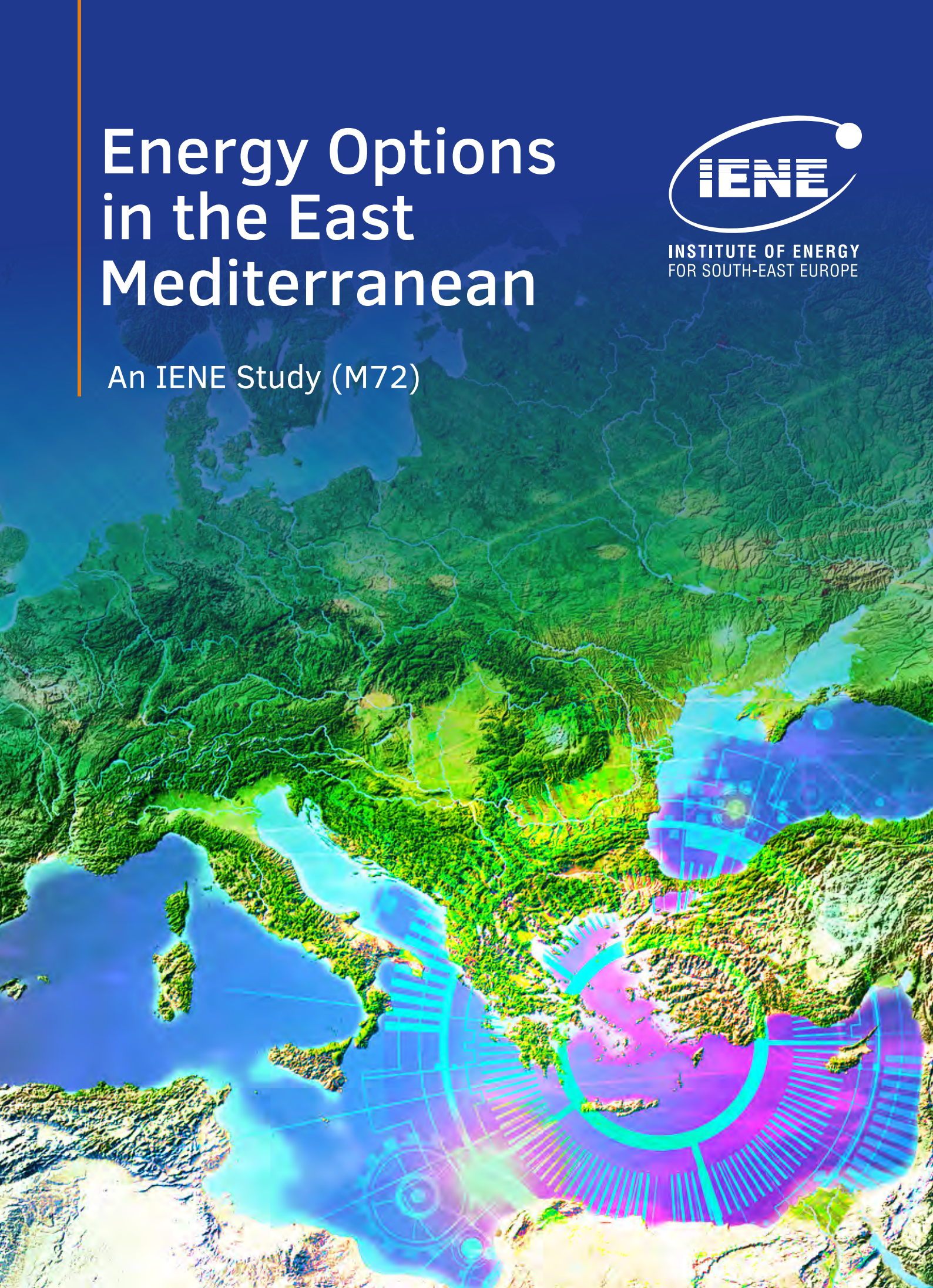
Energy Options in the East Mediterranean

An IENE Study (M72)

