



RESEARCH ARTICLE

European Alternatives of Russian Gas After the 2022 Russian-Ukrainian War

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ABSTRACT

Russian gas supplies to the European Union represent one of the most important energy relationships in the world. However, this mutual dependence on Russian gas and other energy sources for Europe, on the one hand, and the provision of significant financial resources for Russia to support its budget and all sectors, on the other hand, have been marred by numerous setbacks and tensions in the relationship. Ukraine is at the heart of these tensions, starting with the energy crisis in 2006, the energy crisis in 2009, the Crimean Peninsula crisis in 2014, and culminating in the Russian-Ukrainian war in 2022 and the subsequent European and American sanctions on Russia, which was followed by a cut-off of Russian gas supplies to the European Union. As a result, the European Union has been forced to look for secure and stable alternatives to Russian gas sources. The Middle East, the Eastern Mediterranean, and North Africa are priorities for alternative gas sources for the European Union.

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INTRODUCTION

The Russian-Ukrainian war has shed light on the necessity of diversifying natural gas supplies in the European Union, with Russia threatening to cut off energy supplies via pipelines passing through Ukraine and other routes carrying Russian gas towards the European Union after the European Union and the United States imposed economic sanctions on it. This war brings to mind the 1973 October War for Gulf oil and the ban on oil exports to the United States and Western countries, after which the United States made a strategic decision to gradually reduce reliance on Gulf oil and seek other external and domestic alternatives. Therefore, the search for energy alternatives, especially gas, remains a strategic choice for the European Union to break free from Russian political dominance. The European Commission hopes that the European Union will completely stop importing Russian gas by 2027, and that European Union countries will continue their efforts to permanently reduce their reliance on Russian gas supplies, cooperate with alternative gas suppliers, and reduce overall gas consumption. The European Commissioner for Energy, Kadri Simson, has called several European Union governments on multiple occasions to take a stricter stance in this regard, stating that they "must reduce their reliance on Russian LNG exports until they completely abandon them."

(Kapustynska, 2023) In this context, the Eastern Mediterranean region, the Middle East, as well as North Africa and other African sources, emerge as alternative sources to Russian gas.

Research Importance

The importance of this research stems from the core issue of gas sources required for the sustainability of the European Union, which has been negatively impacted on all levels since the outbreak of the Russian-Ukrainian war in February 2022.

Research Objective

The research aims to:

1. Find alternative gas sources for the European Union other than Russian gas.
2. Ensure that the regions of alternative gas sources are politically and economically stable.
3. Ensure that gas supplies are safe, stable, and at suitable prices.
4. Establish long-term contracts with countries in these regions and work on joint projects in the development of gas fields and other sectors.
5. Achieve mutual reliance to the extent possible in the energy relationship to move away from using gas and energy as a political pressure card, as in the case of Russian-European relations.

Research Hypothesis

The central hypothesis of this research revolves around the European Union's capacity to identify alternatives to Russian gas in the event of the protracted Russian-Ukrainian war, potential disruptions to Russian gas supplies to EU member states, and Russia's exploitation of gas as a political and economic pressure tool against the EU.

Research Problem

The research problem is represented by a primary question, which is (What are the possible alternative gas sources for the European Union to abandon Russian energy?) and falls within the following sub-questions:

1. Does the Middle East represent alternative gas sources to Russian gas for the European Union?
2. Does the Eastern Mediterranean region have the capability to export natural gas to Europe?
3. What is the possibility for African countries to be an alternative source to Russian gas for the European Union?

Research Structure

The research structure, entitled "European Abandonment Alternatives to Russian Gas After the Russian-Ukrainian War 2022," consists of three sections. The first section discusses the Middle East as an alternative gas source for the European Union, whereas the second section addresses the Eastern Mediterranean region as an alternative source to Russian gas. The third section focuses on African countries and their role as an alternative source to Russian energy as a gas supplier to the European Union.

The First Section

The Middle East as Alternative Sources to Russian Gas

Following the outbreak of the Russian-Ukrainian war in February 2022, the European Union pledged to gradually phase out all imports of Russian fossil fuels, including natural gas, before 2030. By the end of 2022, the gas flowing through pipelines from Russia represented approximately 8% of the European Union's gas imports, marking a decrease from 40% in early 2022. Furthermore, during the first half of 2023, EU imports of Russian coal, oil, and gas continued to decline from 2022 levels. (Archick, 2023; Kanval et al., 2024) Russia lost its position as the main gas supplier to the European

Union, with its gas exports through pipelines to the EU decreasing from around 146 billion cubic meters in 2021 to about 61 billion cubic meters in 2022.

Russian gas continues to flow to the EU through pipelines passing through Ukraine based on transit agreements in effect until the end of 2024, and through Turkey via the TurkStream pipeline, albeit in lesser quantities than before. Russian gas exports through operational pipelines to the European Union in the first half of the current year, 2023, amounted to only 10 billion cubic meters, compared to 62 and 42 billion cubic meters, respectively, for the same period in 2021 and 2022. It is highly unlikely that Moscow and Kiev will extend the agreement on Russian gas transit through Ukraine beyond 2024, as Russia has repeatedly threatened to cut off supplies even before its expiration. This implies that the volumes of Russian gas reaching the European Union through pipelines are likely to decrease further.

