

# MARITIME STRATEGIC EVALUATION FOR ISRAEL 2022/23

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## **Section 4: Energy in the Eastern Mediterranean**

The two articles in this section discuss energy. One discusses the potential for energy extraction from the sea in a “net zero” economy. The more Israel diversifies its sources of energy, the greater the potential for the production and generation of clean energy from the sea. Demand for hydrogen and liquified natural gas as energy sources derived from the sea will only increase, and it is important to be prepared accordingly. The second article discusses Egypt’s exclusive economic zone in the Mediterranean and provides an overview of the abundance of gas in these waters and the need for Egypt to defend these assets by expanding its navy, on the one hand, and signing maritime boundary agreements on the other.

## Producing Energy at Sea in a Net-Zero Economy

*Orin Shefler*

This article places a spotlight on future needs and methods for producing energy at sea for Israel and provides a brief overview of some new technologies and processes that will unlock this potential. The premise is that the State of Israel is now a producer and exporter of natural gas and has sufficient natural gas reserves to sustain itself and its neighbors for years to come. It is presumed that future developments of offshore natural gas fields will give rise to new opportunities in a "net-zero" economy. To the extent that Israel is able to diversify its energy portfolio, the potential for producing cleaner energy from the sea will rise.

### New Supply and Demand Value Chains

To understand where Israel is headed with respect to producing energy from the sea, one must first envisage future energy supply and demand scenarios. Also, it is imperative to set goals for rolling out new technologies in order to achieve Israel's net-zero targets. Any game-changing plan to decarbonize the Israeli economy must first account for lowering the existing carbon footprint, some of which is attributed to traditional methods of producing energy at sea (such as during the production of natural gas, oil, condensate or LNG [liquefied natural gas]), and going forward, finding ways to eliminate, mitigate, or capture the carbon emissions attributed to traditional energy production. Current assumptions foresee that a full transition to a net-zero economy (i.e., the amount of time that it will take to transition from modern-day reliance on traditional energy sources until achieving Israel's net-zero goals) may last between ten to thirty-five years from the present day,<sup>1</sup> although there are those who would prefer to see this interim period shortened significantly.

During the interim period, it will be the responsibility of the Government of Israel to ensure a steady, uninterrupted supply of energy for Israel that is capable of catering to local and regional energy needs, but also ensuring (a) reasonable energy prices, (b) abundance, reliability, and maintainability of energy for the nation, and (c) keeping to a minimum unavoidable environmental impact. That being said, the length of the interim period will also depend on the pace that scalable and commercial "net-zero" energy

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<sup>1</sup> See Elai Rettig, "[Solar Hopes and Grounded Reality: Should and Could Israel Meet Its 2030 Renewable Energy Transition Target](#)", in *Maritime Strategic Evaluation for Israel 2021/22*, ed. Shaul Chorev and Ziv Rubinovitz (Haifa: Maritime Policy and Strategy Research Center, 2022), 244–250.

production technologies (including storage and transmission infrastructure) can mature in Israel and be successfully deployed.

Also, the main factors to shortening the interim period will be the ability to raise capital for this purpose (a price tag that could be astronomical) and to obtain the necessary Government approvals for new energy projects (including the time needed to plan, fund, and build new infrastructure).<sup>2</sup> At the international level, experts now believe that "annual investments in energy supply and production are expected to double by 2035 to reach \$1.5 trillion to \$1.6 trillion". Furthermore, the majority of energy production growth is expected to come from "decarbonization technologies and power which will exceed [present day] total energy investments by the year 2050".<sup>3</sup>

## Diversifying the Israeli Energy Portfolio

To get the ball rolling toward "net-zero", the Government will need to redefine how Israel produces and consumes energy. Just to be clear—when the term "energy" is used in this article in the context of the sea, it has a two-prong definition that includes (a) production, storage, transmission, or consumption of natural resources used for energy production (such as oil, gas, and their derivatives), and (b) generating electricity from the sea by harnessing nature's elements through technological means such as solar, offshore wind, tidal and wave turbines, and transmitting it directly to consumers.

At present, Israel is still very much dependent on traditional hydrocarbon energy production, which is either produced via concessionaires at sea or otherwise imported from sellers through established sea routes and international supply chains. Unfortunately, traditional hydrocarbon energy production has a massive carbon footprint that will not be sustainable for Israel in the long run, unless the carbon footprint can be mitigated.

So, what does this strategic transformation to "net-zero" mean for Israel in the short term and in the long term when it comes to producing energy from the sea? In the short term, it means that Israel will need to diversify its energy portfolio by blending traditional and renewable energy sources. During the interim period, the name of the game will no longer be to just produce oil and gas from the sea, but rather to begin to produce and consume new forms of energy from the sea that may include traditional hydrocarbon products as

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<sup>2</sup> McKinsey & Co., [Global Energy Perspective 2022: Executive Summary](#), April 2022.

<sup>3</sup> Ibid.

well as other forms of energy such as hydrogen (H<sub>2</sub>, Blue<sup>4</sup> or Green<sup>5</sup>), liquefied natural gas (LNG), compressed natural gas (CNG), ammonia, methanol, and more. And also noting that the sea holds vast potential for producing additional means of energy such as solar power, wind power, tidal energy, wave energy, geothermal energy, and other viable sources (collectively, Alternative Sources).

In the long term, and once Israel's energy portfolio has been diversified to include Alternative Sources, Israel will be able to phase out its reliance on traditional hydrocarbon energy sources and divert surplus quantities to other regions that are behind on their energy transition or still reliant on traditional energy sources.

Each of the Alternative Sources have unique characteristics and may be suitable for different segments of Israel's new "net-zero" economy. The common denominator between all the Alternative Sources is that they must each be made safely available as commodities or consumables to the general public at a reasonable price with minimal environmental impact.

## Expected Increase in the Demand for Hydrogen and LNG in a Net-Zero Economy

In practice, there must be a very clear understanding of what future energy demand scenarios will look like for Israel, and once that understanding is crafted, the Government will be better positioned to initiate new offshore projects, and provide potential investors with the comfort that they need to take final investment decisions (FIDs) and invest the billions of dollars necessary for new offshore projects at sea.

For example, focusing on the vehicle and transportation segment of the new Israeli "net-zero" economy: Will cars of the future be purely electric? Or maybe they will run on hydrogen fuel cells (fuel cell electric vehicles; FCEVs)? Or perhaps car manufacturers will offer a mix between various forms of energy? Clearly, the preferred fuel choice for the

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<sup>4</sup> "Blue hydrogen is when natural gas is split into hydrogen and CO<sub>2</sub> either by Steam Methane Reforming (SMR) or Auto Thermal Reforming (ATR), but the CO<sub>2</sub> is captured and then stored. As the greenhouse gasses are captured, this mitigates the environmental impacts on the planet. The 'capturing' is done through a process called Carbon Capture Usage and Storage (CCUS)". Alex Haynes, "[The Difference between Green Hydrogen and Blue Hydrogen](#)", *Petrofac*, Retrieved December 2022.

<sup>5</sup> "Green hydrogen is hydrogen produced by splitting water by electrolysis. This produces only hydrogen and oxygen ... to achieve the electrolysis electricity (power) is needed. The process for making green hydrogen is powered by renewable energy sources, such as wind or solar. That makes green hydrogen a clean energy source – hydrogen from renewable energy sources without CO<sub>2</sub> as a by-product". Haynes, "The Difference between Green Hydrogen and Blue Hydrogen".

vehicle and transportation segment in Israel will very much affect the supply and demand scenarios for Alternative Sources in Israel, especially with regard to hydrogen, LNG, methanol, or CNG. It is a generally accepted principal that hydrogen, for example, will be one of the preferred fuels of choice for the future vehicle and transportation segment because it can be produced with a low carbon footprint from natural gas or water and has similar range and energy values in comparison to modern-day petrol when used in cars.

As such, experts foresee an immediate need to initiate a "timely deployment of infrastructure across the whole supply chain ... to meet hydrogen demand".<sup>6</sup> The up-side for using hydrogen as a preferred fuel for vehicles of the future is that it emits minimal by-products when used such as water (H<sub>2</sub>O) and heat—which are both nontoxic to the environment. The downside is that hydrogen can only be delivered either in liquid form below 252.87°C—which (a) requires cooling apparatus, (b) extensive safety measures, and (c) carries high energy costs—or it can be delivered in compressed form if stored between 350 Bar and 700 Bar. This means that any new hydrogen infrastructure must also be cost efficient and matured to the highest safety standards prior to being deployed to the general population. These types of challenges will surely affect the cost-benefit analysis for scaling up hydrogen infrastructure for the vehicle and transportation segment and adopting it into the mainstream of the new Israeli economy.

And another example: How will commercial shipping consume energy in the future? Will ships sail using LNG, hydrogen, methanol, ammonia, or perhaps even CNG as their fuel of choice? What type of refueling depots would need to be made available in Israel's ports in order to serve the demand of international commercial shipping fleets? And where would these Alternative Sources be sourced?

Since there is no clear international standard to follow, at present it is difficult to predict where the market trend will go on this matter at this point in time. Nonetheless, a good market indicator can be better understood by studying the forecast of commercial shipping companies, such as ZIM, an Israeli company that ships containers. ZIM announced in August 2022 that it has entered into a long-term LNG bunkering agreement with Shell that will secure LNG supply for ZIM's recently ordered LNG-fueled vessels that are expected to enter service in 2023.<sup>7</sup>

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<sup>6</sup> McKinsey & Co., *Global Energy Perspective 2022*.

<sup>7</sup> ZIM, "[ZIM Announces Large-Scale Long-Term LNG Bunkering Agreement with Shell](#)", August 31, 2022.

As can be seen, the rise of LNG as a preferred Alternative Source will significantly impact the international shipping industry;<sup>8</sup> this is yet another reason to assume that future demand for LNG will continue to rise (an assumption attributed to both local consumption and export factors). Therefore, LNG will most certainly be a very valuable commodity for Israel to produce at sea in the near future and should be made a strategic matter by the Government.

At this early stage of the transition to "net-zero", one thing is certain: it is very plausible that certain segments of the Israeli economy (such as power generation, industrial, residential, commercial, shipping, transportation, railways, etc.) will each have independent energy value chains that will have its needs met by different means.

The term "energy value chain" refers to the set of unique steps that should be taken by the Government with regards to developing each segment of the Israeli net-zero economy to encourage a swift and efficient transition to Alternative Sources. For example, if the vehicle and transportation industry is truly heading toward adopting hydrogen as a key component for powering cars, then the Government must take all the steps necessary to make hydrogen available to the general public starting from developing the supply side (i.e., causing local production at the source), creating transmission, delivery and storage capabilities, and also developing the demand side, i.e., making hydrogen readily available to the public without interruption, at a reasonable price, at the highest safety standards and on a day-to-day basis. If the Government wishes to promote the adoption of hydrogen-powered cars, then hydrogen must be made available to the public at convenient locations such as gas stations for use with FCEVs. Thus, an entire value chain must be designed and created from scratch to achieve this goal.

As such, the Government will undoubtedly need to carry out a very detailed modeling of supply and demand scenarios for all Alternative Sources in order to prepare the market to respond accordingly.

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<sup>8</sup> "The OECD predicts that the transition to LNG as a maritime fuel will lead to the reduction of maritime pollution and an increase in maritime safety. Such transition will lower the carbon footprint of ships entering ports in heavily populated cities. LNG is largely considered a superior marine fuel with the best option for improving air quality. It is also easily scalable and has been named as the leading choice that could assist in meeting decarbonization goals". Orin Shefler, "A Strategic Perspective for Israel on Contending with Innocent and Transit Passage through Maritime Chokepoints In Wake Of Heightened Energy Collaboration In The Middle East", in Benny Spanier, Orin Shefler and Elai Rettig (eds.), *UNCLOS and the Protection of Innocent and Transit Passage in Maritime Chokepoints* (Haifa: Maritime Policy and Strategy Research Center, University of Haifa and Konrad Adenauer Foundation, 2021), p. 53.