INSTITUTE OF ENERGY
FOR SOUTH-EAST EUROPE



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July 2025

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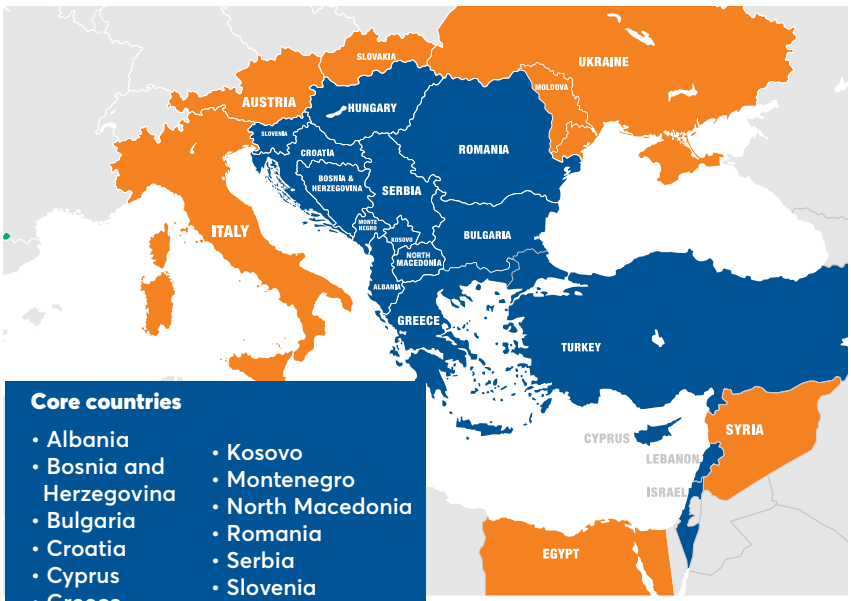
The Institute of Energy for South East Europe (IENE)

The Institute of Energy for South-East Europe (IENE) is an independent organization operating on a regional basis in SE Europe, covering the whole spectrum of the energy sector, with a strategy focused on sustainability and energy transition. IENE provides regular information to its members on developments in several countries in the region (see map), prepares studies and research, organizes events (conferences, workshops, webinars) and educational seminars. For more information visit www.iene.eu.



Core countries

- Albania
- Bosnia and Herzegovina
- Bulgaria
- Croatia
- Cyprus
- Greece
- Hungary
- Israel
- Kosovo
- Montenegro
- North Macedonia
- Romania
- Serbia
- Slovenia
- Turkey

Peripheral countries

- Austria
- Egypt
- Italy
- Lebanon
- Moldova
- Slovakia
- Syria
- Ukraine

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Preamble

As attention on the East Mediterranean and its potential role as a key energy supplier to Europe is growing steadily with new projects and initiatives unveiled almost daily, it is important to adopt a more long-term view and examine the utilisation of the region's energy resources on a holistic basis. In this context we are concerned more with the various energy options available to us now and in future, and how these could be assessed individually or in conjunction with one another, depending on geography and the energy resource concerned.

Hence, the present study which was undertaken solely upon the initiative of the IENE, attempts to provide an overview of the current and anticipated energy developments in the East Mediterranean and through their study and analysis arrive at the energy options which are attainable within a realistic framework.

The present study reveals that although the energy options are plenty - and are fully described in the pages that follow - there are only few avenues to be followed that could lead to their full development, in the sense of providing immediate answers to pressing energy supply issues. In our quest for viable energy options, we have considered all countries that surround the East Mediterranean basin and include Egypt, Israel, Lebanon, Cyprus, Syria, Türkiye and Greece.

These countries are of course examined in the broader context and their association with the Middle East and Iran.

With the East Mediterranean being part of the broader South East European region which the Institute regularly tracks in terms of energy statistics and geopolitical analysis, it was a logical step forward to attempt the undertaking of the present study as we wish to share our thinking and approach with a larger audience.

We hope that this study will not only facilitate the discussion concerning the region's energy issues but will also provide a basis for some further thinking and planning by policy makers in the various governments and international and regional institutions.

