energy, when Russian President Vladimir Putin announced on Nov. 19, 2018 that the Turkstream pipeline will turn Turkey into a storage hub and an interconnector that will carry Russian gas to Southern and Central Europe, something that reflected positively on Turkey's geopolitical position.

(Figure 5)

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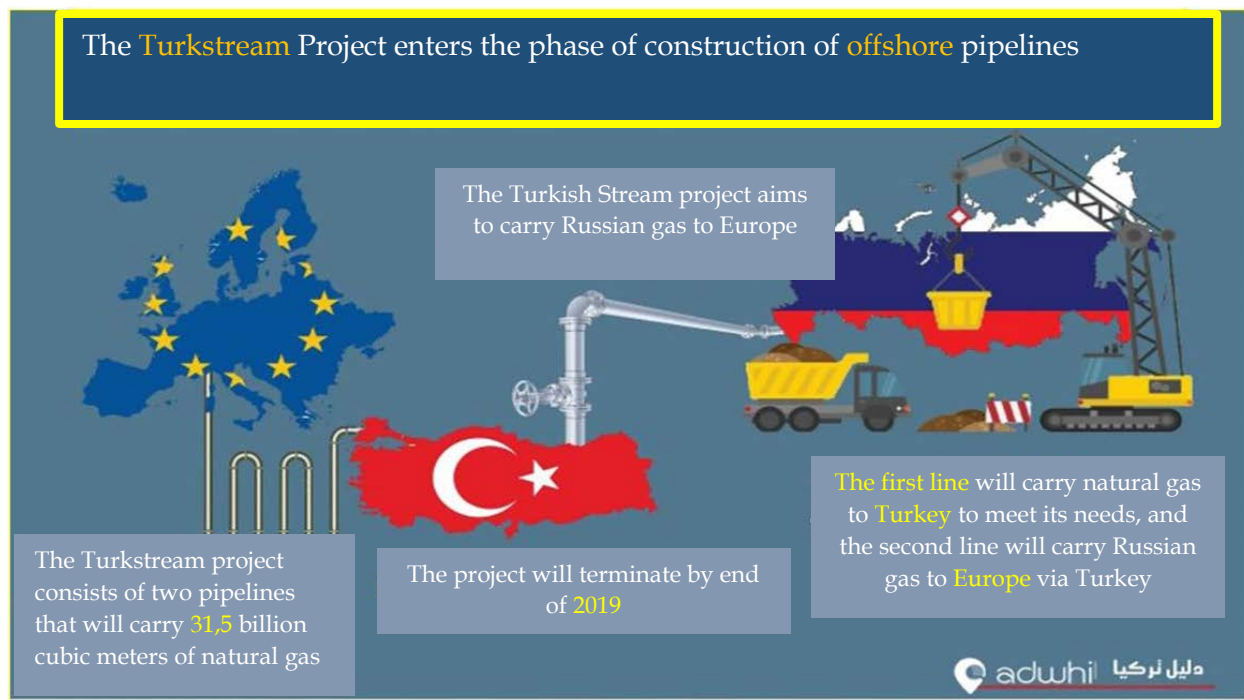
<sup>3</sup> Exclusive Economic Zone.



TurkStream gas pipeline: work starts, euronews.com

This announcement was jointly declared by President Putin and his Turkish counterpart Recep Tayyip Erdogan in Istanbul during the celebration of the completion of the 1800 km offshore line of the Turkstream that will carry the Russian gas via the Black Sea to Turkey and on to Europe. The project will provide natural gas for the Turkish market and the European countries and is expected to have an annual gas delivery capacity of 30 billion cubic meters.