Interestingly, there are currently around "40 countries that [already] ... have dedicated hydrogen strategies in place".<sup>9</sup> In the Netherlands, for example, the government (in partnership with Shell) has already initiated and deployed hydrogen fueling stations alongside major highways as a pilot for adopting hydrogen as a preferred fuel choice for trucks and cars.<sup>10</sup>



Figure 1. A hydrogen refueling station in the Netherlands by Shell<sup>11</sup>

And yet a third example still attributed to the public transportation segment: some market indicators have shown that the public transportation segment may lean toward adopting CNG as one of its Alternative Sources of choice, at least during the interim period. To that extent, in Israel, for example, a local natural gas distributor called SuperGas announced in October 2022 that it has entered into agreements to supply CNG for the Metropolin bus fleet (Metropolin is an Israeli bus and transportation company). SuperGas predicts that it will be able supply up to 600 buses with CNG by 2024.<sup>12</sup>

It is safe to assume that CNG will be an Alternative Source of energy in the new Israeli economy, at least during the interim period. CNG can either be produced directly at sea

<sup>9</sup> McKinsey & Co., *Global Energy Perspective 2022*.

<sup>10</sup> WaterstofNet, "[Shell Opens First Hydrogen Refueling Station of H2Benelux in Amsterdam](#)", *WaterstofNet*, October 13, 2022.

<sup>11</sup> *Ibid.*

<sup>12</sup> ICE, "[SuperGas in a Large Deal: These Buses Will Run on Gas](#)" [In Hebrew], October 2, 2022.



by gas producers at the source and then distributed in pressurized tanks to consumers anywhere in the world, or it can otherwise be produced using dedicated onshore compressors located at exit points at or near the site of consumption or via the national transmission system (NTS) for gas.

CNG could be an especially viable solution for public transportation since Israel has very large quantities of natural gas readily available for immediate consumption that can be easily transmitted from offshore to onshore to the end user at any time.

The problem with CNG is that it must be pressurized at least between 200 to 250 Bar for use in vehicles. Compressing natural gas in large quantities requires a lot of power generation which in itself has a high carbon footprint and a high electricity cost. As such, the CNG market still needs to mature and be proven to have effective safety measures in place in a cost-effective manner. To that extent, carbon mitigation or capturing measures should be carefully evaluated when designing compressing solutions for the production of CNG.

## Land Scarcity and Positioning New Infrastructure at Sea

Another important factor to take into account when advocating the production of energy at sea (especially applicable to the State of Israel) is the issue of land scarcity. The dense and ever-growing population of Israel has driven massive urban construction,<sup>13</sup> has raised public awareness to environmental concerns,<sup>14</sup> and has triggered objections to positioning energy-centric infrastructure near cities or towns (the NIMBY phenomenon – Not In My Back Yard).<sup>15</sup> In the future, there will be less and less available land in Israel to build the variety of new energy infrastructure needed to cater the ever-growing energy portfolio.

Israel has for years deliberated on the potential of establishing artificial islands for a variety of purposes. Such discussions and plans have often included initiatives to construct artificial islands for new airports, energy hubs, platforms, sea ports and more. For such a small country like Israel, it makes perfect sense to seek new ways to use the vast and unpopulated Mediterranean Sea as a preferred location for Israel's new energy facilities. Even more so since the majority of Israel's energy supply and natural resources are already sourced at sea from its oil and gas reservoirs.

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<sup>13</sup> Arik Mirovsky "[Building Starts in Israel Hit 26 Year High](#)", *Globes*, March 20, 2022.

<sup>14</sup> Tamar Pileggi, "[Hundreds Protest in Tel Aviv against Natural Gas Deal](#)", *Times of Israel*, July 4, 2015.

<sup>15</sup> Hagay Hacohen "[Thousands in Tel Aviv protest location of planned Israeli gas platform](#)", *Jerusalem Post*, September 2, 2018.

There are currently many international precedents to rely on when promoting the construction of artificial islands (in any form) for energy-centric infrastructure and hubs. One such recent example can be identified in Belgium. Belgium has already announced plans to construct an artificial energy island almost 45 km off the Belgian coast. This energy island is intended to serve as a link between offshore wind farms and an onshore high-voltage grid.<sup>16</sup> It will house critical energy-producing infrastructure. This new type of artificial island modeling can be adjusted and re-developed specifically for Israel's needs in one form or another.

## Aspects of the United Nations Convention on the Law of the Sea (UNCLOS)

But before "deep diving" into the practical aspects of initiating new energy projects at sea, Israel must establish its fundamental right to do so. Israel is a coastal state according to international law and is entitled to an exclusive economic zone (EEZ). This right stems from Article 56 of the United Nations Convention of the Law of the Sea (UNCLOS) that states as follows:

In the exclusive economic zone, the coastal State has:

- Sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the waters superjacent to the seabed and of the seabed and its subsoil, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds;
- jurisdiction as provided for in the relevant provisions of this Convention with regard to: (i) the establishment and use of artificial islands, installations and structures; (ii) marine scientific research; (iii) the protection and preservation of the marine environment.<sup>17</sup>

Israel has a right, among other things, to establish and use artificial islands, installations, and structures in its EEZ to explore, exploit, conserve, and manage the natural resources thereto, and also to conduct economic exploitation activities such as the production of energy from the water, currents, and winds.

Based on these principles, Israel recently commissioned its first deep water Floating Production and Storage Offloading (FPSO) located in its EEZ citing the recent start-up of the Energean "Power" FPSO for the Karish gas field, which began producing natural gas and derivatives for Israel late in 2022.

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<sup>16</sup> Offshore Magazine, "[Elia Planning 'World's First' Artificial Energy Island](#)", October 3, 2022.

<sup>17</sup> [United Nations Convention of the Law of the Sea \("UNCLOS"\)](#), Article 56.



Figure 2: The Energean "Power" FPSO crossing the Suez Canal<sup>18</sup>

This ground-breaking project has already set the stage for all future offshore developments in the eastern Mediterranean and has become the case study for which Israel's jurisdiction in its EEZ has been crafted. It is very likely that in the near future, additional floating energy infrastructure or other forms of artificial islands will be announced based on the current experience accumulated through the commissioning the Energean FPSO.

### Aspects of Israeli Law, Regulation, and New Government Initiatives

Israel's own interpretation of its rights and responsibilities in its EEZ were originally defined in a legal opinion issued by the Government in January 2013 (Legal Opinion).<sup>19</sup> Also, Israel officially declared the maritime boundaries of its EEZ through several formal

<sup>18</sup> Image used in article by Nermina Kulovic, "[Crossing of Energean Power FPSO Marks 'First-of-Its-Kind' in History of Suez Canal](#)", *Offshore Energy*, June 3, 2022.

<sup>19</sup> A legal opinion issued on January 13, 2013, by Adv. Avi Licht (the deputy attorney general at that time) determining, among other things, that Israeli regulation on oil and gas, environmental protection, and fiscal laws of the State of Israel apply to marine areas. This legal opinion also determined that these laws applied to the surface and the subsurface of the sea and the legal basis for applying these laws to the marine areas was, first and foremost, the Underwater Areas Law—1953.

actions including: (a) entering a delimitation agreement signed with Cyprus in 2010 (Agreement with Cyprus), (b) issuing a government decision about its northern maritime border with Lebanon in 2011 (Government Decision), and (c) entering a new delimitation agreement with Lebanon announced in October 2022 regarding the settlement of the northern maritime boundary line dispute (Agreement with Lebanon). Additionally, there is a new draft law in its final stages prior to enactment titled the Marine Areas Law–2017 (Draft Marine Areas Law) that clearly establishes the scope of Israeli jurisdiction in the EEZ (to the extent necessary) in order to exercise Israel's sovereign rights according to international law.<sup>20</sup>

The Legal Opinion, the Agreement with Cyprus, the Government Decision, the Agreement with Lebanon, and the Draft Marine Areas Law have all cherry-picked key principles from UNCLOS and international law, among others, and applied them to Israeli law in order to establish the necessary legal framework for exploiting Israel's natural resources in its EEZ. By defining the scope of its EEZ, Israel has marked the territory in which it has rights to establish dedicated offshore infrastructure in accordance with the law of the sea. This is an especially tricky task since Israel is not an actual signatory to UNCLOS but has traditionally accepted UNCLOS as customary international law and mostly abides with the majority of the provisions set forth thereto.<sup>21</sup>

In parallel, the Government ministries (such as the Ministry of Energy, the Ministry of Environmental Protection, and more) are all currently deeply involved in analyzing the strategic importance of expanding the applicable uses of the Israeli EEZ. One significant initiative is a recent request for information and tender issued by the Ministry of Energy titled "Strategic Environmental Assessment for examining the production of renewable energy and developing climate technologies for the marine areas of Israel" (SEA Report).<sup>22</sup>

In the upcoming SEA Report, for which a tender has been (or is expected to be) issued by the end of 2022 or the beginning of 2023, the Government will examine and collect critical maritime data necessary in its EEZ in order to (a) establish a database for policies and decisions about potential exploitation of Israel's natural resources in the EEZ, (b) make recommendations about the best ways to exploit the natural resources in the EEZ, and (c) establish the preferred locations in the EEZ for construction of new infrastructure to allow

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<sup>20</sup> [The Proposed Marine Areas Law—2017](#).

<sup>21</sup> See also Benny Spanier, "[The State of Israel and the Convention on the Law of the Sea: The Current State](#)", in *Maritime Strategic Evaluation for Israel 2021/22*, ed. Shaul Chorev and Ziv Rubinovitz (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2022), 301–310.

<sup>22</sup> Issued under the guidance of Directive 2001/42/EC on the assessment of [the effects of certain plans and programs on the environment](#) (SEA Directive).

such exploitation. According to the Ministry of Energy, a SEA Report is the recognized method for all OECD states to build tools necessary to initiate new infrastructure.<sup>23</sup> These actions correlate to actions taken by many other governments in the regions in parallel.

To be clear, if, as a result of the SEA Report, certain areas in the Israeli EEZ are found to have an appropriate wind factor suitable for offshore wind electricity production, then a consequence could be that the Government would issue offshore licenses to construct offshore wind farms in that area of the EEZ. Or, if, as a result of the SEA Report, certain areas are found to have strong tidal currents or wave strength suitable for offshore electricity production, then a consequence could be that the Government would issue licenses to construct tidal or wave farms in that area in the EEZ.

As such, based on the results of the SEA Report, the potential of producing Alternative Sources at sea will eventually be evaluated and better understood by the Government. The SEA Report process will then encourage private entrepreneurs to initiate and carry out studies or research with respect to energy production at sea through Government-backed fast-track approval processes and allocation of dedicated areas in the EEZ for this purpose.

## Applicable Offshore Technologies

### *Oil, Natural Gas, and Derivatives*

At present, Israel has already established four offshore energy projects within its territorial waters and its EEZ (Existing Offshore Infrastructure).<sup>24</sup> The Existing Offshore Infrastructure were built over the span of at least twenty years with a primary purpose of producing natural gas and derivatives for the local and regional markets. The construction of the Existing Offshore Infrastructure has contributed significantly to securing Israel's energy security, and have elevated Israel's geopolitical position to that of an "energy producer" and "regional gas exporter".

The Existing Offshore Infrastructure are expected to continue to produce energy for Israel and the surrounding region during the interim period and possibly long after that—and there are also immediate plans to increase their production capabilities significantly for additional export scenarios.

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<sup>23</sup> See presentation delivered by the Israeli Ministry of Energy regarding the foundations of the Sea Report. Ministry of Energy, "[Webinar on Renewable Energy at Sea-13.7.2022](#)" [In Hebrew], *YouTube*, uploaded July 17, 2022.