Although the study was originally planned for release earlier in the year the momentous events in Israel, Lebanon and Syria and the need for further research and re assessment postponed its release until June. However, this small delay has resulted in a more thorough analysis and a clearer presentation of our findings.

As a final note we should add that this study was completed just before the latest military confrontation between Israel and Iran, and therefore no mention whatsoever is made on the outcome of the conflict and its impact on the energy sector in the East Mediterranean.

Athens, July 2025

Introduction

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1. Introduction

In introducing the subject area of this study, we are bound to spontaneously ask two key questions. Why the Mediterranean, and why energy? The answer is not straight forward, and one must delve, even briefly, into historic, cultural, geological, agricultural, meteorological and geopolitical data before beginning to understand how such diverse elements mix and moreover how they help link our two pillars of investigation. i.e. the Mediterranean, and more specifically the East Mediterranean, and its abundant energy resources.

By necessity such a review is cursory since the main focus of the study is energy and not history or culture. And as far as energy is concerned, we are dealing with all the different energy resources to be found in the region, and how these can be successfully utilised. With minimal environmental impact and in a cost-effective manner. Firstly, for the benefit of the people residing in the various countries, and secondly for export to the rest of Europe and possibly beyond.

In order to understand our interest in the Mediterranean we must consider two basic factors. The first one concerns the identity of our Institute, its scope of work and radius of operation, which most definitely embraces the East Mediterranean along with the mainland core area of the Balkans and Türkiye. The second factor is related to the modern world's need to satisfy its ever-growing energy demand, not only in the region itself but also worldwide. In this respect the East Mediterranean, as latest findings and experience shows, and as discussed extensively in the present study, has apparently a very useful contribution to make.

This contribution is related to viable and multifaceted energy solutions which can satisfy both inward and outward needs. The inward streak aims to facilitate energy exchanges between the countries of the region, already happening to a certain extent, but which can be developed considerably more. However, the outward part is the one which presents the greatest potential and harbours even greater challenges and opportunities. The outward direction involves the export of energy produced in the region to other countries in the vicinity, mainly to be found in the energy hungry EU, but also further afield.

This optimism regarding the region's energy export potential is not unfounded and follows a series of successful hydrocarbon findings in several countries over the last 20 years or so, in parallel to important technological strides during the same period which allow significant energy transfers in almost all energy forms, i.e. natural gas, electricity and hydrogen to take place. Given the spectacular progress which has been achieved in cross border and underwater electricity interconnections in recent years and the equally admirable achievements of offshore wind technology, the prospects of exporting low carbon electricity from the region to Europe and elsewhere is no longer a fantasy. Indeed, as we shall see in the relevant sections of the study, they begin to take shape.

Historical background

Although this study does not concern history and is focusing on geography, natural resources and the economy, it is nevertheless important to place our current search within the appropriate historical context. To start with one must be aware from the very start of the cultural, religious and geopolitical sensitivities of the countries surrounding the East Mediterranean lake, part of what has for centuries been called the Great Sea. Known in English and the Romance languages as the sea between the lands, the Mediterranean goes by many names such as "Our Sea" (Mare Nostrum) for the Romans, the Middle Sea (Μεσόγειος) for the Greeks, the "Great Sea" (Yam gadol) for the Jews, the White Sea (Akdeniz) for the Turks and so forth.

It is important therefore at this point to define its limits and more particularly the boundary of our immediate area of interest. In the northeast we have the Black Sea from whose shores grain, slaves, furs, skins and spices were exported into the Mediterranean since antiquity. At the same time the Black Sea, approachable through the Dardanelles, was a route to the Balkans, the Steppes and the Caucasus thus providing an outlet to goods traded from the west part of the Great Sea. In the northwest part we have the Adriatic which provided a passage in the opposite direction towards the West Balkans and to Italy ferrying marbles, artefacts, a variety of goods and wine since ancient times, while the west part of the East Mediterranean, save Cyprus, is fully exposed to the open seas south of Crete and going as far as west as Libya. With Palestine and Egypt on the south and southeast completing the encirclement of our area of interest.