Despite the decrease in pipeline gas exports to the EU, exports of Russian liquefied natural gas (LNG) to the European Union increased from 16 billion cubic meters in 2021 to 22 billion cubic meters in 2022 and continued to grow in the first half of 2023. These numbers indicate that some EU countries still seem unprepared to completely forego Russian LNG, despite increasing calls from the European Commission to reduce imports from Russia and refrain from signing new contracts to purchase Russian LNG. However, it is unlikely that these exports will significantly increase, and they may even decrease as the momentum of EU and US sanctions against Russia continues. (Kardas, 2023)

First: Turkey

In 2020, Turkey announced the discovery of the Sakarya gas field in the western Black Sea. Turkish President Recep Tayyip Erdogan stated on June 13, 2022, that Turkey would begin extracting ten million cubic meters of natural gas from its first well in this field in the fourth quarter of 2022. Turkey's lack of energy independence affects both its economy and politics. For example, in 2021, Turkey imported 60.1 billion cubic meters of natural gas, including 46.1 billion cubic meters via pipelines from Russia, Iran, and Azerbaijan, and 14.1 billion cubic meters in the form of LNG. (Khurais, 2023)

Russian-Turkish relations in the natural gas sector, which constituted 45% of Turkey's total imported natural gas in 2021, have been an important axis. Consequently, this relationship led to Turkey abstaining from joining sanctions against Moscow in light of the Russo-Ukrainian war and refusing to close its airspace to Russian aircraft, as well as facilitating the passage of Russian ships through the Dardanelles and the Bosphorus. Turkey has continuously announced discoveries of natural gas reserves in the Black Sea through ongoing exploration, reaching 710 billion cubic meters by mid-2023. Indeed, in April 2023, Turkey began production and extraction of gas from its fields in the Black Sea, with Turkey's natural gas production expected to meet 30% of its domestic needs. (<https://TRT.com>)

Turkey could become a significant hub for gas supplies to Europe, accessing long-term LNG sources from various markets, including Azerbaijan, Iraq, Iran, Israel, and Cyprus. Turkey has sought to be one of the sources and alternatives for Europe's abandonment of Russian energy by signing several agreements with European countries since early 2023: (Amar, 2023)

The First Agreement

One of Turkey's prominent deals was the signing of a long-term agreement with Bulgaria at the beginning of January 2023 to export LNG aimed at compensating for the absence of Russian gas in Europe. The agreement included Turkish export terminals supplying approximately 1.5 billion cubic meters annually (4 million cubic meters daily) to Bulgaria for up to 13 years. In reality, Bulgaria received its first shipment of LNG from Turkey in April 2023. Some analysts view the agreement as a

circumvention of sanctions imposed on Moscow. Despite Ankara's gas discoveries, Turkish terminals still rely on Russian gas imports.

The Second Agreement

Turkey signed an agreement with Hungary in August 2023 as part of their economic relations and Turkish gas exports to Europe. The agreement entails supplying Hungary with approximately 275 million cubic meters of natural gas annually, equivalent to 0.75 million cubic meters per day. According to the agreement, Turkey will begin exporting natural gas to Hungary during the next year (2024). The agreement also grants Hungary's MVM company the right to use Turkish gas facilities to import LNG from Qatar. Turkey's deals related to gas exports to Hungary are the first of their kind with a country that does not share a border with Turkey. Ankara is set to export gas through pipelines connecting with European countries. (Ammar, 2023; Rashid et al., 2023)

The Third Agreement

Turkey signed its third gas export deal this year with Romania in September 2023. The agreement includes Turkish export terminals supplying Romania with around 4 million cubic meters per day, equivalent to 1.5 billion cubic meters annually, through pipelines linking the two countries. The agreement's implementation started on October 1, 2023, and will continue until the end of March 2025. The agreement was signed by the Turkish Pipeline Corporation (BOTAS) and the Romanian OMV Petrom company.

The Fourth Agreement:

Turkey signed its fourth gas export agreement this year on September 28, 2023, with the Republic of Moldova, situated between Ukraine and Romania in Eastern Europe. The agreement was signed between the Turkish Petroleum Pipeline Corporation (BOTAS) and the Moldovan East Gas Energy Trading company. The deal includes supplying East Gas Energy Trading with approximately 750 million cubic meters annually (two million cubic meters per day). Starting from October 1, 2023, the Turkish company began implementing the deal. Figure (1) illustrates Turkish gas export agreements to Europe in 2023. (Alhan, 2023, Jam et al., 2014)