With its two lines, the Turkstream project has an annual gas delivery capacity of 31.5 billion cubic meters, each with a capacity of 15.75 billion cubic meters and aims at transiting Russian gas through Turkey to Europe via the Black Sea. While the first line will provide natural gas for the Turkish market, the second line will deliver the commodity to Southern and Southeastern Europe, replacing the South Stream pipeline which was planned to run through Bulgaria but was opposed by the latter in 2014. (Figure 6)



www.adwhit.com

## 5.2 Egypt - Diplomatic and Geopolitical Potential

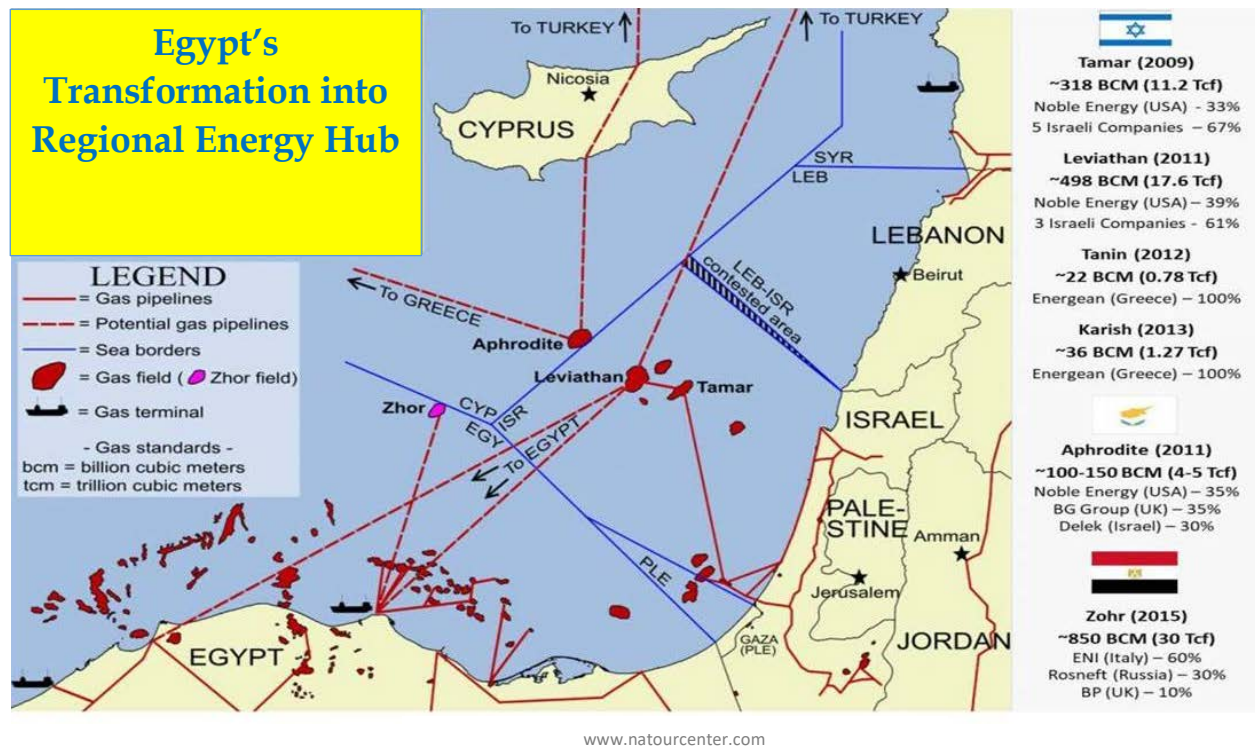
On the other side of the Middle East, Cairo has put its weight behind Nicosia. Foreign Minister Sameh Shukri not only defended the gas exploration projects in Cyprus but also emphasized that the EEZ<sup>4</sup> maritime agreement is still in force, and that any Turkish move would constitute an attack on Egypt and also an encroachment on its sovereign rights.

Simultaneously, Cairo and Nicosia signed an agreement to identify economic zones and gas exploration in the Mediterranean Sea. According to Egypt's Foreign Ministry spokesperson Ahmed Abu Zeid "No party can dispute the legality of the maritime demarcation agreement signed between Egypt and Cyprus as it is consistent with the International Law and it was deposited with the United Nations as an international treaty". On Feb. 7, 2019 Egypt warned Turkey against any attempt to violate its economic rights in the Eastern Mediterranean under its agreement with Cyprus. In addition to the maritime demarcation agreement signed between Nicosia and Cairo, negotiations are under way to demarcate the maritime border between Egypt and Greece.