As David Bulafia observes from a historic point of view the Mediterranean, "was a sea penetrated by its merchants rather than a sea whose inhabitants participated in the political, economic and religious changes taking place in the Mediterranean itself"[1] . Although the above statement largely holds true if we consider the entire Mediterranean area, the Eastern part was not just a convenient merchant route but also contributed decisively to the birth of the Graeco-Jewish civilisation which formed the basis of western society. Today, the Eastern Mediterranean if we judge from the countries that surround it and the economies it supports plays a much different role than in the past. National priorities and politics have taken precedence over trade, often leading to armed conflict (Egypt, Israel, Lebanon, Syria) the sharp rise of external influences (USA, Iran, Russia) and rising tensions (Greece, Cyprus, Türkiye).

[1] *Abulafia, David, (2012) "The Great Sea, A human history of the Mediterranean", Penguin Books, London.*

Looking at the historical phases of the East Mediterranean it is becoming increasingly obvious that tradition and history run deep in the veins of all the people residing in the greater area for Greeks, Egyptians, Arabs, Jews all have centuries old claims on its lands and shores, including late comers Turks who appeared on the scene in the 11th century, soon after the battle of Manzikert[2]. Friendship, cooperation and partnership but also antagonism and animosity, sometimes leading to war, have for centuries been the main currencies of the East Mediterranean people.

The great mercantile tradition of the region during the 19th century and the first half of the 20th century, really flourished, thanks to the rise of great city ports such as Smyrna, Alexandria, Syros, Sidon, Istanbul, Livorno and Trieste. This chain of ports and supply points provided the basis for trade and finance. This tradition, long passed, has now given its place to mass tourism and activities that surround it, with the economies of the region depending increasingly more on the seasonal influx of millions of visitors. Today, in the first part of the 21st century the East Mediterranean is yet again being transformed through the expansion of a much-needed energy resource base. Given the right investment incentives and ample backing from business ventures, more resources could be aptly exploited to cover not only the needs of surrounding countries but more importantly to serve the energy demand of the rest of Europe. This study examines this transformation and looks into the great variety of options now opening up.

The Sea and Climate in the East Mediterranean

With utilisation of the energy resources in the region depending to large extent on climate, weather conditions and sea transportation it is important to acquire an understanding on how these interact and how they have evolved over the centuries, and their importance to present day efforts to tap them.

With navigation being such a vital activity, an appreciation of the prevailing sea currents is essential. These currents have had a significant impact on the ease with which ships have been able to sail around the Mediterranean, then with sails and oars, and now with internal combustion engines. The weather systems in the region tend to move from west to east, so that winds could be profitably exploited to carry shipping in spring from the ports of the south to destinations in the Levant and further north. In the winter and in spring seas can get rough and no one should underestimate the unpleasantness or danger of a Mediterranean storm, despite the modern-day image of a sun-drenched sea. Occasionally low-pressure weather systems develop over the Sahara and are dragged north as the unsettling wind known as the scirocco (Italy, Greece), xaloc (Catalonia) or hamsin (Israel, Egypt); vast amounts of red Saharan dust may be dumped on the lands surrounding the Mediterranean[3].

These long-established weather patterns in the East Mediterranean have clearly not changed in recent years as claimed by various pro climate change experts. The centuries old weather patterns continue unperturbed until today with a normal change of seasons and temperatures which, despite unrestrained propaganda by climate groups, do not exceed historical peaks. And any trend towards desertification in fringe areas of the region is mainly the result of human activity related to building construction of tourist facilities and clearance of spaces needed for roads, bridges and dams.

In the past changes in the climate could have important consequences for the productivity of lands close to the Mediterranean, with a knock-on effect on the trade in Mediterranean grain, which was so important in antiquity and the Middle Ages and then lost its primacy. A cooling of the climate in the sixteenth and seventeenth centuries helps explain why grain lands went out of cultivation and why imports of grain from northern Europe became surprisingly common, strengthening the hand of Duch and German merchants in the Mediterranean. “Although desiccation of coastal regions could have been caused due to changing climate patterns, more importantly,” as Abulafia suggests, “the human hand is often visible: in North Africa new waves of Arab invasion in the eleventh and twelfth centuries may have resulted in neglect of dams and irrigation works, so that agriculture suffered”[4].