<sup>24</sup> The four offshore projects are: The "Mari-B" platform (Operator: Chevron), the "Tamar" platform (Operator: Chevron), the "Leviathan" platform (Operator: Chevron), and the Karish FPSO (Operator: Energean).



Figure 3: The Leviathan Platform located within Israel's territorial waters<sup>25</sup>

At a global level "gas demand is projected ... to increase by at least 16% before it reaches a peak in 2040".<sup>26</sup> Moreover, in the years to come, "additional demand for imported [or exported] gas supplied by LNG, ... is projected to lead to a growth of 20–70% by 2050 compared to 2019".<sup>27</sup> Such projected demand scenarios for natural gas and LNG are especially accurate with respect to European countries who all have shortages of natural gas supply and have each developed dependency on Russian natural gas and are suffering from the backlash of the war between Russia and Ukraine.

As such, the European energy markets are presumed to be constantly seeking ways to increase their natural gas and LNG supply through import. The global energy demand scenarios, in turn, will trigger the continuous expansion of Existing Offshore Infrastructure production capabilities for export purposes and the initiation of new projects in the Israeli EEZ. As the Existing Offshore Infrastructure are expanded in Israel to meet the natural gas and LNG demand scenarios and as new offshore projects are conceived, it will be equally important for the Government to take further action to manage the increased carbon footprint attributed to the increase in the production capabilities.

### *Natural Gas and Alternative Sources (Such as LNG, CNG, Hydrogen, Ammonia, and Methanol)*

Given the above, the potential growth of the natural gas and derivatives sectors in Israel and the region will most probably trigger the construction of regional LNG facilities for

<sup>25</sup> Image from NewMed Energy, "[Leviathan, with 22.9 TCF of Recoverable Gas, Is the Largest Natural Gas Reservoir in the Mediterranean, and One of the Largest Producing Assets in the Region](#)".

<sup>26</sup> McKinsey & Co., *Global Energy Perspective 2022*.

<sup>27</sup> Ibid.

export. There are already several plans of action in place with respect to constructing floating liquefied natural gas (FLNG) facilities in the Israeli EEZ. This would be an ideal scenario from the concessionaire's perspective and would also align with European interest at this time. The question still remains whether or not the Government will support and approve such plans in the near future.



Figure 4: Future prospects for an FLNG facility in Israel's EEZ<sup>28</sup>

Fast-tracking FLNG projects will be essential if Israel and its concessionaires intend to capitalize on the growing natural gas and LNG potential in the near future. The same logic will apply to the initiation of new offshore hydrogen projects in Israel's EEZ. According to Exxon, the "global hydrogen demand is forecasted to more than double by 2030, with substantial increases from the power, industrial, and transportation sectors".<sup>29</sup>

Furthermore, Exxon estimates that the "size of the hydrogen market globally could be more than \$1.5 trillion by 2050".<sup>30</sup> On hydrogen issues, Chevron has also recently started working with "Toyota, Caterpillar, Cummins and other companies to explore hydrogen's potential and create demand",<sup>31</sup> and also has begun "to promote hydrogen as a decarbonizing solution for transportation and industry".<sup>32</sup>

<sup>28</sup> Image from the article by Josh Lewis, "[Shell's Prelude FLNG to Remain Offline for Most of Q1](#)", *Upstream: Energy Explored*, February 4, 2022.

<sup>29</sup> ExxonMobil, "[Things You Didn't Know about Hydrogen](#)", *EnergyFactor by ExxonMobil*, August 24, 2022.

<sup>30</sup> *Ibid.*

<sup>31</sup> Chevron, "[Inside Our Alliances to Boost Hydrogen](#)", *Chevron*, October 7, 2022.

<sup>32</sup> *Ibid.*

These industrial efforts by major stakeholders will have tremendous influence on the way forward with respect to producing energy at sea in Israel since Exxon and Chevron are both key players in the global natural gas markets, and Chevron in particular operates the majority of Israel's Existing Offshore Infrastructure.<sup>33</sup> To that extent, "natural gas [will definitely] play a new role in blue hydrogen and ammonia production [as well]".<sup>34</sup> This will be a central role.

Another option to consider is repurposing Existing Offshore Infrastructure for production of low-carbon fuels such as hydrogen.<sup>35</sup> The possibility of repurposing Existing Offshore Infrastructure is highly applicable in Israel, especially with respect to establishing a hydrogen hub. For example, the Mari-B platform, operated by Chevron and partners, is currently standing idle following the depletion of all its subsea wells. Mari-B is a good candidate for repurposing activities initiated by Chevron with respect to producing energy from the sea. Experts predict that "regions with cost-optimal production resources, such as natural gas or renewable energy, could become major hydrogen export hubs and be at the forefront of a new global hydrogen trade".<sup>36</sup> This will very likely be the case for the State of Israel.

On the issue of expansion or repurposing of Existing Offshore Infrastructure, various offshore technology providers or EPC (engineering, procurement, and construction) contractors have introduced designs for establishing blue and green hydrogen hubs. One of the more significant solutions that has been presented is offered by TechnipFMC.<sup>37</sup> TechnipFMC has introduced a concept for generating hydrogen by electrolyzing seawater using renewable power and is working with partners on demonstrating the effectiveness of large-scale offshore hydrogen production and storage using renewable energies such as wind turbines.<sup>38</sup> The TechnipFMC solution is scalable and can be configured for a variety of applications, albeit this technology is still at a very early stage.

It may prove to be very effective in initiating technical discussions and international forums between Investors, Operators, EPC contractors, and the Government in order to

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<sup>33</sup> Glen Segell, "[The Chevron Corporation and the State of Israel](#)", in *Maritime Strategic Evaluation for Israel 2021/22*, ed. Shaul Chorev and Ziv Rubinovitz (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2022), 251–259.

<sup>34</sup> McKinsey & Co., *Global Energy Perspective 2022*.

<sup>35</sup> *Ibid.*

<sup>36</sup> *Ibid.*

<sup>37</sup> [TechnipFMC Website](#), Retrieved December 2022.

<sup>38</sup> *TechnipFMC*, "[Hydrogen](#)", Retrieved December 2022.



review the possibilities for adopting some of these solutions and establishing a hydrogen hub offshore Israel.

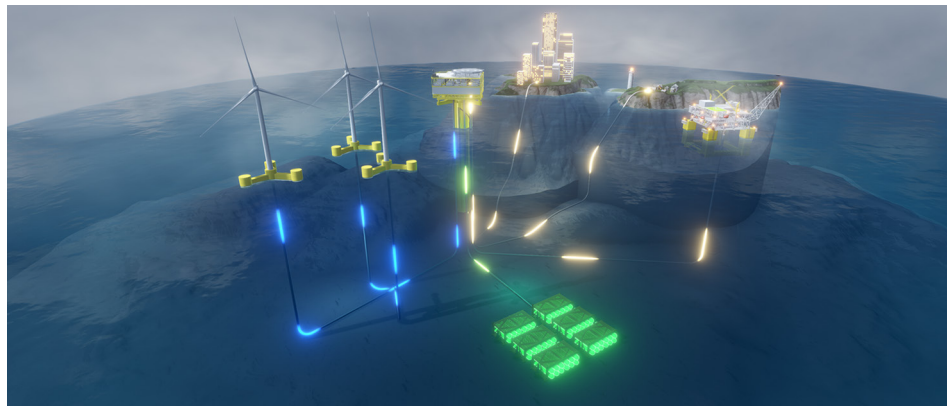


Figure 5: Future scenarios for offshore infrastructure for the production and storage of offshore electricity and/or hydrogen as envisaged by TechnipFMC<sup>39</sup>

At the midstream level, the Government has already taken action in preparation for the emerging hydrogen economy. The natural gas authority (NGA) recently authorized a study to be carried out by Israel Gas Lines Limited (INGL) to examine the effects of the emerging hydrogen market on the national transmission system (NTS) and the purpose of the national transmission company.<sup>40</sup> The purpose of the study will be to map out and to understand the capacity for using or repurposing the NTS with respect to storing, transmitting, or commingling hydrogen with natural gas in the future.

### *Offshore Wind Farms and Production of Offshore Electricity*

The construction of offshore wind farms in Israel's EEZ may also be applicable to the extent that the SEA Report is able to identify suitable areas in the EEZ with an appropriate wind climate. Clearly, at this point in time, "solar and wind builds already come at a lower cost than existing fossil fuels in most countries and are projected to become increasingly cost competitive globally".<sup>41</sup> At the global level, it is becoming more and more common to see offshore wind farms catering to the needs of energy hubs at sea as a means to

<sup>39</sup> Image from *ibid.*

<sup>40</sup> "[A Call to Anyone Interested in Submitting Their Proposal Or Position On Imposing A Systemic Tariff For 2023](#)", a letter issued to the general public by the Natural Gas Authority (NGA) on October 6, 2022 (in Hebrew).

<sup>41</sup> McKinsey & Co., *Global Energy Perspective 2022*.

provide net-zero electricity to energy-centric production and other processes at sea, for which the carbon footprint must be mitigated. This will be especially relevant when discussing the future potential for producing LNG and hydrogen offshore.

The European Union has been investing for years in the establishment of offshore wind farms, and the EU prides itself as being a "first mover" on this matter. In November 2020, the EU set very ambitious goals with respect to the continuous development of offshore wind and is aiming for an installed capacity of at least 60 GW of offshore wind by 2050.<sup>42</sup>

In the United States, the Department of Energy (DOE) through the Office of Energy Efficiency and Renewable Energy (EERE)<sup>43</sup> has initiated many offshore wind projects that are now currently in operation in US waters. Among others, the EERE funds R&D and demonstration activities in US waters with the intent of making renewable energy (such as offshore wind) cost-competitive with traditional sources of energy.



Figure 6: Possible future offshore wind farms in Israel's EEZ<sup>44</sup>

The Biden-Harris administration, acting through the DOE and EERE, has allocated tens of millions of dollars to fund research and development projects that will lower costs for wind energy projects on land and offshore.<sup>45</sup> Offshore wind is still a fledgling enterprise in the United States in comparison to its potential, and as such, the EERE has defined the following issues as core for eligibility for US government funding: (a) advancing

<sup>42</sup> "[Offshore Renewable Energy](#)", *European Commission*, Retrieved December 2022.

<sup>43</sup> The US Department of Energy, [Office of Energy Efficiency and Renewable Energy Website](#), Retrieved December 2022.

<sup>44</sup> Image from National Grid, "[What Is Offshore Wind Power?](#)".

<sup>45</sup> The US Department of Energy, "[Biden-Harris Administration Announces \\$30 Million from Bipartisan Infrastructure Law to Speed Up Wind Energy Deployment](#)", *Energy.gov*, October 18, 2022.

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technologies needed to transmit large amounts of electricity from offshore wind over long distances, (b) improving the offshore permitting processes, (c) improving technologies to minimize impacts to local wildlife and ecosystems, and (d) developing optimal anchoring and mooring for deep water applications.<sup>46</sup>

An ongoing dialogue between the DOE, EERE, and the Israeli Ministry of Energy would be beneficial to prioritizing the offshore wind potential for Israel. Nonetheless, it remains to be established if Israel has commercially viable wind within its EEZ that could justify promoting offshore wind farms. If so, the potential for establishing offshore wind farms in Israel's EEZ shall increase significantly.

## Conclusions

The implementation of Israel's net-zero strategy going forward is still a work in progress. Nonetheless, the die is cast (*Ālea iacta est*), and there is no turning back. As we move forward, it will be the Government's responsibility to provide clarity to the market with respect to new supply and demand value chains for energy production and consumption. Clarity will be achieved by developing reliable supply and demand models for Alternative Sources, which will prove to be critical for putting together proper business models, attracting investors and raising capital to complete an effective transition to net-zero.

Additionally, the Government will need to issue clear guidelines and policies and set realistic goals for diversifying the Israeli energy portfolio to meet the "net-zero" requirements of the future. It is already very clear that there will be an expected increase in the demand for hydrogen and LNG, which means that concrete plans should already be put in place to initiate offshore projects to cater this growing demand.