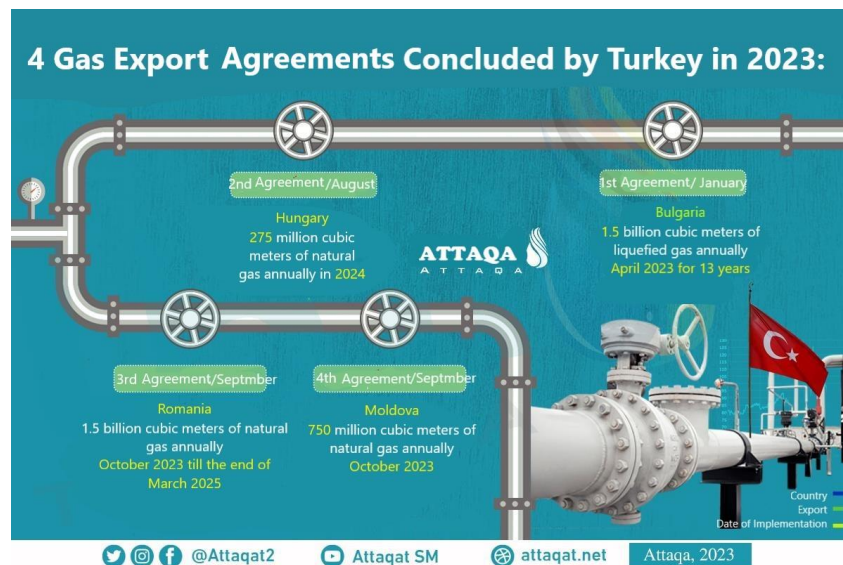


Figure 1: Turkish agreements to export natural gas to Europe in 2023.

Source: Ammar, A. (2023, June 10). Turkey's gas export deals witnessed strong momentum in 2023. Energy Research Unit, Energy Platform. Retrieved from <https://attaqa.net>

In November 2023, the Turkish state energy company, BOTAS, signed an agreement with the Algerian state oil and gas company, Sonatrach, to extend their current gas supply contract for 3 years, which includes Turkey continuing to purchase 4.4 billion cubic meters of liquefied natural gas from Algeria annually. The Turkish Ministry of Energy stated that the current contract was scheduled to expire in October of the following year, 2024, but was extended until 2027. (<https://Al-Jazeera.net/ebusiness>.)

Second: (Israel)

Israel's natural gas production in 2021 reached about 19.5 billion cubic meters of gas, of which between 8-10 billion cubic meters were exported, and the rest of the produced natural gas was consumed domestically. In 2022, Israel produced 21.9 billion cubic meters of gas, with the Leviathan field producing 11.4 billion cubic meters and the Tamar field producing 10.2 billion cubic meters. Israel exported 5.8 billion cubic meters to Egypt. It is important to note that a significant portion of the exported gas goes to Egypt via a pipeline between the two parties, where Egypt liquefies this gas and exports it on its behalf, not Israel's, to Europe via the sea. Israel faces several obstacles in its efforts to increase its gas exports to Europe: (Sweidan, 2022)

1. Completing the demarcation of maritime borders with Lebanon to extract gas from fields in the sea between occupied Palestine and Lebanon.
2. Problems with Turkey prevent agreements on gas transportation projects from the Eastern Mediterranean to Turkey and ending in Europe.
3. The economic infeasibility of the Israeli gas transportation project to Greece, as the EastMed pipeline project costs approximately \$6.1 billion.
4. The Israeli infrastructure was built for local benefit, so gas conversion for export is not easy and requires investments.

Exporting Israeli gas to Europe has been an ambition that Israel has worked on even before the Russian-Ukrainian war in February 2022. The establishment of the East Mediterranean Forum in 2019, consisting of Israel, Cyprus, Greece, Italy, Egypt, the Palestinian Authority, and Jordan for this purpose, is part of this effort. Turkey is currently seeking to join it, in addition to France's recent accession. It is a formation aimed at investing in gas and exporting it to the European Union. Israel has been working on a gas export strategy to Europe for years, but the European Union did not give this source sufficient attention back then due to the cost of building a gas pipeline, which is around \$7 billion. However, opportunities increased when Israel signed a gas sales agreement with Egypt, and with the start of the Russian war on Ukraine and the fluctuation in the energy market, as well as the escalating mutual policies between Russia and the European Union and the United States, which complicated matters and prompted a serious search for alternative sources to Russian gas, providing a significant opportunity for Israel to be part of these alternatives.

The stages of Israel's gas export strategy to Europe began actively in 2019 when the Israeli Natural Gas Lines Company announced its project to build a natural gas pipeline to Europe under a memorandum of understanding signed with the IGI POSEIDON company, a joint project between the Greek Natural Gas Company (DIPA) and the Italian energy company (EDISON). The Israeli company stated that it would form a joint team with IGI POSEIDON to discuss technical matters and other issues related to the pipeline construction, which can transport about 10 billion cubic meters of gas annually from the Eastern Mediterranean region to Cyprus, Greece, Italy, and other European markets. (Merji, 2022)

As part of Israel's efforts to develop its natural gas projects and increase its exports to the European Union, Israeli Energy Minister Karen Alharar expressed that "Israel has mobilized to help Europe with diverse sources of its energy, and the global energy crisis presents an opportunity for Israel to export natural gas, alongside the real and genuine concern for what is happening in Europe." (Sami, 2023) As a result of these efforts, Israel signed an agreement to export its natural gas through Egypt to Europe. In the context of the European Union's efforts to find alternative sources to Russian energy

after the Russian-Ukrainian war in 2022, especially natural gas, and urgently, on June 15, 2022, Israel, Egypt, and the European Union signed an agreement in Cairo to export natural gas to the European Union at the seventh ministerial meeting of the Eastern Mediterranean Gas Forum held in Cairo. The agreement included the following: (Arnaut, 2022; Jam et al., 2013)