Economic decline in Asia Minor during the period of the late Roman Empire was accentuated by the abandonment of vines and olive terraces that had held in place soil which now washed down into rivers and silted them up. In modern times, dams, notably the Great Aswan Dam in Upper Egypt, have changed the pattern of flow of water into the Mediterranean, with effects on currents and humidity. As evaluated by latest research, it is man who has altered the seasonal cycle of the Nile, decisively changing the economic life of Egypt and putting to an end the annual floods which the ancient Egyptians attributed to their gods.

Grove and the ecologist Oliver Rackham have suggested that human beings have had a less drastic effect on the Mediterranean environment than is often assumed, for nature in the Mediterranean lands shows a capacity to recover from climatic and other variations, and from the abuses imposed on it. Humans, they stress, do not determine the evolution of climate, or at least did not do so before the twentieth century; and erosion, even allowing for a human role, also takes place naturally – it happened in the age of the dinosaurs too. One area where human impact has often been reported is deforestation, which has had severe effects in Sicily, Cyprus and along the Spanish coast; demand for timber for ships has been succeeded by the clearance of land for new or expanding towns and villages, but here too an argument can be pressed that natural regeneration has often taken

[2] *Greek Reporter, Chrysopoulos Philip, 16.11.2024, “Battle of Manzikert: The defeat that marked Byzantine Empire’s decline”, https://greekreporter.com/2024/11/16/byzantine-empire-battle/*
Theotokis, Georgios, (2024), “The Campaign and Battle of Manzikert”, Arc Humanities Press

[3] *Encyclopaedia Britannica, “Mediterranean climate: Definition, Region, Map and Facts”, Retrieved, 01.08.2023 https://www.britannica.com/science/Mediterranean-climate*

[4] *Abulafia, David, op. cit., pp. xxvii-xxxi.*

place. Grove and Rackham are less optimistic about the future the Mediterranean faces, as water resources and fish stocks are over-exploited and, in some areas, desertification threatens, likely to be rendered worse if credible legitimate assumptions of assorted prophecies about global warming are even partly valid. To look back at the history of the Mediterranean is to observe a symbiosis of man, and nature that may be about to end[5].

The Present Challenges

The obvious question often asked by politicians, entrepreneurs and analysts is if in view of persistent geopolitical instability in the region we may continue to aspire to greater utilisation of natural energy resources, regional collaboration and joint projects. A thorough analysis is necessary if we are to fully understand and evaluate the various every options which are open ahead of us. This is necessary so that we may not harbour any illusions over the region's geopolitical environment which ultimately may affect the viability of the energy options discussed. In this context it is useful to trace, even briefly, the main elements of the region's rich, if unstable, political and economic history especially since the First World War. For this is the period which has largely shaped today's geopolitical, economic and cultural milieu against which this study is set.

The 20th century brought momentous changes to the geopolitical landscape of the East Mediterranean which at times had global repercussions. Starting from the collapse of the Ottoman Empire soon after the end of the First World War, the creation of new states and mandates, such as Syria - Lebanon and Palestine - Trans-Jordan, under French and British rule respectively. Then followed the British exit from Palestine and the birth of a new state, Israel (1948), and with that the emergence of a bitter conflict with the Palestinian people which continues until today, the 1956 Suez crisis and subsequently the loss of British influence in Egypt, and soon after Britain's departure from Cyprus and the occupation of northern Cyprus following the Turkish invasion of 1974. To that we should add the first (1967) and second (1973) Israeli-Egyptian wars and subsequent peace and the worsening security situation in the broader region as a result of the rising Jihadist movement (inspired by the Muslim Brotherhood) and Iran's regional aspirations. Which brings us to today's bloody conflict between Israel and the Axis of Resistance (i.e. Iran's proxies) which climaxed with the October 7 ,2023 audacious attack by Hamas against Israel and culminated in a direct military engagement, for the first time ever, between Israel and Iran (2024).