Furthermore, the Government must find solutions to address the growing land scarcity issue in Israel by taking positive measures to encourage the construction of new infrastructure at sea including defining options for construction of artificial islands or fixed or floating solutions away from the civilian populations.

Going forward, it will also be the Government's responsibility to engage in transparent dialogue with all the relevant parties (including international offshore operators, EPC contractors, technology providers, investors, etc.) to make sure that the best available technologies are matured, deployed, and made available to Israel in the near future.

Clearly, the market drivers for producing energy at sea are, and will always be, the significant oil and natural gas fields in Israel's EEZ. Therefore, all aspects of current and

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<sup>46</sup> Ibid.

future exploration, development and production of traditional hydrocarbon resources must be further encouraged, explored, and developed to secure the continuous production of a natural gas supply for local and regional needs, on the one hand, but also as the basis for sourcing new and Alternative Sources at sea (such as LNG, CNG, hydrogen, ammonia, and methanol) to cater to the needs of tomorrow, on the other hand.

Notwithstanding, as Israel continues to develop its traditional hydrocarbon industry, it will be equally important to ensure that the carbon footprint remains at minimal levels. To do this, carbon capture technologies should be explored for new offshore projects going forward, and also priority should be given to completing a transition to renewable energy at sea (such as offshore wind) to cater the power needs of offshore infrastructure. And finally, the Government should exhaust all efforts to establish viable energy hubs for natural gas, hydrogen, LNG, and electricity production in the territorial waters of Israel or its EEZ.

## Egypt and its Exclusive Economic Zone (EEZ) in the Mediterranean

*Shlomo Guetta*

In late September 2022, it was reported that over the course of the year, Turkey had become the biggest importer of liquefied natural gas (LNG) from Egypt, of the ten states that imported this commodity from Egypt.<sup>1</sup> According to this report, in the first three quarters of 2022, Egypt had exported some 880,000 tons of LNG to Turkey for a total sum of \$1.1 billion.

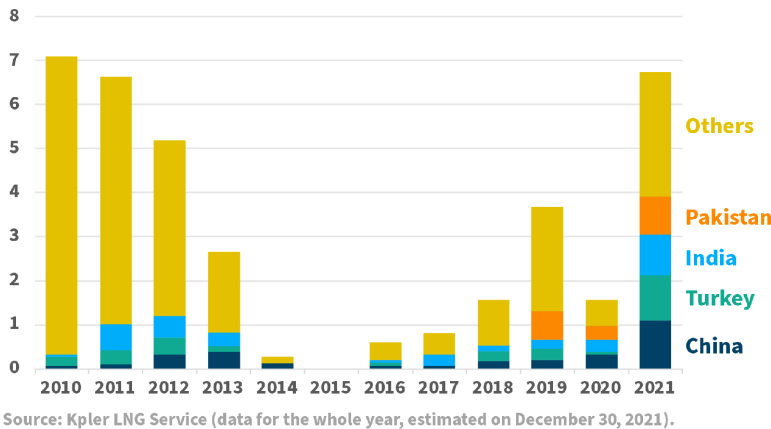


Figure 1: LNG exports (millions of tons) to various states in 2010–2021<sup>2</sup>

From Figure 1, we see that exports of LNG from Egypt to Turkey are increasing. Although we do not yet have definitive data for 2022, it appears that Turkey imported more LNG from Egypt than any other market this year. By way of estimation, the total scope of Egyptian exports to Turkey stands at a record of nearly one million tons, or over \$1.1 billion—despite the existing tensions and rivalry between the two states, as we shall discuss below.

The gas and energy market is primarily affected by economic profit-and-loss considerations, not diplomatic or ideological considerations. Indeed, interstate tensions do not entail a lack of trade, even in the gas market, as we see from this example of Turkish-Egyptian commerce, or indeed from Israel's supply of gas through Egypt to Jordan and from there to Syria and Lebanon.

<sup>1</sup> [Mahmoud Gamal](#), *Twitter*, September 28, 2022.

<sup>2</sup> [Nikos Tsafos](#), *Twitter*, December 30, 2021.

Since the overthrow of President Mohammed Morsi (the leader of the Muslim Brotherhood in Egypt) in 2013, relations between Egypt and Turkey have been marked by rivalry and tension. In the past three years, since the end of 2019, tensions between the two countries escalated against the backdrop of the Libyan Civil War, when Turkey masterminded the signing of an agreement with the Government of National Accord in Tripoli (the GNA in western Libya) over a shared exclusive economic zone. The agreement caused tensions with Egypt, which supports the National Liberation Army government in Tobruk and Benghazi (the LNA in eastern Libya).<sup>3</sup> The Libyan-Turkish EEZ agreement also sparked tensions, as we shall see, in connection with Greece and Cyprus' own EEZs.

In this context, against the backdrop of these tensions over the demarcation of EEZs in the Eastern Mediterranean, we should note that Egypt has a treaty with Cyprus determining the boundaries of their respective EEZs, and another such treaty with Greece, in addition to a *de facto* agreement with Israel.

Therefore, notwithstanding the political rivalry and tensions, in the economic domain, Egyptian-Turkish relations have not been adversely affected. On the contrary, they have continued to flourish, with Egypt seizing its greatest advantage in the Eastern Mediterranean and establishing two large-scale liquefaction plants on its Mediterranean coast—the Idku liquefaction plant and the Damietta facility, which was reactivated in 2021 after an eight-year hiatus,<sup>4</sup> in light of growing demand for LNG—in addition to an LNG storage terminal at Ain Sokhna in the northern Gulf of Suez.

Unrelated to Turkish-Egyptian relations and commercial ties, including in the LNG market, it goes without saying that Egypt's advantage in terms of natural gas liquefaction and storage infrastructure has been helping it during the Russo-Ukrainian War, which has triggered shortages in western European countries, where demand now outstrips supply. Egypt now sees itself as a provider of LNG to the nations of Europe and Asia, so much so that it is cutting back on its own local consumption of gas in order to increase its surpluses for export, especially to Europe. The reason is that the Europeans are now willing to pay an extremely high price for LNG, especially to cover the winter of 2022–2023.

Egypt's minister of petroleum and mineral reserves, Tarek el-Molla, said in June 2022: "We have ambitious plans to coordinate with neighboring Eastern Mediterranean countries on

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<sup>3</sup> Biancamaria Vallortigara, "[Will the proxy war in Libya become proxy peace?](#)" in Uzi Rabi and Tony Marko (eds.), *Middle East Crossroads* (June 6, 2021) [Hebrew].

<sup>4</sup> [Egypt exported 30 LNG shipments from Damietta, Idku plants in Q1 2021](#), *Energy Egypt*, April 11, 2021.

meeting the increased demand from the EU — and the world — for LNG over the next few years."<sup>5</sup>

He was joined in the latter half of September 2022 by Egypt's finance minister, Mohamed Maait, who announced monthly revenues of \$500 million from natural gas exports, with the hope of hitting \$1 billion in monthly revenues. Egypt is pushing to maximize its natural gas exports in order to secure foreign reserves, having been thrown into a financial crisis by the war in Ukraine.<sup>6</sup>

The Egyptian Government says that gas exports were stepped up after it presented its electricity savings plan in August, i.e., its program to reduce domestic consumption in order to divert more gas for export. In order for the Egyptians to be able to meet their \$1 billion target, they must continue to reduce domestic consumption but at the same time also increase extraction from their own gas reserves. Moreover, Egypt will have to boost the quantity of gas at its disposal by increasing its own imports from Israel or Cyprus, liquefying them at its facilities, and then exporting them to international markets at higher prices.

Having established this background, this is the place to outline and analyze Egypt's exclusive economic zone in the Eastern Mediterranean. This EEZ contains the bulk of Egypt's major gas reserves, from the El-Arish region in the northern Sinai in the east of the country, all the way to the maritime boundary with Libya in the west. Egypt's gas reserves have grown eightfold in recent years, relative to its known reserves in 2010-2014. Egypt's known gas reserves now stand at 36.8 trillion cubic feet<sup>7</sup>—and counting, in my assessment.

This resource, of abundant gas reserves in the Eastern Mediterranean, provides one of Egypt's main sources of income alongside its revenues from the Suez Canal, which also provides Egypt with a substantial revenue stream. Twelve percent of global trade passes through the Suez Canal, and in July 2022, the canal (and therefore Egypt) registered record revenues of \$704 million. This figure is far higher than the \$531.8 million of revenues in the same month in the previous year, representing a rise of \$172.2 million—a 32.4 percent increase.<sup>8</sup>

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<sup>5</sup> Minister el-Molla quoted in: [Egypt's natural gas, LNG export revenues double in first four months of 2022](#), *Energy Egypt*, June 1, 2022.

<sup>6</sup> ["Egypt Reports \\$500 Million Monthly Income from Natural Gas Exports"](#), *Pipeline and Gas Journal*, September 22, 2022.

<sup>7</sup> Hiba Zin, ["Egypt's Transformation into a Regional Energy Hub via the Gas Facilities Project in the Recent Eight Years"](#), *Almarsad Almasry*, June 8, 2022 (translated from Arabic by Moshe Uzan).

<sup>8</sup> Shai Hayut, ["Data on the new Suez Canal"](#), *COB*, August 13, 2022 [Hebrew].

It follows that Egypt's EEZ in the Eastern Mediterranean and in the future, its EEZ in the Red Sea—a strategic asset of national importance for Egypt—can explain the accelerated build-up of the Egyptian Navy and construction of military ports over the past decade.<sup>9</sup>

As a neighboring state, enjoying peaceful relations with Egypt, it would be prudent for Israel to consider cooperation with Egypt in the fields of not only economics and commerce, but also security and the confrontation with external threats, such as from terror organizations or state sponsors of terror, or both.

### Exclusive economic zones in the Mediterranean: agreements, conflicts, and tensions

The states along the coastline of the Eastern Mediterranean claim exclusive economic zones (EEZs). Some of these EEZs are matters of agreement between states, but others are still disputed. Egypt is one of the states whose EEZ has been agreed with its neighbors: with some, *de jure*; with others, *de facto*.

Table 1 lists the states in the Eastern Mediterranean to which EEZs may be attributed: Cyprus, Greece, Turkey, Egypt, Israel, Lebanon, Syria, and even a small sliver belonging to the Palestinian Authority off the coast of the Gaza Strip. As we can see from this table, Egypt's EEZ in the Eastern Mediterranean stretches over an expanse of 236,000 km<sup>2</sup> (91,120 square miles), representing 19 percent of the total EEZs in this region. It should also be noted that recently, the possibility has also emerged for future Egyptian discoveries of gas reserves in the Red Sea, following the announcement of gas exploration tenders for ten zones from the northern Red Sea to the border with Sudan; tenders have already been won to explore three of them.<sup>10</sup>

On February 17, 2003, Cyprus and Egypt signed an agreement demarcating their EEZs, which achieved U.N. recognition.<sup>11</sup> In this context, we should note that later, in December 2010, Israel also signed its own EEZ agreement with Cyprus.<sup>12</sup>

<sup>9</sup> Yitzhak Vardi and Shlomo Guetta, "[Interview with Vice Admiral Ahmed Khaled](#)", Maritime Policy & Strategy Research Center, University of Haifa, February 2, 2022 [Hebrew].

<sup>10</sup> On this issue of the potential for Egypt to discover and develop natural gas in its Red Sea EEZ, see: Shlomo Guetta, "Exclusive Economic Zones (EEZ) in the Red Sea Region: Risks and Opportunities" in Shaul Chorev and Ziv Rubinovitz (eds.), *Maritime Strategic Evaluation for Israel 2021/22* (Haifa: Maritime Policy & Strategy Research Center, University of Haifa, 2022), 221–243.