- A. The agreement allows for the export of gas from Israel to the European Union through Egypt for a period of up to 3 years, renewable automatically for two years.
- B. Natural gas is transported from Israel to liquefaction plants in Egypt, then shipped north to the European market with the aim of supplying Europe with Israeli gas through the Egyptian liquefaction plants in Idku and Damietta.
- C. A significant part of the agreement involves encouraging European Union companies to participate in new tenders for gas exploration in the Mediterranean Sea. Additionally, cooperation between Israel and Europe in the field of green hydrogen (renewable energy) is encouraged.
- D. The agreement includes directives for the signatory parties to ensure regular gas supply to European Union companies from Egypt and Israel, among other parties, using the current infrastructure for natural gas liquefaction in Egypt. This is to be done by taking all of the above into account while maintaining energy security and the ability to supply the domestic market in the signatory countries. The memorandum will not prevent the Israeli entity and Egypt from exporting natural gas to other countries.
- E. In this regard, the agreement helps attract more investments in gas transportation and liquefaction sectors and revitalize ports, potentially maximizing Egypt's role as a major regional energy hub. The cooperation agreement contributes to revitalizing the Egyptian economy, as Egypt received a grant of €100 million upon signing the tripartite agreement by the European Union.

For Israel, this memorandum represents a commitment to share natural gas with the European Union in finding alternative sources to Russian gas and diversifying energy sources. The President of the European Commission, Ursula von der Leyen, described the agreement as "historic" and the beginning of a successful energy story in the region, after the Russian-Ukrainian war caused a significant rise in energy and food prices, necessitating cooperation to address the global energy and food crisis.

Egypt aims to become a regional energy hub by exporting its surplus natural gas production, alongside exporting the surplus gas of neighboring countries, through its liquefaction plants located on the shores of the Mediterranean Sea in Idku and Damietta. Tim McPhie, the European Commission spokesperson for energy affairs, stated that the agreement signed in Cairo is very important for the European Union countries and can compensate for about 10% of the gas volumes that Russia used to export to the European Union. (Merji, 2022) Egypt's imports of Israeli gas decreased at the beginning of the cessation of gas production from the Tamar gas field following the outbreak of the Gaza War on October 7th, resulting in approximately 350 million cubic feet of gas per day, down from over 850 million cubic feet before production halted. On the sidelines of the 12th Arab Energy Conference on December 11, 2023, held in Doha, energy ministers discussed activating the Arab Gas Pipeline, which runs from northern Sinai to Aqaba in Jordan, then to Syria and Lebanon. This discussion coincided with a decline in gas flow from the Zionist entity to Egypt following the outbreak of the Battle of the Al-Aqsa Flood in Gaza on October 7, 2023. (Jamal, 2022)

Third: Qatar

Qatar possesses the third-largest reserves of natural gas and is the world's second-largest producer of liquefied natural gas (LNG). Qatar plans to increase its natural gas production by 64% by 2027 to reach 126 million tons annually of LNG. (Al-Zaiadi et al, 2022). As part of its efforts to become an alternative source for the European Union to replace Russian gas, Qatar worked on expanding the

giant North Field gas field in reality. The groundbreaking ceremony for the expansion project took place in October 2023. Companies participating in the development and expansion of Qatari fields include Royal Dutch Shell, ENI, ExxonMobil, and Total, aiming for Qatar to become an alternative source for Russian gas. Qatar signed its first European supply deal for the expansion project in November 2022 to deliver approximately two million tons annually to Germany for at least 15 years. (Al-Hitti, 2023) Additionally, in October of the current year, Qatar signed the largest and longest gas supply agreement within the European Union with France for up to 3.5 million metric tons of LNG annually for 27 years. (<https://aljazeera.net/ebusiness>.)

According to the Global Center for Development Studies, Iraq would be the ideal option for the European Union to obtain Qatari gas, given Saudi and Qatari investments in this field. Both Total Energies and Qatar Energy secured a deal worth \$27 billion with Basra Oil Company. Additionally, Iraq agreed with Saudi Arabia to invest in the Akkas gas field in the western Anbar province of Iraq. Therefore, Iraq is expected to play a significant role as a transit route for transporting Qatari gas to the European Union via Turkey. The cost of the Qatari-Turkish gas pipeline is approximately \$20 billion, and it is planned to pass through Saudi and Kuwaiti territories, then through Iraq and into Turkey, finally reaching the European Union. (Ramadan, 2023)

Fourth: Iran

Iran holds the world's second-largest natural gas reserves after Russia. However, this sector has been subject to strict US sanctions, re imposed in 2018 following Washington's withdrawal from the nuclear agreement Tehran signed with major powers in 2015. (<https://alaraby.co.uk/economy>). Due to Iran's limited ability to export as a result of sanctions, the majority of the gas produced in Iran is consumed domestically. European energy markets represent a golden opportunity for Iran to export its natural gas. Despite its strategic partnership with Russia, the largest gas supplier to the European Union, it competes in the energy market. This makes some consider Iran as one of the potential alternatives to Russian gas. However, this proposal faces numerous geopolitical and economic obstacles. (Ra'ouf, 2022) In recent years, natural gas has not been a priority in Iran's energy strategy. Its export volume has not exceeded 7% of total production, compared to a domestic consumption of 244 billion cubic meters. This is part of a strategy to substitute gas for oil in order to maximize oil exports. As a result, Iran has not invested in building the necessary infrastructure for gas transmission and liquefaction networks. However, the discovery of the South Pars Gas Field in the Caspian Sea, with estimated reserves of 120 trillion cubic feet, has led to a 20-year cooperation agreement between Iran, Russia, and China. Under the agreement, Gazprom and Rosneft will hold 40% of the project, CNPC and CNOOC will hold 28%, and KEPCO will hold 25%. Chinese companies will finance the project and provide the necessary infrastructure, while Russian companies will transport the produced gas. This makes Russia a key partner in this field. The discovery of the South Pars Gas Field has raised expectations of Iran becoming a major supplier to Europe, as it could enable Tehran to meet 20% of European gas needs. Additionally, Iran is keen on reviving the "Friendship Pipeline" project, which aims to export Iranian gas to Europe via Iraq, Syria, and Lebanon. However, significant geopolitical challenges hinder this path, including Russia's deep ties with Syria. Russia has long been wary of Iran's geostrategic competition in gas exports and is keen to keep its gas exports out of Europe. Furthermore, the security and political situations in the three countries (Iraq, Syria, and Lebanon) obstruct the implementation of any regional integration projects. Even if Russia allows such a project in the future, it would be a key partner, enabling it to control its economic returns. (Ra'ouf, 2022)