Apparently the above unprovoked strike against Israel proved a cardinal error if we are to judge from subsequent developments and the bloody war against Hamas which Israel unleashed and still goes on with tremendous loss of life, mainly among Palestinian people (with more than 50,000 dead compared to Israel's 1,200, according to Reuters[6]) As Israel's war machine was once again fully ignited the opportunity arose for the decapitation of Hamas's leadership in Palestine and abroad and also the elimination (for all practical purposes) of Lebanon's Hezbollah. This in turn lead to the demise of the Assad regime in Syria, after 55 years in power, following the abandonment of the region by Tehran. A much-weakened Iran by Israel's attrition and subsequent bombardments against military targets, proved unable of continuing propping up of the Axis of Resistance which henceforth collapsed.

Following the quiet exit of dictator Bashar al-Assad in December 2024, a new regime emerged in Damascus backed by the radical Hayat Tahir al-Sham (HTS) Idlib based rebel group and lead by ex-Islamist Ahmed al-Sharaa, which alas controls only a fraction of the country. Kurdish militias run three provinces in the north-east, tribesmen control the Daraa province, Druze the Suwayda and Alawites the coastal areas, while Türkiye controls an extended strip of land inside north Syria. At the same time Israel has expanded its control of land areas in the Golan Heights and carries out bombardment of military threatening targets inside Syria. In addition to its efforts to control the country by creating a new national army, police force and judicial system the Al-Sharaa provisional government (pending the adoption of a new constitution and elections) is facing huge challenges notwithstanding a humanitarian crisis following the ending of a 14-year civil war which has devastated much of Syria.

During the war Syria's economy shrank 85% with most of its industry and industry wiped out, with more than 90% of Syrians now living below the poverty line. Thus, it remains to be seen whether Ahmed al-Sharaa will be able not only to survive but manage to set a new course for the reconstruction of Syria and the rebirth of its economy. The anticipated return of Syria to the international fold as a fully functioning state is not expected to significantly alter the geopolitical balance, where Israel will continue for the foreseeable time to act as the regional hegemon.

With Iran now lacking the strength to enforce a new political order to back its regional ambitions, the only remaining thorn is the Tehran backed Houthi regime in North Yemen which continues to pose a serious challenge to international shipping by attacking at will passing vessels near and far from its shores. Although not directly involved with the East Mediterranean the Houthi military involvement clearly stems from the Israel-Gaza conflict and so we see how the East Mediterranean region is inadvertently affecting a much broader geographical area. In response to the threat posed to international shipping the USA and the Western Alliance have now become directly involved in this remaining conflict, having undertaken themselves the task of eliminating this menacing threat to maritime trade by reestablishing law and order to international sea lanes.

[5] *Grove, A. and Rackham, O. (2001), "The nature of Mediterranean Europe: an ecological history", New Haven, CT: Yale University Press.*
[6] *Reuters, "Gaza death toll: how many Palestinians has Israel's offensive killed?", 24 March 2025, https://www.reuters.com/world/middle-east/how-many-palestinians-has-israels-gaza-offensive-killed-2025-01-15/*

Regional Geopolitics

The geopolitical landscape of the Middle East and Eastern Mediterranean (MEEM) has undergone a transformative decade, marked by intricate interconnections between the Middle East and the Eastern Mediterranean regions. The Arab Uprisings following the so-called Arab Spring in 2011, initiated a seismic shift, setting the stage for ongoing changes with repercussions extending beyond the borders of MEEM, particularly influencing Europe. The withdrawal of the United States from Iraq in 2011 and the subsequent rise of the Islamic State (IS) further fuelled regional insecurity, contributing to a complex and volatile geopolitical environment[7].