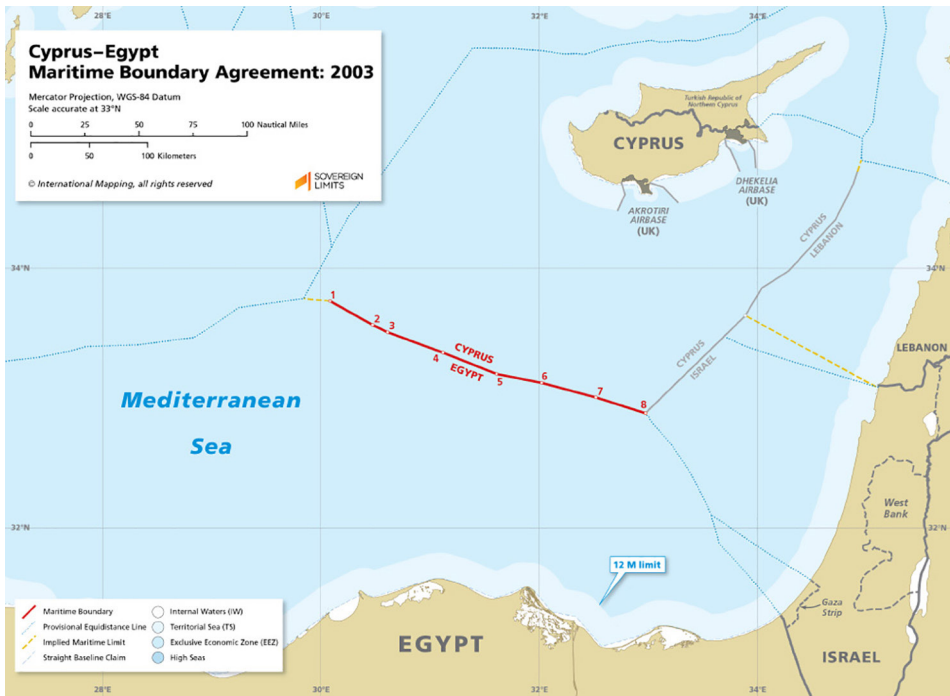
<sup>11</sup> [Agreement between the Republic of Cyprus and the Arab Republic of Egypt on the Delimitation of the Exclusive Economic Zone](#), February 17, 2003.

<sup>12</sup> Yuval Yoaz, "[The agreement with Cyprus about the maritime boundary will be anchored in law](#)", *Globes*, December 17, 2013 [Hebrew]; Avi Bareli, "[Israel and Cyprus agreed on the boundary of their EEZs](#)", *The Marker*, December 19, 2010 [Hebrew].



Table 1: Exclusive Economic Zones in the Mediterranean

EEZ	Size (km <sup>2</sup> )	Size (as % of total EEZs in the Eastern Mediterranean)
Palestine	1,668	0.001%
Syria	10,181	1%
Lebanon	19,261	2%
Israel	20,090	2%
Cyprus	98,044	8%
Joint Turkey-Libya EEZ	107,000	9%
Egypt	235,895	19%
Turkey	255,744	21%
Greece	493,235	40%
Total EEZs, including declared Turkey-Libya EEZ	1,247,117	100%

Figure 2: Map of the agreement demarcating Egypt and Cyprus' EEZs, 2003<sup>13</sup>

Israel and Egypt do not have an official, signed agreement demarcating the boundary between their EEZs in the Mediterranean. In practice, however, they have understandings, because Israel has already publicized the scope of its EEZ and gas and petroleum

<sup>13</sup> [Cyprus-Egypt](#), Sovereign Limits, Retrieved December 23, 2022.

exploration areas, and Egypt has also marked out its own claims. In meetings and discussions with the Israeli Ministry of Foreign Affairs and Ministry of Energy a few years ago, in preparation for the publication of a tender, there were no discrepancies between the nations' demarcations, besides one small area, apparently because of differences in the method for determining the placement of the boundary, as defined by each respective state.<sup>14</sup>

In late 2019, Turkey pursued a fairly dramatic shift in its approach to existing agreements. In the latter half of the preceding decade, Turkey had adopted a doctrine that it called "Blue Homeland" (*Mavi Vatan*), which stated that Turkey enjoyed much greater economic rights in the Mediterranean than previously recognized. In a move to implement this doctrine, Turkey signed a memorandum of understanding with the Tripoli-based government of Libya in 2019, demarcating a shared EEZ for the two nations (Figure 3: a trapezoid area from the middle of the Turkish coast to the eastern shoreline of Libya).<sup>15</sup>



Figure 3: Demarcation map of EEZs in the Eastern Mediterranean, including the joint Turkish-Libyan area unilaterally declared by the two nations.<sup>16</sup>

The memorandum of understanding between Turkey and the Libyan government in Tripoli shocked the nations of the Eastern Mediterranean, and moreover, it came at the height

<sup>14</sup> Conversation with Mr. Baruch Pertzman, former head of the hydrography division of the Israeli Navy and former head of the cartographic reproduction department at the Survey of Israel. To the best of his knowledge, the agreement between Israel and Egypt has not been signed. He says that a tender was published and no subsequent problems emerged with the Egyptian side.

<sup>15</sup> Omri Eilat and Ayal Hayut-man, "[The Turkish Maritime Doctrine – The 'Blue Homeland' \(\*Mavi Vatan\*\)](#)", in Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21* (Haifa: Maritime Policy & Strategy Research Center, University of Haifa, 2021), 187–195.

<sup>16</sup> *Ibid.*, 194.

of the civil war in Libya between the Tripoli government and the Benghazi government, with Turkey, of course, supporting the former and even sending military and naval forces there,<sup>17</sup> while Egypt, as we have seen, supports the rival government in the east of Libya.

As we can see from Figure 4, Cyprus and Greece are the main victims of Turkey's announcement of its Blue Homeland Doctrine, which like the MOU with Libya, similarly transverses and dissects their own EEZs. The Turkish-Libyan agreement is, from Turkey's perspective, an expression of this stated doctrine.

From Egypt's perspective, Turkey's Blue Homeland Doctrine, put into practice, *inter alia*, with the Turkish-Libyan agreement, does not directly undermine its EEZ other than in a marginal area, but Egypt expressed its reservations and concerns about the Turkish side of the agreement, since it positions Turkey militarily on Egypt's western border and poses a potential threat to the integrity of Egypt's EEZ along its maritime boundary with Libya. In Figure 4, we can see that the joint Turkish-Libyan zone slightly encroaches into Egypt's EEZ on its eastern flank.

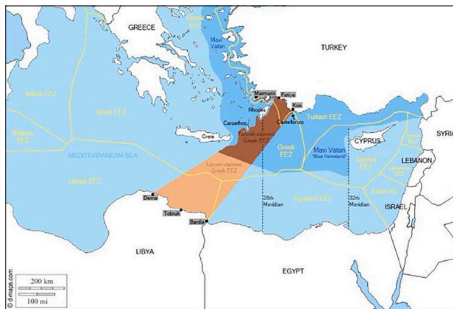


Figure 4: The joint Turkish-Libyan EEZ and its proximity to Egypt's EEZ (in its northwestern corner)<sup>18</sup>

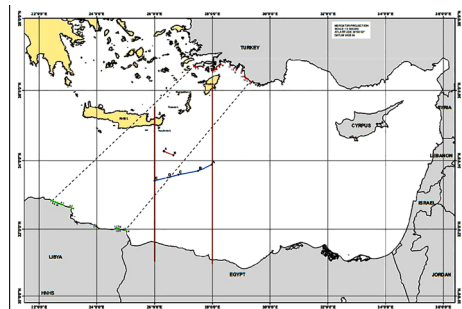


Figure 5: Map of the EEZ agreement between Egypt and Greece, 2020<sup>19</sup>

Moreover, from Egypt's perspective, Turkey's doctrine and joint endeavor with Libya undermine its shared economic interests with Cyprus and Greece. As we recall, Egypt signed an EEZ agreement with Cyprus back in 2003. In the context of this Turkish move,

<sup>17</sup> Shlomo Guetta, "[The Turkish Navy – Its Strengthening Process and Operational Doctrine](#)", in Shaul Chorev and Ehud Gonen (eds.), *Maritime Strategic Evaluation for Israel 2020/21* (Haifa: Maritime Policy and Strategy Research Center, University of Haifa, 2021), 168–186.

<sup>18</sup> [Egypt says Turkey's seismic survey plans could encroach on its waters](#), *Keep Talking Greece*, August 2, 2020.

<sup>19</sup> [Greece and Egypt sign historic agreement for delimitation of EEZ](#), *Keep Talking Greece*, August 6, 2020.

Egypt and Greece quickly signed an agreement in September 2020, which they deposited with the United Nations in December.<sup>20</sup>

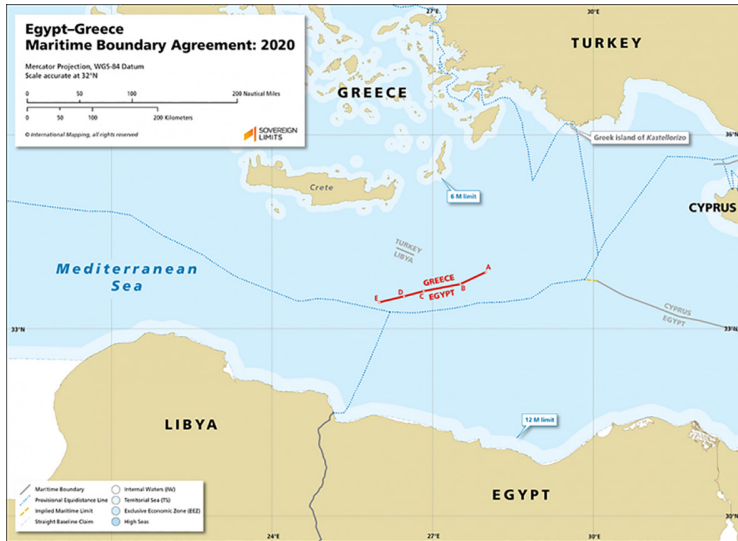


Figure 6: Map of the EEZ agreement between Greece and Egypt<sup>21</sup>

Over the course of 2020, Turkey gave practical expression to its declaration of intent regarding its rights to EEZs in the Eastern Mediterranean in accordance with its Blue Homeland Doctrine and sent drillships, escorted by warships, to conduct surveys and drilling operations in Greece and Cyprus' exclusive economic zones.<sup>22</sup>

In 2021, and for most of 2022, Turkey's pursuit of its Blue Homeland Doctrine calmed down somewhat, but in the first week of October 2022, Libya's Tripoli-based government signed a series of preliminary economic agreements with Turkey, which included provisions for potential energy exploration at sea.<sup>23</sup> It is almost certain that the "maritime areas" in question are the joint Turkish-Libyan EEZ. Predictably, these latest agreements from

<sup>20</sup> EEZ agreement between Greece and Egypt in 2020: [@Emerson14](#), *Twitter*, December 24, 2020; for an analysis of the agreement, see: Ildir Lika, "[The Greece-Egypt Maritime Agreement and Its Implications for the Greek-Turkish Dispute in the Eastern Mediterranean](#)", *SETA Analysis*, no. 67, August 2020.

<sup>21</sup> [Egypt-Greece](#), *Sovereign Limits*, Retrieved December 23, 2022.

<sup>22</sup> For details on Turkish activity in this field, see: Semion Polinov and Shlomo Guetta, "[Turkey: Oruc Reis's geophysical maritime surveys and other research ships in the Eastern Mediterranean](#)", *Maritime Policy and Strategy Research Center*, University of Haifa, September 30, 2020 [Hebrew].

<sup>23</sup> "[Berlin: Greece 'not bound' by Turkey-Libya agreement](#)", *ekathimerini*, October 5, 2022.