<sup>4</sup> Exclusive Economic Zone.



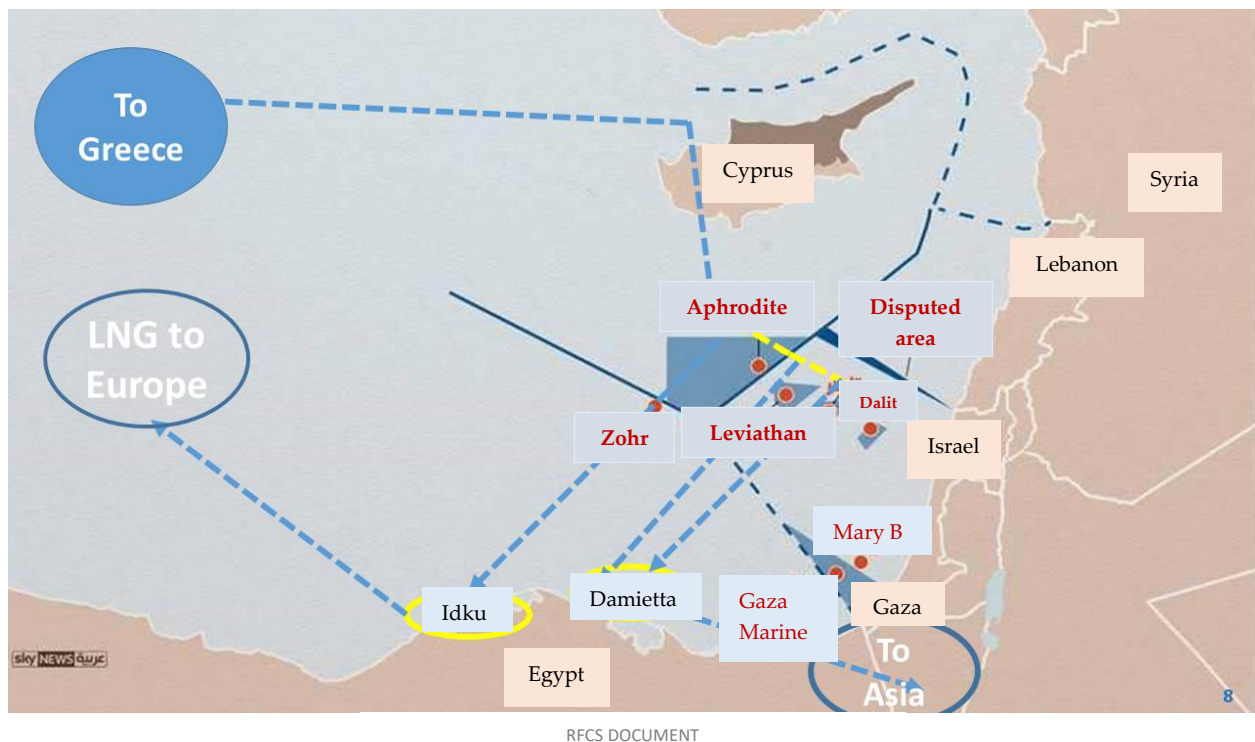
Egypt's strategic decision to transform into a regional energy hub was based on important factors such as its location on both sides of the Suez Canal, and its potential to transport, store and trade crude oil, petroleum products and gas. Egypt possesses currently huge refining capacities that are being modernized and increased, in addition to the pipelines' networks for gas transportation and production across the country. Also, Egypt possesses Liquefied Natural Gas (LNG) plants on the shores of the Mediterranean Sea in Damietta and Idku, which increases its role in trading and exchanging gas. Until the gas pipeline between Egypt, Cyprus and Greece will be completed, the country remains the only hub for the delivery of the gas of the Eastern Mediterranean countries, including Israel and Cyprus, on to Europe or to anywhere in the world via the Egyptian liquefaction plants. (Figure 7)