Although Iran is connected via a pipeline to transport gas to Turkey, it has not yet become a major supplier. Iran represents about 10% of gas consumption in Turkey. Due to sanctions imposed by the United States on Iran, the growth of the natural gas sector has slowed down, preventing Iran from acquiring the necessary technology for gas liquefaction. If nuclear negotiations succeed, Iran will

become a strategically important focus for exporting gas to the European Union, attracting investment and developing the natural gas production sector. Iran will benefit from the support of international donors to complete the construction of gas plants. This will be a significant opportunity to export gas to the European Union as an alternative source to Russian energy through massive investments and long-term purchase agreements. Therefore, the export of gas from Iran to Europe is linked to ongoing negotiations. (Merji, 2022)

Topic 2: Eastern Mediterranean Region: Eastern Mediterranean Region and Its Role in Gas Export to the European Union:

The Eastern Mediterranean region has significant reserves of natural gas, some of which remain untapped. The primary gas-producing countries in the region are Egypt and Israel, but their production is mainly used for domestic purposes. Despite important discoveries of natural gas in the Eastern Mediterranean, the delineation of maritime borders between Israel and Lebanon is crucial in this matter due to shared and adjacent offshore gas fields. It is expected that after the agreement between Lebanon and Israel regarding maritime border delineation, if implemented on the ground, it will have positive implications for the production and export of natural gas to the European Union.

As for Turkey, it remains excluded from the East Med Gas Forum (EMGF) due to geopolitical disputes with Greece and Cyprus (the Greek part). Consequently, Turkey exerts pressure through military interventions, gunfire, and naval clashes in exploration activities. Negotiations between Turkey and Israel regarding the construction of an underwater pipeline connecting the Leviathan gas field to Turkey have resumed after the deterioration of relations between the two countries. Negotiations and mutual visits between Turkey and the Zionist entity (Israel) have begun regarding a potential Israeli-Turkish gas pipeline project. The pipeline, with a length of 550 km, aims to transport gas from Israel to Turkey and then to the European Union, with an estimated cost of around 1.5 billion euros for construction. This pipeline is considered to be more cost-effective and feasible than the EASTMED pipeline project in the Eastern Mediterranean, which is planned to connect Israel to Cyprus, Greece, and Italy, with an estimated cost of 6 billion euros.

The coordination between Israel and Turkey for gas export is hindered by the Cypriot issue and relations with Greece. If a Turkish settlement is reached with Greece and Cyprus, Turkey could become a partner alongside the Mediterranean Gas Forum and potentially serve as a corridor for a pipeline to it and, consequently, to the European Union. (Merji, 2022)

Topic 3: African Countries as an Alternative Source to Russian Energy

First: Egypt

Egypt has long been focusing on natural gas within its energy sector through continuous exploration and drilling of gas fields to invest in domestic consumption and export the surplus, utilizing it as a strong source of national income. Egypt achieved self-sufficiency in gas and became a net exporter of liquefied natural gas (LNG) since 2018 after developing discoveries of Egyptian gas fields in the Mediterranean Sea. Its current daily production ranges between 6.5 to 7 billion cubic feet, reflecting an increase in LNG exports from 0.45 million tons in 2020 to 4.3 million tons in 2021. This included sending 75 LNG shipments abroad in 2021 compared to 24 shipments in 2020, making it one of the closest and cheapest energy suppliers to Europe. Egypt is working in the short term to meet Europe's growing needs as much as possible, as its exports have reached maximum capacity. The two liquefaction plants in Idku and Damietta are operating at full capacity; however, they do not fully meet the ambitions of the European Union at present. Egypt and the European Union are working to become strategic partners in the energy field, especially in electricity, given its role as a regional energy trading hub. Egypt has a surplus of approximately 26 gigawatts of electrical power. The Egyptian government is working on connecting the Egyptian power grid to Europe via Cyprus and Greece, with approximately 3 gigawatts in 2023, doubling later to 6 gigawatts. Moreover, Egypt will

serve as a gateway for clean Gulf and African electrical energy. Egypt and Saudi Arabia signed an agreement in October 2021 for an electrical connection with a capacity of 3 gigawatts over three years. (Al-Zaiady et al, 2022)