October 2022 have provoked resistance and disagreement on the part of the eastern Libyan government, and indeed also from Greece, Cyprus, and Egypt.<sup>24</sup>

From Israel's perspective, Turkey's Blue Homeland Doctrine may have implications for the Israeli-Cypriot EEZ agreement from 2010 as well as for the progression of the EastMed gas pipeline project (which is expected to serve Israel, Egypt, Cyprus, and Greece). Assessments of this project's feasibility and profitability have changed over time, and at present, against the backdrop of the Russo-Ukrainian War and the gas crisis in Europe, the project has become significantly more urgent and worthwhile from Egypt's perspective.

The primary focus of this article is Egypt, but if we are already discussing the web of EEZs in the Mediterranean, it is only proper to recall the dispute between Israel and Lebanon concerning the demarcation of the maritime boundary between them, which was a considerable preoccupation for both parties and mediators in 2022. Ultimately, in October 2022, the two states signed a memorandum of understanding after intense efforts with U.S. mediation.<sup>25</sup>

Egypt is expected to play a role, whether direct or indirect, in the energy relationship between Israel and its neighbors to the north and south, as an interim stage until they reach independence in gas extraction. As for Lebanon, Egypt is involved in the transportation of LNG (which might in fact originate in Israel), to be sent through a pipeline to Jordan and from there, to Syria and Lebanon. As for the economic potential of gas extraction off the coast of the Gaza Strip, here too Egyptian involvement can be expected (and is indeed even desirable), to help to extract gas from the Palestinian Authority's small reservoir, called Gaza Marine.<sup>26</sup>

## The development of the Egyptian gas industry in the maritime domain

The previous section explored the complex web of national EEZs in the Eastern Mediterranean, with a particular focus on Egypt. This section discusses how Egypt has been realizing the latent economic potential of its Mediterranean EEZ.

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<sup>24</sup> For an example of Greece's expected preliminary response, see: LibyaMohammed, "[After the signing of Libyan-Turkish agreement, Greece escalates its position and threatens to use force](#)", *The Libya Observer*, October 8, 2022.

<sup>25</sup> For more, see the article by Benny Spanier and Orin Shefler in this volume.

<sup>26</sup> For more on the possibility of Egyptian involvement in the production of gas from the Palestinian prospect off the coast of the Gaza Strip, see: Rasha Abou Jalal, "[Egypt Persuades Israel to Extract Gaza's Natural Gas](#)", *Al-Monitor*, October 6, 2022.

This field is the responsibility of the Egyptian Ministry of Petroleum and Mineral Reserves, which has been headed since September 2015 by Tarek el-Molla.<sup>27</sup> The natural gas business in Egypt is led by EGAS, the Egyptian Natural Gas holding company, founded in 2001.<sup>28</sup> Foreign energy companies' involvement in the extraction of Egyptian natural gas will be discussed later in this article.

Since the late 1990s, and especially since the turn of the twenty-first century, large and proven natural gas fields have been discovered in the Mediterranean Sea in the maritime domain stretching from Port Said and the northern shores of the Sinai in the east to the shores of the Nile Delta and Alexandria in the west, and now even further west, in the direction of the maritime boundary with Libya.

During Hosni Mubarak's presidency, Egypt placed a severe cap on gas prices and the Egyptian Government refused to pay the foreign gas companies operating these fields more than \$2/BTU, a rate that was simply unprofitable for them. Mubarak's overthrow in 2011 during the events of the Arab Spring, and the subsequent rise of the Muslim Brotherhood regime headed by Morsi, did not fundamentally change the situation, and the Egyptian gas industry continued to falter until 2014, and what is more, Egypt failed to pay its debts to the production companies. In these circumstances, foreign companies saw Egypt as an unreliable business partner.<sup>29</sup>

When President Abdel Fattah el-Sisi rose to power in 2014, Egypt was at a dead end. For years, President Mubarak had neglected the gas market and had not invested in developing new energy sources. After his overthrow, Egypt was thrust into a long period of instability, which plunged the Egyptian Government not only into heavy debts but also into a shortage of gas for domestic consumption. In 2012, the rate of gas production in Egypt began to drop. El-Sisi worked to reduce Egypt's heavy debts and undertook a series of reforms, including the privatization of the gas market, which produced significant new discoveries and boosted extraction efforts in 2015-2019. The high point in the 2010s came with the discovery of the Zohr gas field by the Italian energy company Eni.<sup>30</sup>

Since the formation of the el-Sisi government, foreign companies' confidence in Egypt's abilities to pay its debts has been restored, in a deviation from the past, and they began to enjoy better concession and compensation terms. Moreover, in this period, Egypt

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<sup>27</sup> [Tarek El-Molla](#), *Wikipedia*, retrieved December 2022.

<sup>28</sup> Website of the [Egyptian Natural Gas Holding Company](#) – EGAS.

<sup>29</sup> This state-of-affairs finds expression in a range of sources, specifically in: Hiba Zin, *Egypt's Transformation into a Regional Energy Center*, 2022.

<sup>30</sup> This account is based on a range of sources, including: "[President Sisi urges Italy's Eni to expand its Egypt exploration activities](#)", *Energy Egypt*, October 15, 2020.

became one of the biggest gas producers in Africa (taking third place behind Algeria and Nigeria) and the Eastern Mediterranean. This was thanks to the discovery of enormous gas reserves, especially in Egypt's Mediterranean EEZ.

Egypt's vision is that by 2030, gas production in the country will fully satisfy local demand (which is only growing, owing to population growth) while at the same time leaving sufficient surpluses for export. According to one source, quoting an energy industry professional: "We expect that by 2030, Egypt will have sufficient gas surpluses for export, ranging between around 17-30 BCM a year, and between 7.5-25 BCM a year by 2040."<sup>31</sup> The realization of this vision depends on Egypt's ability to take additional steps to use technology to produce energy from other sources, with the aim of releasing more gas for export, such as developing green energy (wind turbines and solar energy), building a new hydroelectric dam, and setting up a nuclear energy reactor.

This was the forecast as of 2019. In light of developments in the first half of 2022, however, and especially the Russo-Ukrainian War, there have been noticeable changes, as we have seen, and the direction in Egypt nowadays is toward increasing production on the one hand and cutting back on local consumption on the other, in order to leave larger gas surpluses for export. Additionally, there are now more energy production fields as a result of the announcement of new tenders over the past two years, with winning companies selected in the Red Sea and in the Herodotus Basin adjacent to the Libyan border.<sup>32</sup>

The development of Egypt's maritime gas reserves led to the development of a large-scale gas industry out at sea and along the Mediterranean coast, including a pipeline and two LNG liquefaction plants: one at Idku east of Alexandria,<sup>33</sup> and the second at Damietta west of Port Said.<sup>34</sup> It bears noting that a joint Spanish-Egyptian company called SEGAS, a joint venture founded at the start of the twentieth century, is involved with these liquefaction plants in Egypt.<sup>35</sup>

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<sup>31</sup> Amnon Portugali, "[The gas balance in Egypt—growth is up, but so is poverty](#)", *Avoda Shchora*, October 2, 2019 [Hebrew].

<sup>32</sup> On the subject of new tenders on Egypt's western border in the Mediterranean, see: "[Egypt agrees with five majors on West Mediterranean exploration](#)", *Energy Egypt*, February 16, 2020; And in the Red Sea: "[Egypt signs Oil & Gas Exploration Agreements worth \\$1 billion](#)", *Energy Egypt*, January 3, 2021; and "[El Molla: New Oil & Gas exploration tenders coming soon](#)" *Energy Egypt*, January 31, 2021.

<sup>33</sup> For more on the potential of liquefaction at the Idku plant, see: "[Egyptian LNG Project, Idku](#)", *NS Energy*, Retrieved December 23, 2022.

<sup>34</sup> "[Damietta Segas LNG Terminal](#)", *Global Energy Monitor Wiki*, edited July 13, 2022.

<sup>35</sup> For more on the joint Egyptian-Spanish company's operations, see: "[SEGAS Liquefied Natural Gas Complex, Damietta](#)", *Hydrocarbons Technology*, Retrieved December 23, 2022.

As noted, the Damietta liquefaction plant was brought back online in 2021 after an eight-year hiatus. Together, these two plants are capable of producing over 12 million tons of LNG a year. Egypt also has an LNG storage terminal in the northern Gulf of Suez, in a place called Ain Sokhna, which serves to improve the transportation of liquefied gas to and from Asian markets.



Figure 7: Idku LNG plant with an annual production capacity of 7.2 million tons of liquefied gas and the potential for a further increase<sup>36</sup>



Figure 8: Damietta LNG plant, which is back online with an annual production capacity of around 5 million tons of liquefied gas and the potential for a further increase with an expansion<sup>37</sup>

Moreover, Egypt, whose shores and ports lie along the Mediterranean Sea and the Red Sea, will, in my assessment, aim to build another port or two as hub ports (regional natural

<sup>36</sup> Source of illustration: [Welcome to Egyptian LNG](#), Egyptian LNG Website.  
<sup>37</sup> Source of illustration: Mariana Somensi, "[ADNOC LNG Signs \\$860M EPC Contract with Tecnicas Reunidas](#)," *Egypt Oil & Gas*, September 26, 2018.



gas centers) to export LNG from its own reserves and from additional foreign sources, such as Cyprus and Israel.

From an objective perspective, it is universally accepted that Egypt is an important player in the Mediterranean when it comes to EEZs. Other developments that unfolded in 2021-2022 have improved Egypt's ability to remain a central and dominant actor in the production of natural gas from its reserves in its EEZ.

In June 2022, an Egyptian scholar published a paper on Egypt's transformation into a regional energy hub, which is clearly based on up-to-date information from Egyptian authorities. In her account, in 2011–2013, Egypt's development of its energy infrastructure was effectively frozen. In 2014, by implication, following President el-Sisi's rise to power, Egypt reactivated its energy production and exploration efforts. The scholar notes that in 2014–2020, eighty-four exploration agreements were signed with international energy companies, which committed to a minimum investment of \$14.8 billion, with Egypt receiving a \$1.1 billion grant with the signing of drilling agreements for a total of 351 drilling operations. These agreements, and the orderly demarcation of Egypt's gas fields, restored international confidence in the Egyptian energy production market.<sup>38</sup>

## Proven and active gas reserves in the Mediterranean

Statistically, we should note that nearly 60 percent of the gas produced in Egypt comes from its reserves in its Mediterranean EEZ, as illustrated in the diagram in Figure 9.<sup>39</sup>

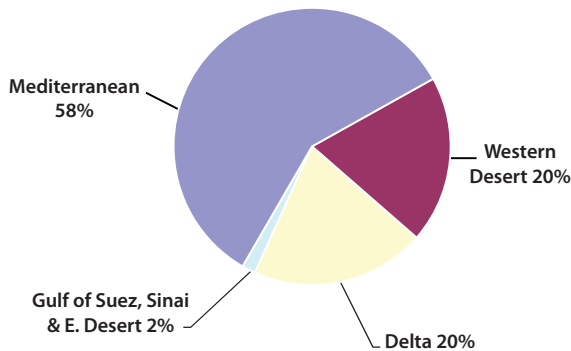


Figure 9: Quantities of gas produced in Egypt from reserves in its Mediterranean EEZ in 2018–2019<sup>40</sup>

<sup>38</sup> Hiba Zin, "Egypt's Transformation into a Regional Energy Hub", 2022.

<sup>39</sup> *Egyptian Natural Gas Holding Company, Sustainable Energy Leap, Annual Report 2018–2019*, EGAS (2019).

<sup>40</sup> *Ibid.*, p. 26.