Israeli-based Delek Drilling announced that it has signed a ten-year \$15 billion contract with Egypt's Dolphin Energy to export gas from the natural gas fields of Tamar and Leviathan to Egypt. Commenting on the deal, Delek Drilling's Chief Executive Yossi Abu said: "The deal will turn Egypt into a real gas hub, and it is the first among other potential deals in the future." The Dolphin Energy's plan to export gas from Israel to Europe reinforced the importance of Egypt's

LNG<sup>5</sup> plants located on the Egyptian coasts in the Mediterranean Sea. On Feb. 11, 2019, the Israeli Energy Minister Yuval Steinitz announced that Israel will start exporting gas to Egypt in a few months, as a main step of its plans to sell its growing gas abroad, and that shipments will double after the huge Leviathan field in the Eastern Mediterranean becomes fully operational in next November.

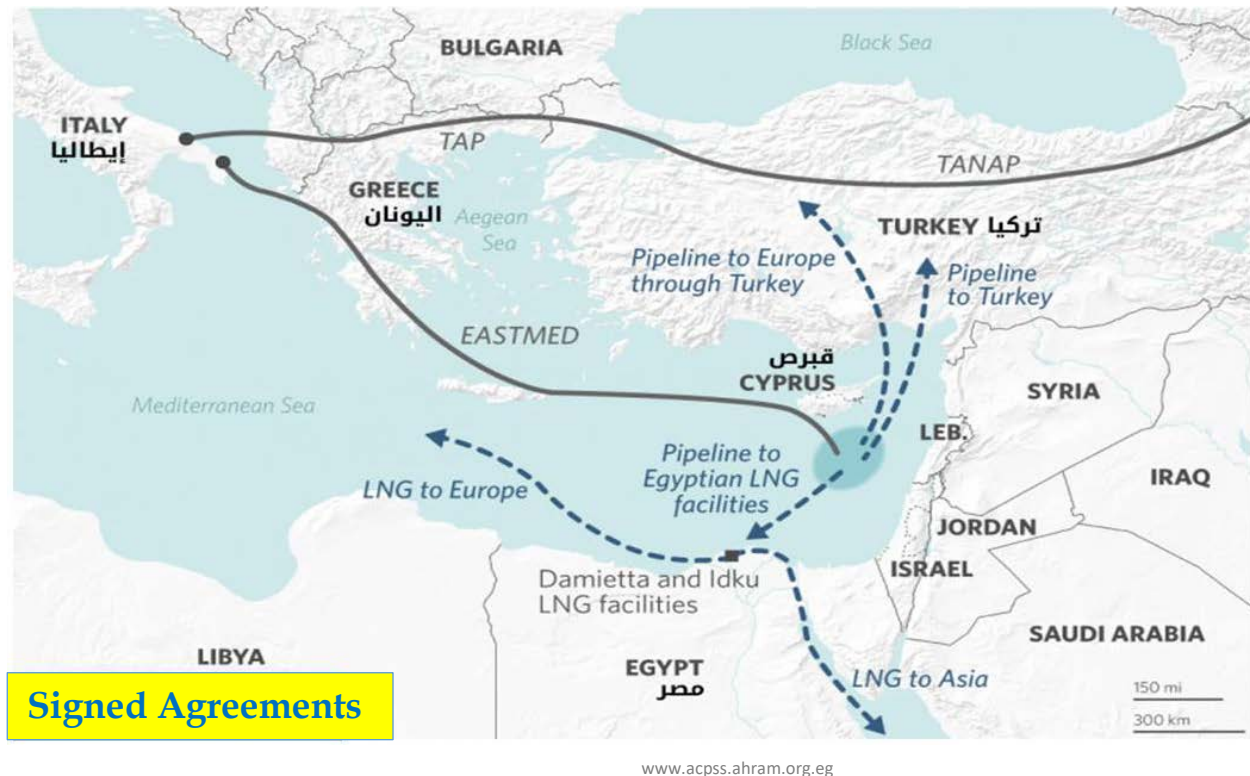
The launch of the joint Israeli-Cypriot production came on top of the afore-mentioned steps. With the expansion of Egypt's LNG export plans, the only way to make Cypriot gas commercially attractive was to export it in partnership with Egypt. As such, it was natural to create a new tripartite alliance which has exacerbated the tension in Israel-Turkey relations and is likely to drive Israel's retraction from gas exports to Europe via a Turkish pipeline. This will spark the interest of European countries and energy companies that are looking for supply alternatives from outside Russia. (Figure 8)