Regarding domestic consumption of natural gas in Egypt, it consumes around 158 million cubic meters of gas daily, compared to Qatar's and Algeria's daily consumption of 96 million cubic meters and 118 million cubic meters, respectively. Additionally, Egypt's gas production costs are higher than others. Therefore, a global increase in LNG prices is beneficial to Egypt. Egypt exports 63% of its natural gas to Asia, 31% to Europe, including Turkey, and the remaining 6% to Kuwait. Egypt's geographical proximity to Cyprus and Israel, aspiring to export their surplus production to Europe, has encouraged them to enter into agreements with Egypt. These agreements stipulate that Cyprus and Israel will export their surplus to Egyptian gas liquefaction plants in Idku and Damietta, which Egypt will then liquefy and export to the European Union. These agreements may help transform Egypt into a regional hub for gas exports from the Eastern Mediterranean. In 2022, Egypt imported around 450 million cubic feet of Israeli gas daily with the aim of re-exporting it to Europe, and this quantity is expected to increase. Concerning relations with Cyprus, Egypt has agreed to build an underwater pipeline to bring quantities of gas from the Egyptian Aphrodite field to the Idku export facility. However, Cyprus is still in the drilling phase for Aphrodite. Additionally, the Egyptian renewable energy sector will play a role in Europe's export strategy, with its production expected to reach approximately 90 gigawatts by 2035, representing 42% of total domestic energy production. (Swedan, 2022)

Second: Algeria

Algeria is also highlighted as an option relied upon by the European Union, being the third-largest gas provider in the Union after Russia and Norway. Algeria is Africa's leading gas exporter, supplying approximately 11% of the European Union's needs. To increase Algerian gas supplies to EU countries, in August 2022, after a visit by French President Emmanuel Macron to Algeria, it was agreed to increase Algerian gas supplies to France as an alternative to cutting Russian energy sources to Europe. Algerian gas exports to France during the first half of 2023 saw a historical jump, making it the most important energy source for France. This surge in imports represents approximately half of France's gas imports from abroad, accounting for 49% of France's energy imports in the first half of the current year. Efforts continue to develop Algerian gas exports to France, especially after an agreement between the French company Total and Algeria to supply Algerian LNG to meet the European Union's increasing energy demand in September 2023. Furthermore, Algeria supplied Italy with 13.9 billion cubic meters, surpassing previously agreed-upon quantities by 113% since the beginning of 2022, leading gas imports to Italy in May 2023, and witnessing a growing resurgence in Algerian gas exports to Spain. (Kahal. 2023)

Sonatrach's CEO, Toufik Hakkar, has indicated that there is unused capacity in the TransMed pipeline extending to Italy. Gas supplies from Algeria to the European Union are continuously increasing and evolving, especially considering Algeria's confirmed reserves of 4,500 billion cubic meters. The Algerian state-owned energy company, Sonatrach, plans to invest approximately \$40 billion between 2022 and 2026 in oil and gas production capabilities, as well as urgent investments in energy infrastructure in Algeria. (Chronas, 2022) In April 2022, the Italian Prime Minister visited Algeria to sign an agreement with the Algerian state-owned energy company to purchase natural gas from Algeria, representing 12% of Italy's consumption. Sonatrach announced on July 25, 2022, that it had discovered three oil and gas fields in the Algerian desert, one of which is in partnership with the Italian energy company Eni, which enhances the possibility of increasing Algerian gas exports to Europe in the coming years. In addition, the Italian energy company Eni announced on September 7, 2022, its acquisition of British Petroleum's activities in Algeria, as well as two concessions in Algeria, namely En Amenas and En Salih, both gas production concessions. The Italian company Eni plays a

major role in the European Union's energy security plan, aiming to end dependence on Russian gas and find alternative and secure supplies. It seeks larger supplies from Algeria, Angola, and Congo, doubling production. As part of this, the Algerian company Sonatrach announced the additional injection of 4 billion cubic meters of gas through the TransMed gas pipeline as part of the agreement signed with the Italian company Eni. (Shawmera, 2022)

Third: Senegal

As part of the European Union leaders' efforts to diversify energy sources away from Russian sources, especially natural gas, Germany's movements aimed to diversify energy sources, including towards the African continent. German Chancellor Olaf Scholz visited Senegal in May 2022 and met with its President, Macky Sall, to coordinate the import of LNG from Senegal to the European Union. Senegal agreed to supply Europe with natural gas. The French newspaper *Le Monde* stated that the joint fields between Senegal and Mauritania in the Atlantic Ocean are expected to produce 2.5 million tons of LNG annually starting from the fourth quarter of 2023, then 10 million tons by 2030. (Abd Al-Sattir, 2022)

Fourth: Other African countries as an alternative source for Russian gas and energy

Africa possesses significant advantages that position it uniquely to meet Europe's energy needs. As of 2021, Africa's natural gas reserves reached 625 trillion cubic feet. Current global and European energy crises, particularly the Russian energy crisis, present an opportunity to revive old energy projects in Africa. Nigeria and Niger have revived the Trans-Saharan gas pipeline project, which dates back to the 1970s. Nigeria, which is still awaiting the commissioning of its seventh gas liquefaction facility, has also given the green light to another major project involving laying an underwater gas pipeline along the West African coast to Morocco and Spain. Africa's overall gas production capacity is expected to double by 2030, according to a study by the Norwegian consulting firm Rystad Energy. Siva Prasad, a senior analyst at the company, suggests that Africa's current pipeline infrastructure with North Africa and Europe, as well as historical gas supply relationships, make Africa a strong alternative to European markets in the event of a ban on Russian imports. (Shawmera, 2022)