For an impression of the full scope of Egypt's Mediterranean gas reserves, we shall present a list of production sites in Egypt's maritime domain in the Mediterranean Sea. But before outlining the key details of the active gas reserves in Egypt, we should note the historical fact that the first Egyptian maritime gas field in the Mediterranean was discovered in 1969 in the sea opposite Abu Qir.<sup>41</sup>

Since then, foreign energy companies have begun to be involved in the production of natural gas in Egypt, from both its underground and maritime reserves. The largest, oldest, and most dominant companies in this industry are British Petroleum (BP), the Italian company Eni, and the Dutch company Shell. Over the past two to three years, more energy companies have joined the Egyptian natural gas scene, including the U.S. energy giants Chevron and Exxonmobil, the French company Total, the Italian company Edison, the Greek company Energean, and the Emirati company Mubadala.

Spain is also involved in the natural gas liquefaction industry in Egypt, through the company Union Fenosa, founded in the early twenty-first century by a joint Egyptian-Spanish company called SEGAS, and in the context of the construction and operation of the Damietta liquefaction plant, which the Italian company Eni was also involved in running. The facility was inactive for around eight years, and under pressure from Eni was brought back online in 2021.<sup>42</sup>

### *The Alexandria and Nile Delta region*

**WND (West Nile Delta)** — a deep-sea gas reserve 60–80km (37–50 miles) north of Alexandria. The main contractor and production company is British Petroleum (BP).

**Northwest Abu Qir** — In late November 2022, it was announced that British Petroleum, which has been working in a successful partnership with Egypt for around sixty years, with a cumulative investment of over \$35 billion, was awarded two new gas exploration blocks northwest of the WND development, which has also been operated by BP for many years. These two new blocks cover an area of around 1,000km<sup>2</sup> (386 square miles) with water depths ranging between 600 and 1,600 meters.<sup>43</sup>

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<sup>41</sup> Website of the Egyptian Ministry of Petroleum and Mineral Reserves: "[Natural Gas](#)", Ministry of Petroleum & Mineral Resources, Retrieved December 2022.

<sup>42</sup> Eni is advancing talks between the partners of the Damietta plant to restart its activities: "[Eni: Talks resume on restarting Egypt's idled Damietta LNG facility](#)", *Energy Egypt*, October 11, 2020.

<sup>43</sup> "[BP Awarded Two Exploration Blocks in Egypt's Offshore Nile Delta](#)", *Energy Egypt*, November 28, 2022.

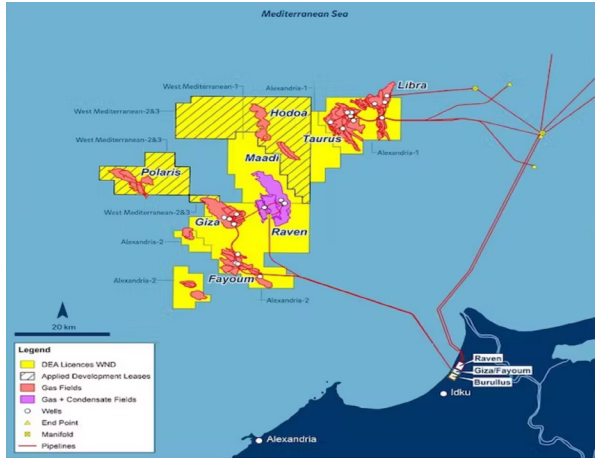


Figure 10: The West Nile Delta (WND) reserve north of Alexandria<sup>44</sup>

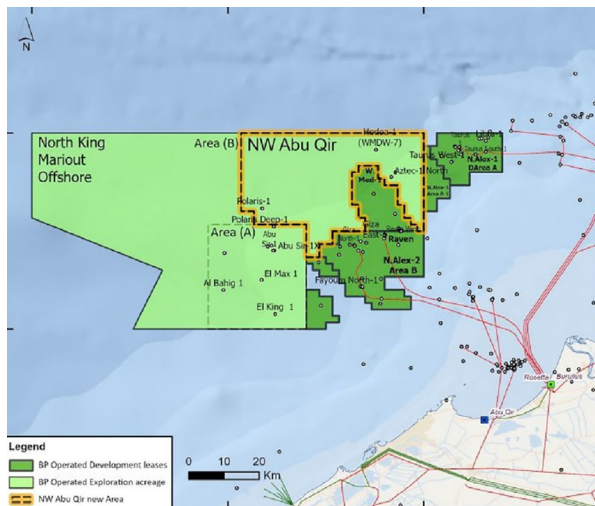


Figure 11: The new development in which BP was awarded exploration blocks northwest of Abu Qir: the light-green area surrounded by an orange line. The dark-green area is the WND development, mostly a BP concession.<sup>45</sup>

**Nooros** — a gas reserve in shallow waters north of the Delta. The development is known as the Great Nooros Area, adjacent to WND but closer to the shore. In early July 2020,

<sup>44</sup> Offshore Staff, "[BP brings two more gas fields onstream offshore northern Egypt](#)", *Offshore*, February 11, 2019.

<sup>45</sup> *Ibid.*

the Italian company Eni announced the discovery of a new well in the Nooros area some 11km (7 miles) offshore, at a depth of around 22 meters, with promising potential for the extraction of a layer of gas around 150 meters thick.

Zohr — the centerpiece — a huge reserve discovered in 2015 by the Italian company Eni. Extraction, at a daily rate of 2.3 billion cubic feet, began in July 2019. Eni is the operator of the block, albeit in a partnership with British Petroleum and the Emirati company Mubadala. Many researchers believe that this development marked a turning point in Egypt's status as a gas producer in Africa and the Mediterranean, of the sort that could become a regional energy hub. In any case, Zohr is considered one of the biggest gas fields in the world and the largest in the Mediterranean.<sup>46</sup>

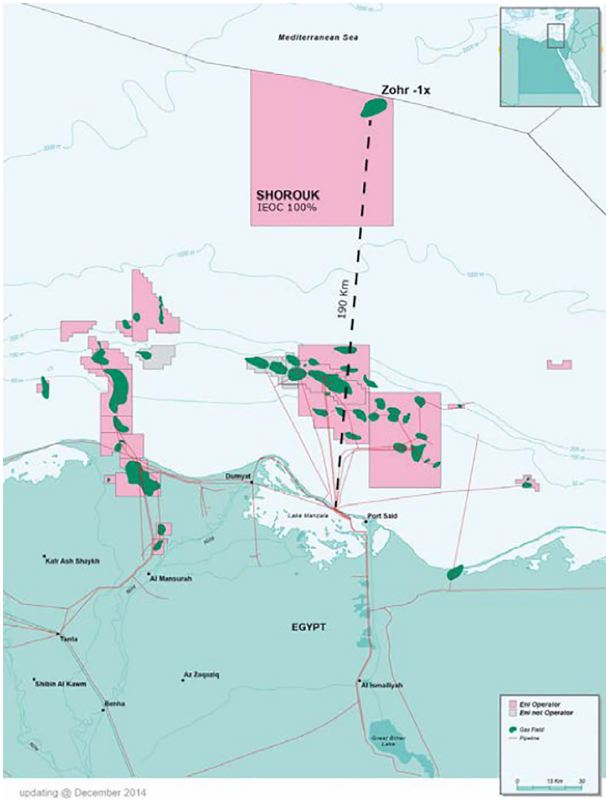


Figure 12: The Zohr gas field, 150km (93 miles) north of the shore, on the northern boundary of Egypt's exclusive economic zone<sup>47</sup>

46 "[Eni discovers a supergiant gas field in the Egyptian offshore, the largest ever found in the Mediterranean Sea](#)", *ENI.com*, August 30, 2015.  
47 "[Zohr Gas Field](#)", *Offshore Technology*, February 26 2021.

Atoll — discovered in 2017, some 40km (25 miles) north of Damietta. Discovered and operated by BP.

Adjacent to the WND reserves north of Alexandria, in the development known as the Great Nooros Area, Egypt recently published new tenders, this time for blocks 3, 4, and 6. This area is known as North Marakia. As far as is known, contracts have been awarded to the following major corporations: the Italian company Eni, the French company Total, the U.S. company ExxonMobil, the Dutch company Shell; it appears that BP will also be involved.

In the waters opposite the Nile Delta, across the Abu Qir Bay, the Greek company Energean was awarded a concession in 2021 to extract gas in a reserve spanning four fields in relatively shallow waters (30–80 meters), known as North El Amriya and North Idku.<sup>48</sup>

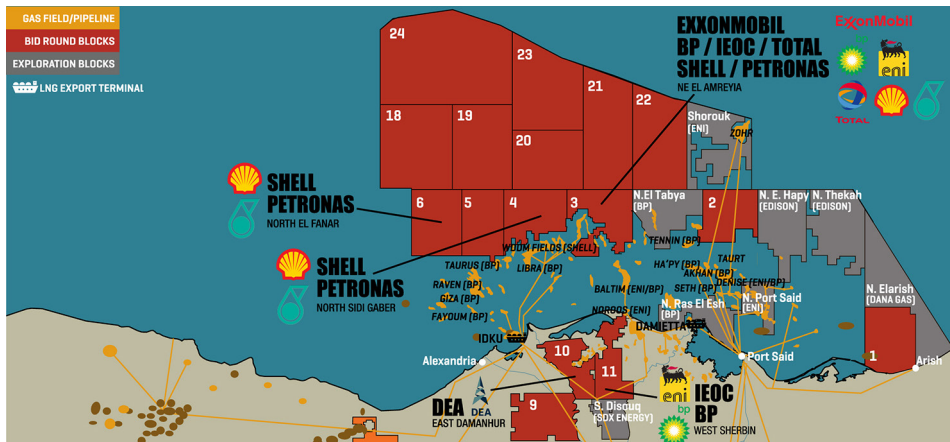


Figure 13: Concessions in new blocks (3, 4, 6) north of Alexandria and the Nile Delta<sup>49</sup>

### *The waters across the shores of the northern Sinai*

Nour and Tamsah are gas fields across the shores of the northern Sinai, led by the Italian corporation Eni in partnership with other companies, including Mubadala from the United Arab Emirates and British Petroleum.

North Thekah and North East Hap'y—On June 21, 2020, the Egyptian oil minister, Tarek el-Molla, announced new contracts at two sites opposite the northern shores of the

<sup>48</sup> For more on Energean's concession in the Bay of Abu-Qir, see: "[North El Amriya and North IDKU](#)", *Energean*, Retrieved December 23, 2022.

<sup>49</sup> Map depicting the concessions in blocks north of Alexandria and the Nile Delta. See: "[EGAS, EGPC 2018 Bid Rounds results announced with 12 blocks awarded](#)", *Energy Egypt*, February 13, 2019.

Sinai Peninsula, where the Italian company Edison had been awarded a concession in partnership with the Greek company Energean.<sup>50</sup>

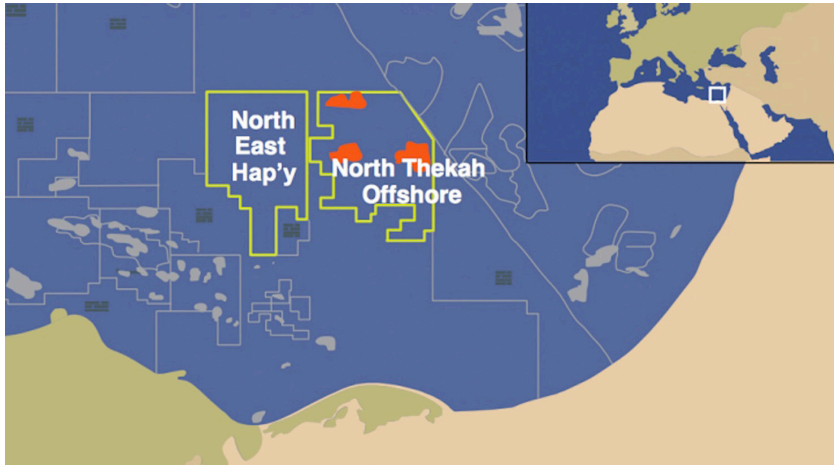


Figure 14: New sites opposite the northern shores of the Sinai, where Italian company Edison and Greek company Edison were recently awarded concessions<sup>51</sup>

**Thuraya**—a gas prospect north of El-Arish, very close to the Palestinian Authority's EEZ across from the Gaza Strip (Gaza Marine). The Italian energy company Eni currently holds a concession for this reserve, and in November 2022 it was announced that the company had begun drilling and was optimistic about finding similarly rich gas reserves to those previously discovered at Zohr.<sup>52</sup>

**Nargis**, another reserve off the coast of the northern Sinai in the eastern section of Egypt's EEZ, is a new prospect; its discovery by the U.S. company Chevron, in partnership with Italy's Eni, was announced in mid-December 2022.<sup>53</sup> Figure 15 depicts Chevron's drilling sites in Egypt's EEZ, mostly west of Alexandria, while the new prospect of Nargis, off the coast of the northern Sinai, is situated on the eastern edge of Egypt's EEZ, adjacent the western fringes of the Israeli and Palestinian EEZs.