<sup>5</sup> LNG Liquified natural gas.



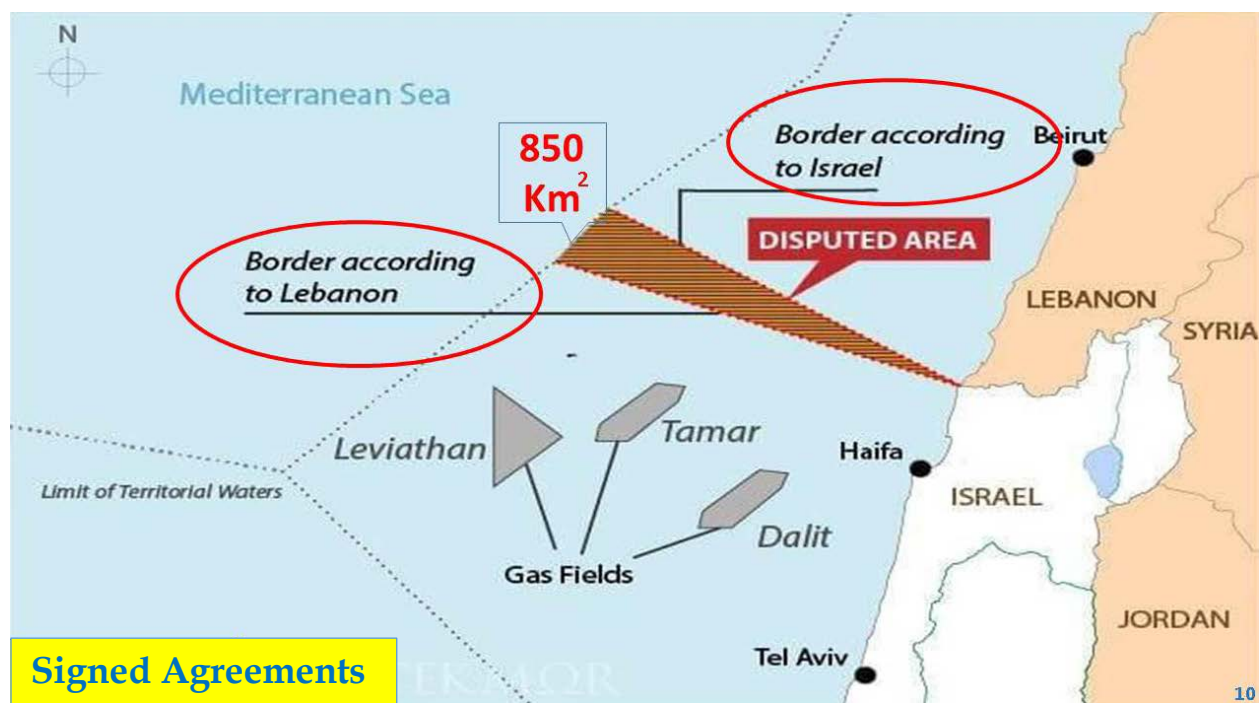
In February 2018, the American-based Bloomberg network praised the future of the Egyptian energy sector by stating that Egypt is turning into a regional energy hub with Idku and Damietta as cornerstones of the transformation strategy. According to Bloomberg, the U.S Geological Survey (USGS) estimates that the Levant Basin located between Egypt, Cyprus and Lebanon in the Mediterranean Sea sits on more than 340 trillion cubic feet of gas, which exceed the United States' reserves. (Figure 9)