European and global oil companies are accelerating large oil deals and acquiring discovered oil and gas fields in Africa. In March 2022, German Chancellor Olaf Scholz recommended accelerating Germany's negotiations on oil and gas deals with African countries such as Algeria, Nigeria, Egypt, and Angola to reduce its reliance on Russian resources. In the first quarter of 2023, Senegal and Mauritania signed an agreement with American company Cosmos Energy and British Petroleum BP to extract resources from the Tortue/Ahmeyim field. The first phase will involve producing 2.5 million tons of LNG annually. Additionally, British company Royal Dutch Shell is focusing on developing the LNG project in Tanzania, costing \$30 billion, which includes building an LNG export facility on the Indian Ocean coast.

In terms of the European Union's energy and gas policy, some of the largest European gas markets have made radical changes to their gas policies. Germany, the largest economy in the European Union, which used to import most of its Russian gas before the outbreak of the Russian-Ukrainian war in 2022, completely stopped importing Russian gas via pipelines. Furthermore, the German government has embarked on building several LNG terminals and enhancing cooperation in the gas sector with Norway, which became Germany's main gas supplier in 2022. Additionally, the German company Securing Energy For Europe (SEFE) signed a 20-year contract with American company Global Venture in June 2023 to supply LNG from the United States to Germany, amounting to 2.25 million tons annually. Russia also lost its dominant position in the Italian market, its second-largest market after Germany. Italy, among all EU member states, has signed the highest number of agreements with gas-exporting countries since the Russian invasion of Ukraine as an alternative source to Russian gas. Furthermore, the Russian company Gazprom permanently lost its Polish

market share, as Poland intended to abandon Russian gas in 2019, years before the Russian-Ukrainian war in 2022. With the current war, the Polish government further strengthens its position by halting Russian gas exports, making it unlikely for the Polish government to review its approach in the near future. (Shawmera, 2022)

CONCLUSION

Based on statistics and data provided in this research and the topics addressed, it indicates that the European Union, regarding the issue of imported gas, has dealt with it realistically and has given it significant importance in the current Russian-Ukrainian war that broke out in February 2022. The EU prioritized this matter much more than previous crises, seeking to rid itself of Russian dominance in the energy sector, especially natural gas. Therefore, it sought contracts with other gas-producing and exporting countries in multiple directions, including the Middle East, the Eastern Mediterranean region, and Africa, to secure stable and consistent natural gas supplies through long-term contracts with countries such as Turkey, Egypt, Qatar, (Israel), Algeria, Senegal, and others. The European Union works to support stability in these regions to avoid falling into the same predicament it faced after the current Russian-Ukrainian war, with subsequent EU-imposed sanctions on Russia, disruption of Russian natural gas supplies to the EU, a significant increase in natural gas prices, and the current crisis.

Conclusion

1. The issue of mutual dependence between the European Union and Russia in supplying Russian gas, despite being ongoing for decades, collapsed with the start of the Russian-Ukrainian war in February 2022. This collapse revealed the complexity of the relationship between the two parties, marred by many obstacles and external interventions.
2. Importing countries of energy resources, especially natural gas, must diversify their sources of supply and seek politically and economically stable regions. They should steer clear of relying solely on gas supplies from one country due to the numerous influencing factors, whether political or economic, both domestically and externally, in energy relationships.
3. Gas-exporting countries must diversify their markets to multiple destinations and countries to prevent their impact on crises occurring in a specific region or country.
4. Countries that export and import natural gas must strengthen their energy relationships because natural gas transportation is highly complex, especially when the destination country changes. Liquefied natural gas (LNG) production entails significant costs and requires transportation via specialized ships, compression stations, and other complex procedures, which are much more challenging than transporting natural gas through pipelines and other energy sources like oil and coal.
5. In order to ensure the sustainability of relations in the field of natural gas supply from producing countries to consuming countries, consuming countries must participate in developing projects in gas fields or gas pipeline networks with gas-producing countries and other energy sources through activating investments and economic partnerships in these countries.

REFERENCES

- Abdul Sattar. S. (2022). Europe's Alternatives to Russian Gas. *Al-Sharq Al-Awsat Newspaper*, London, p. 4.
- Al Jazeera - Agencies. (2023). *Qatar signs two agreements to supply liquefied gas to France for 27 years*. Available at <https://www.aljazeera.net/ebusiness/>. Retrieved December 4, 2023.
- Al Jazeera. (2023). *Turkey extends liquefied gas import agreement with Algeria until 2027*. Available at <https://www.aljazeera.net/ebusiness>. Retrieved December 1, 2023.