<sup>50</sup> "[Edison successfully completes Aameq 1-X exploration well offshore Egypt](#)", *Energy Egypt*, June 2, 2020; North East Hap'y, *Energean*, June 2020.

<sup>51</sup> Edison successfully completes Aameq 1-X exploration well offshore Egypt, 2020.

<sup>52</sup> Eni's statement about the start of drilling operations north of el-Arish: Ed Reed, "[Eni Plunges into Thuraya work, Picking Up from Dana Gas](#)", *Energy Voice*, November 28, 2022.

<sup>53</sup> "[Chevron Hits a Motherlode in the Mediterranean](#)", *Africa Oil+Gas Report*, December 19, 2022; Reuters News Service "Egypt discovers large gas field in Mediterranean, minister says", *Cyprus Mail*, December 19, 2022.



Source: Chevron Corp.

Figure 15: The gas fields operated by Chevron in Egypt<sup>54</sup>

### *New exploration prospects in the western Herodotus Basin*

The Herodotus Basin lies off the Egyptian coast from the center of the Nile Delta in the east to the Libyan border in the west. In late 2019, a new tender was published in Egypt for gas exploration in eleven blocks, of which eight were in the western section of the Herodotus Basin (Figure 16).<sup>55</sup>

In July 2020, it was announced that foreign companies had been awarded concessions in several of the eight blocks included in the new tender in the Herodotus Basin. One of the successful firms was a new player in the region: the U.S. energy giant Chevron. Its neighboring blocks were awarded to Britain's BP, France's Total, and the Netherlands' Shell (Figure 17).<sup>56</sup>

<sup>54</sup> Jacob Dick, "[Chevron, Egypt Pondering Increased Natural Gas Exports](#)", *NGI, Natural Gas Intelligence*, June 27, 2022.

<sup>55</sup> Announcement by the Egyptian Ministry of Energy in October 2019 about the publication of a tender for eleven blocks on Egypt's western coast: "[EGAS upcoming Bid Round will include 11 Blocks in Egypt's West Mediterranean](#)", *Energy Egypt*, October 20, 2019.

<sup>56</sup> "[MEES: Egypt bags all five Supermajors with key West Mediterranean awards](#)", *Energy Egypt*, July 11, 2020.

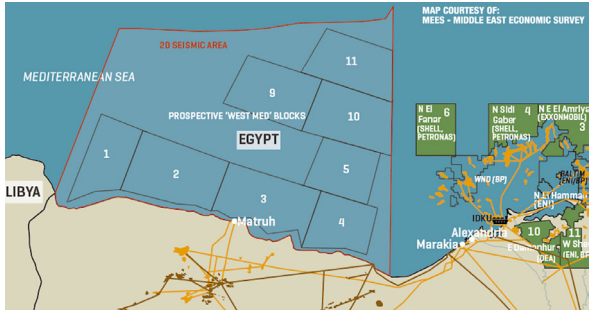


Figure 16: Distribution of the eight blocks in the Herodotus Basin included in the tender<sup>57</sup>

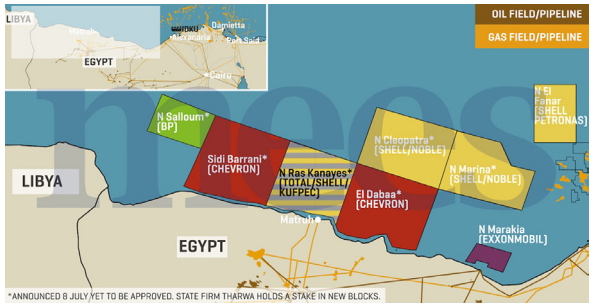


Figure 17: New concessions in the western Herodotus Basin<sup>58</sup>

## Conclusion

Egypt is an important and influential player in the Eastern Mediterranean, not least as a state possessing a significant share of abundant gas reserves in its exclusive economic zone, from the El-Arish area in the northern Sinai in the east to the area of El-Salloum on the Libyan border. Additionally, Egypt possesses relatively developed infrastructure, including gas liquefaction plants capable of producing over 12 million tons a year, and whose capacity is expected to grow with additional investment by major foreign gas firms. This liquefaction infrastructure gives Egypt a considerable advantage considering the present demand for LNG from a range of consumers around the world and especially in the European market.

<sup>57</sup> Announcement by the Egyptian Ministry of Energy about the publication of a tender for eight blocks in the Herodotus Basin, with concessions awarded for some of them. "[Egypt agrees with five majors on West Mediterranean exploration](#)", *Energy Egypt*, February 16, 2020.

<sup>58</sup> MEES, *Energy Egypt*, 2020. Note that Chevron's activities on Egypt's western shore is in addition to the activity announced in December 2022 in the Nargis prospect off the coast of the northern Sinai.



The recent discoveries from the middle of the 2010s, most notably the Zohr gas field, in the context of Egypt's plan for this industry and accelerated development efforts, have brought Egypt's capacity for natural gas production up to 7.2 billion cubic feet a day—a record pace for the gas industry in Egypt.

Egypt's known gas reserves have grown eightfold over the past few years, relative to its proven reserves in 2010-2014. According to the *Oil & Gas Journal*, as of January 2021, Egypt's gas reserves stand at 63 trillion cubic feet (Tcf),<sup>59</sup> and in my assessment, this number will surely rise with the discovery of new reserves in the Herodotus Basin adjacent to the Libyan border and in the northern Red Sea, after their development by the contractors who have been awarded new concessions over the past two years, and with the announcement of a new package of tenders in 2023.

In early 2023, a new tender is expected to be announced in Egypt for gas extraction at twelve blocks in the Western Desert and Mediterranean Sea. Bid offerings will be allowed to be submitted until the end of the second quarter of 2023.<sup>60</sup> When companies are awarded these new blocks, this will come on top of the enormous existing gas reserves in Egypt's EEZ in the Mediterranean Sea.

The past three years have seen diplomatic and political tensions and conflict over questions of control and ownership in the exclusive economic zones of the Eastern Mediterranean. Nevertheless, it is worth noting that the gas and energy market, influenced mainly by economic profit-and-loss considerations, is not swayed by diplomatic or ideological considerations. For evidence, consider that tensions between states have not translated into a lack of trade between them, even in the gas market, as we can see from commerce between Turkey and Egypt, or even Israel's supply of gas through Egypt to Jordan and from there to Syria and Lebanon.

In the introduction to this article, we noted the Egyptian finance minister's aspiration, as he expressed this past summer, to reach monthly natural gas exports of \$1 billion. This means that Egypt will strive to achieve the following targets:

- Increasing gas extraction from its wells, beyond its original plans for the coming years;
- Reducing and streamlining domestic consumption of natural gas in order to make more available for export;
- Speeding up exploration and extraction from reserves for which new concessions have been awarded;

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<sup>59</sup> [Country Analysis Executive Summary: Egypt](#), EIA, US. Energy Information Administration, April 4, 2022, p. 6.

<sup>60</sup> "[Egypt Will Offer 12 Blocks for Gas Exploration](#)", *Africa Oil+Gas Report*, December 19, 2022.

- Striving to buy additional quantities of natural gas from Israel, Greece, and Cyprus, with the aim of selling it as LNG at a higher price.

Egypt's EEZ in the Eastern Mediterranean and soon also, it appears, its EEZ in the Red Sea provide the country, therefore, with a substantial economic anchor and an extremely significant source of revenues for the Egyptian treasury, alongside Egypt's revenue stream from the Suez Canal.

We may, to a large extent, point to Egypt's maritime resources and its need to protect them as a critical factor behind the expansion of the Egyptian navy with advanced ships and the accelerated development of its ports and harbors (including for military purposes) along Egypt's shores.

The development of Egypt's ports and harbors is directly related, in part, to the nation's gas infrastructure and shipping industry (which is also growing in Egypt, in line with an organized masterplan); it is also related, in another part, to the deployment of Egyptian military vessels at its new or renovated naval bases, such as the 3 July Naval Base (Gargoub) adjacent to the border with Libya, as well as the Abu Qir and Port Fuad naval bases, all in the Mediterranean. Meanwhile, the new Berenice Naval Base in the Red Sea near the border with Sudan is intended to host a deployment of naval vessels to defend Egypt's EEZ and any gas reserves discovered in the Red Sea in the near future (here too, as we have seen, Egypt has announced a bidding process and awarded concessions in three blocks).<sup>61</sup>

As for Israel, Egypt is a neighboring state with which Israel has a peace treaty that is over forty years strong. Since Egypt is an influential player in the energy sector in the Eastern Mediterranean, in the interests of good neighborly relations and mutual, shared, and complementary economic profitability, it is important that decision-makers in the State of Israel be conscious of the proven potential of Egypt's exclusive economic zones and gas industry.

The fact that in the last two years, two major energy firms (the U.S.-based Chevron and Greece's Energean) have started working both with Egypt and with Israel signals the potential for deepening ties between the two states in the energy sector in general and in the exploitation of gas reserves in their EEZs in particular.

It would therefore be right and proper to see Egypt as an important link in a friendly network across the Eastern Mediterranean (including Greece, Cyprus, Israel, and Egypt,

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<sup>61</sup> Guetta, "Exclusive Economic Zones (EEZ) in the Red Sea Region: Risks and Opportunities"; Vardi and Guetta, "Interview with Vice Admiral Ahmed Khaled."

and maybe in the future even Lebanon, to the extent that it is not controlled by hostile forces). Even Turkey, to the extent that it reaches understandings under international auspices in the context of its disputes with Greece and Cyprus, may yet join this web of states producing and exporting gas with the aim of addressing global demand in the present era.

As for Israeli-Egyptian bilateral relations, Egypt's EEZ serves as a platform for cooperation between the two nations, not only on matters of trade and commerce but also on security and action against similar and shared threats. The more cooperation in these fields, the greater the contribution to the continued maintenance and reinforcement of the Israel-Egypt Peace Treaty.

As for economic and commercial cooperation between Israel and Egypt, especially in the context of rising demand for natural gas as a result of the Russo-Ukrainian War, it is worth noting that in June 2022, Israel's then-energy minister, Karine Elharrar, signed a trilateral MOU in Cairo (between Israel, Egypt, and the European Union), which provided for Israeli gas to be transported to Egyptian liquefaction plants and from there, to Europe. The parties determined the division of Israeli gas between Egypt and the European Union. Another issue that was sorted out with the new MOU was the decision that Israel would use Egypt's liquefaction plants for the next few years as a means of transporting gas to Europe. The MOU stated that its signatories would work together to facilitate a dependable supply of natural gas to EU member states from Egypt, Israel, and other sources by means of the existing natural gas liquefaction facilities in Egypt.<sup>62</sup>

It is almost certain that Egypt and Israel's gas export surpluses will only partially meet European demand, but these new understandings hint at things to come—as the reexamination of the economic and practical feasibility of the EastMed gas pipeline project would suggest.

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<sup>62</sup> Danny Zaken, "[Now it's official: Israel, EU and Egypt signed gas export deal](#)", *Globes*, June 15, 2022 [Hebrew].