### 5.3 Lebanon and Israel: War-prone Conflict

The dispute between Lebanon and Israel involves an offshore area between the two countries designated as Block 9. Lebanon did not recognize the bilateral agreement signed between Israel and Cyprus because it disagreed with the tripoint that is equidistant from Cyprus, Israel, and Lebanon, which transgressed nearly 850 square kilometers of Lebanon's Exclusive Economic Zone. Similarly, Turkey did not recognize the Delimitation Agreement signed between Cyprus and Israel in 2010, arguing that Cyprus cannot start any exploration works as long as the dispute between Greek Cypriots and Turkish Cypriots remains unsolved.

On Feb. 9, 2018 a new and troubling dimension was added to the longstanding dispute over part of the offshore gas field located in the maritime border between Lebanon and Israel, when Lebanon announced the signing of two agreements with Total (France), ENI (Italy) and Novatek (Russia) for offshore oil and gas exploration and production in the area falling within Block 4 and Block 9 part of which lies in waters disputed with Tel Aviv. (Figure 10)



Waters Disputed by Israel; [www.honestreporting.com](http://www.honestreporting.com)

Commenting on the Lebanese announcement, Israeli Energy Minister Yuval Steinitz stated that reaching a diplomatic resolution to the conflict is better than threats. "We have made two things very clear over the past year (...) do not provoke us or conduct explorations within or even near the disputed demarcation line", he said, hinting that drilling might be hampered.

The gas dispute between Lebanon and Israel is perhaps the most poised to military confrontation. Israel's Defense Minister Avigdor Lieberman said in a statement that "Block 9 is for Israel," a statement which Lebanon considered a threat. Lebanon's Supreme Defense Council gave a mandate to the military forces to confront Israeli aggression on the country's sea and land borders. Additionally, any border tension between Lebanon and Israel could serve as a spark for a regional conflict because of the Hezbollah-Iran relationship and the U.S. pressure and sanctions on Iran. It is worth mentioning that the disputed area between Lebanon and Israel

is part of an area of 83 thousand square kilometers in the Eastern basin of the Mediterranean Sea located near the Lebanese-Israeli maritime border and contains a huge amount of gas and oil.

## 5.4 Russian Influence: Attempt to Gain Major Footholds in the Eastern Mediterranean

Russia has achieved great milestones in its aim to become an international powerhouse that wields influence in the Middle East, especially after it has played a major role in the Syrian conflict and has revived old relationships and forged new ones with many Arab countries, such as Egypt, Saudi Arabia and Turkey. This will extend Russia's sphere of influence; most importantly it will increase its hold on the Eastern Mediterranean oil and gas file in both its security and economic dimensions. Moscow is aware that the Middle East's energy deals are one of the most important tools that will enable it to gain major footholds, regionally and internationally. Against this backdrop, Russia will be strongly positioned and it will possess a strong pressure lever to use in its relations with the European Union's countries. (Figure 11)



Middle East perspectives by Rick Francona; [www.francona.blogspot.com](http://www.francona.blogspot.com)

Amid the likelihood that the Mediterranean basin's natural gas reserves are increasing in such a manner as to alter the regional and global energy supply map, the Russian government's

strategy focused on increasing the volume of its investments in Egyptian gas fields. In January 2018, Rosneft announced the completion of its acquisition of 30% of Egypt's Shorouk field, the largest in the Mediterranean. Russia's strong desire to expand the sphere of Moscow's influence and control over the Eastern Mediterranean gas fields is perhaps one of the main reasons for its staunch commitment in Syria - an important partner in the gas reserves discovered in the Mediterranean Sea.