- Alhan, D. (2023). *Türkiye set to play key role as Europe's energy supplier* (p. 2). Anadolu Ajansi, Energy, Türkiye.
- Al-Hitti, N. A. R. (2023). *Qatar's gas exports achieved trade with 160 countries totaling \$164 billion, enhancing its global presence*. Gulf Opinions, Gulf Research Center, Issue 180.
- Al-Zayadi, R., et al. (2022). *Geopolitical effects: Gas and the Middle East in the Ukrainian crisis*. Arab and Regional Studies, Egyptian Center for Thought and Strategic Studies, Cairo, 6.
- Amar, A. (2023). *Turkey's gas export deals witness strong momentum in 2023*. Energy Research Unit, Energy Platform.
- Amar, A. (2023). *Turkey's gas export deals witness strong momentum in 2023*. Energy Research Unit, Energy Platform. Available at <https://attaqa.net>. Retrieved December 4, 2023.
- Archick, K. (2023). *Russia's War Against Ukraine: European Union Responses and U.S.-EU Relations* (p. 3). Congressional Research Service, USA.
- Arnaut, A. R. (2022). *Details of the memorandum of understanding for exporting Israeli gas to Europe via Egypt*. Anadolu Agency, Jerusalem, p. 1.
- Dubouk, Y. (2022). *Israeli gas to Europe: Greater enthusiasm than achievement* (p. 2). *Al Akhbar Newspaper*, Beirut.
- Iran aims to export natural gas to Europe. (2022). *Al Arabi Al Jadeed*. Available at <https://www.alaraby.co.uk/>. Retrieved December 5, 2022.
- Jam, F. A., Mehmood, S., & Ahmad, Z. (2013). Time series model to forecast area of mangoes from Pakistan: An application of univariate ARIMA model. *Acad. Contemp. Res*, 2, 10-15.
- Jam, F. A., Rauf, A. S., Husnain, I., Bilal, H. Z., Yasir, A., & Mashood, M. (2014). Identify factors affecting the management of political behavior among bank staff. *African Journal of Business Management*, 5(23), 9896-9904.
- Jamal, A. (2023). *Political propaganda for the Arab gas pipeline amidst the war in Gaza*. *Al Arabi Newspaper*, London, 12983(1).
- Kahal, H. (2023). *Algerian Gas Exports to France Reach a Record High Despite Political Disputes*. *Al-Araby Al-Jadeed Newspaper*, Algiers. Retrieved from <https://www.alaraby.co.uk/economy>. Accessed December 7, 2023.
- Kanval, N., Ihsan, H., Irum, S., & Ambreen, I. (2024). Human Capital Formation, Foreign Direct Investment Inflows, and Economic Growth: A Way Forward to Achieve Sustainable Development. *Journal of Management Practices, Humanities and Social Sciences*, 8(3), 48-61.
- Kapustynska, K. (2023). *The EU has found an alternative to a complete gas embargo from Russia: a new plan revealed by the FT*. Obozrevatel UA. <https://eng.obozrevatel.com/section-news/news-the-eu-has-found-an-alternative-to-a-complete-gas-embargo-from-russia-a-new-plan-revealed-by-the-ft-08-12-2023.html>
- Kardas, S. (2023). *Own goal: How Russia's gas war has backfired* (pp. 1-2). European Power, European Council on Foreign Relations (ECFR), Warsaw.
- Kharis, R. (2023). *Sakarya field in Turkey: Politics in gas and gas in politics*. *Ink Magazine*, pp. 2-8.
- Merji, H. A. (2022). *Russian gas alternatives and the feasibility of betting on Israeli gas*. Cultural Papers. *Journal of Literature and Humanities*, p. 9.
- Merji, H. A. (2022). *Russian gas alternatives and the feasibility of betting on Israeli gas*. Cultural Papers, *Journal of Literature and Humanities*, Beirut, 22, p. 9.
- Ramadan, K. (2023). *Will Qatari gas reach Europe via Iraq and Turkey?* *Al Arabi Al Jadeed, Muscat*. Available at <https://www.alaraby.co.uk/economy>. Retrieved December 6, 2023.
- Ra'ouf, H. (2022). *The Ukrainian crisis: Opportunities and challenges for Iranian natural gas*. Independent Arabia, p. 2.

- Rashid, A., Jehan, Z., & Kanval, N. (2023). External Shocks, Stock Market Volatility, and Macroeconomic Performance: An Empirical Evidence from Pakistan. *Journal of Economic Cooperation & Development*, 44(2), 1-26.
- Sami, M. (2022). *Trilateral agreement between Egypt, Israel, and Europe... Who benefits in the gas market?* *Al Jazeera*. Available at <https://www.aljazeera.net/ebusiness>. Retrieved December 2, 2023.
- Shawamreh, N. (2022). *Africa: An Alternative to Russian Gas for Europe*. *Center for Strategic Studies*, Istanbul. P.2.
- Shukri, O., & Sabah, N. (2022). *Iran cannot export natural gas to Europe in the short term*. *Energy Platform, Energy website*. Available at <https://attaqa.net/2022/03/06>. Retrieved December 7, 2023.
- Shuqra, N. S., & Sabah, N. (2022). *Iran cannot export natural gas to Europe in the short term*. *Energy Platform, Energy website*. Available at <https://attaqa.net/2022/03/06>. Retrieved December 7, 2023.
- Sweidan, M. H. (2022). European gas map: Russia and alternative sources. *Al-Akhbar Newspaper*, p. 7.
- TRT Arabic. (2023). *Black Sea gas: Knowing the sequence of its discovery and transfer to Turkey's national network*. Available at <https://www.trtarabi.com/explainers>. Retrieved November 25, 2023. Available at <https://attaqa.net>. Retrieved December 4, 2023.