## 6. Offshore Security Threats

### 6.1 Motivations and Courses of Action

The afore-mentioned geopolitical challenges and the disputes over interests between the countries of the Eastern basin of the Mediterranean may lead to hostilities that would jeopardize all stages of the gas industry from drilling to extraction and transport. The spread of offshore oil and gas installations in large areas within the Exclusive Economic Zone of each country and hundreds of kilometers away from shorelines increases risks and puts maritime borders protection beyond the control of any individual country. Hostilities vary depending on the motivations and courses of action; they include, inter alia, piracy, terrorist acts, inter-state hostilities, or vandalism.

### 6.2 Cyber-Attacks

Cyber-attacks are becoming a greater challenge for the oil and gas installations. Oil companies are vulnerable to attacks at different points and are exposed to relatively large threats given the global nature of oil and gas production and distribution. Attacks target infrastructure (such as fiber optic cable cuts), disruption of vital systems (system outages), theft or destruction of information, or prevention of information dissemination. These attacks might cause devastating effects, including loss of equipment, loss of competitive advantage and even loss of lives. The Assessment Report issued in 2014 by the Department of Homeland Security's Industrial Control Systems Cyber Emergency Response Team's (ICS-CERT) identified weaknesses in information security across "critical infrastructure (CI) sectors". The report identified three top weakness categories:



- Boundary Protection
- Information Flow Enforcement
- Remote-Access Control

Ensuring the security of drilling processes and their related information requires companies to add a Broad and Effective Security Layer to their existing defenses. This level, which allows companies to proactively detect intrusion and other forms of attacks, should consist of Firewalls, Network-Monitoring Equipment, and Network Use Rules, which can secure systems and enable infrastructure to detect intrusions and associated incidents. Many governments, such as the United States, the European Union, Russia and Saudi Arabia, have developed national cybersecurity policies or frameworks with a particular focus on critical infrastructure. By way of example, an Industrial Control Systems - Computer Emergency Response Team (ICS-CERT) can be established to track and respond to cyber security incidents across the main critical infrastructure sectors, make security assessments and provide recommendations regarding the gas industry.

## 7. Challenges

By overviewing all the risks constituting the security dimensions of the development of the Mediterranean gas, it becomes evident that the industry needs more than decades of research, exploration contracts and transparency laws. Plans need to be put in place to build national capacities and enforce regional cooperation agreements to open the door for the exploration and exploitation of existing resources. Tackling these challenges will require us to raise the following questions:

- How do Eastern Mediterranean countries face the difficulties and technical challenges: leakages, work accidents, fires, cyber-attacks? What are the conditions and constraints of regional cooperation?
- How can gas installations in EEZs be protected amidst these regional conflicts?

- How can the conflicts between Cyprus and Turkey and between Hezbollah and Israel be prevented from turning into hostile acts against oil installations or against operating companies?
- What are the benefits and demerits of Lebanon's connection to the natural gas liquefaction ecosystem in Egypt, and can the investment in gas be separated from the conflict with Israel? What are the possible alternatives?
- Is the Russian presence in the Mediterranean a factor for reassurance or stress?

## 8. Recommendations

**Firstly:** Signature of agreements/treaties between the countries of the Mediterranean Basin aiming to establish regional cooperation and to distribute responsibilities and tasks regarding the following:

- Protection of installations and pipelines.
- Protection of the environment against fires, leakage incidents and natural disasters.
- Exchange of logistic and medical insurance services for workers in exploration and extraction sites.
- Exchange of technical expertise and capacity-building of manpower specialized in the gas and oil field.
- Investment in research and studies related to the petroleum industry through the establishment of specialized research centers that exchange experiences and collaborate with experienced centers abroad.

**Secondly:** To establish a national cybersecurity authority (in each country) in order to develop national and regional protection protocols and avoid depending only on sectoral protection ecosystems restricted to oil installations.



**Thirdly**<sup>6</sup>: To approach the Egyptian and Cypriot authorities in order to discuss the possibility of transporting the Lebanese gas to Egypt's LNG terminal via the Cyprus-Egypt gas pipeline.

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<sup>6</sup> Recommendation for Lebanon.