Simultaneously, the discovery of hydrocarbons off the coasts of Israel, Cyprus, and Egypt, coupled with Greece's renewed focus on its southeastern neighbourhood, developments in the long-standing Cyprus Problem, and Türkiye's evolving foreign policy under the Justice and Development Party (AKP), have woven a tapestry of unprecedented security linkages between the traditionally labelled 'Middle Eastern' and 'European' states in the Eastern Mediterranean[8,9].

The current security dynamics in the Eastern Mediterranean are multifaceted, encompassing four key interconnected elements: energy discoveries, geopolitical rivalries, emerging security imperatives, and the heightened interest of external powers. The exploration of hydrocarbons has emerged as a central driver reshaping the geopolitical and security landscape, offering both opportunities and challenges. States in the region have had to recalibrate their strategic calculations, with energy security considerations at the forefront. However, these developments have also fuelled tensions, particularly between Türkiye and neighbouring states such as Cyprus, Greece, Israel, and Egypt, intensifying pre-existing geopolitical antagonisms.

In response to these challenges, regional actors—Cyprus, Greece, Israel, and Egypt—have forged trilateral partnerships, exemplified by initiatives like Cyprus-Greece-Israel and Cyprus-Egypt-Greece. These collaborations are pivotal in shaping a nascent security architecture in the Eastern Mediterranean, serving as a counterbalance to Türkiye's regional power projection. The effectiveness and coherence of these partnerships are subjects of ongoing scrutiny, particularly as they navigate complex regional dynamics.

External powers, including the United States, Russia, the European Union, and China, have increasingly turned their attention to the Eastern Mediterranean, contributing to the complexity of geopolitical rivalries. This external involvement has played a crucial role in shaping regional cooperation and competition, as these powers seek to safeguard their strategic interests in the region.

Beyond traditional security concerns, the Eastern Mediterranean is grappling with contemporary human security imperatives. The Arab Uprisings and the aftermath of IS have given rise to immense economic, social, and humanitarian challenges, particularly in countries like Libya, Egypt, Iraq, Yemen, Lebanon, and Syria. The resulting refugee crisis has become a major concern for Europe, impacting countries such as Greece, Italy, and Cyprus. Furthermore, the instability in the Middle East has been a contributing factor to a global wave of Islamist terrorist attacks, affecting regions beyond the immediate vicinity[9].

Looking ahead, the future of every production and infrastructure in the Eastern Mediterranean with emphasis on gas, power generation and electricity interconnections, faces considerable challenges. Regional conflicts and disputes over drilling rights pose significant hurdles, impacting the industry's efforts to establish viable export routes to international markets. The Eastern Mediterranean Gas Forum (EMGF), established in 2019, represents a collaborative effort by governments from Egypt, Cyprus, Greece, Israel, Italy, Jordan, and the Palestinian Authority to address these challenges. However, the transition from a discussion-based forum to a platform with substantial political and economic influence will likely require time and concerted effort.

Of no less importance are concerns about the implementation of plans for the construction of much needed cross-border electricity interconnections in the region. As the latest episodes attest following the intervention by Türkiye's naval forces off the islands of Kasos (July 2024) and north east of Crete (December 2024), as they tried to prevent research vessels from carrying out underwater surveys for the laying of the Crete-Cyprus- Israel electricity cable.

Crucial to the peaceful development of hydrocarbons in the Eastern Mediterranean is the adherence to the United Nations Convention on the Law of the Sea (UNCLOS). However, challenges persist, as some key players, including Israel, Syria, and Türkiye, have yet to ratify UNCLOS. Disputes over exclusive economic zones (EEZs) among East Med countries further complicate the situation, with varying degrees of success in resolving these issues.

Notably, Türkiye's interventions have heightened tensions and risks, impacting Cyprus's gas development and complicating efforts to reach agreements on EEZ boundaries. The United States and the EU continue to support Cyprus in its endeavours, emphasizing the importance of resolving disputes for the region's stability. Türkiye's recent claims of substantial gas discoveries in the Black Sea add a new dimension to the geopolitical landscape, potentially altering its energy dynamics and influencing its assertive strategy in the Eastern Mediterranean.

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[7] *Tziarras, Z., 2019 "The New Geopolitics of the Eastern Mediterranean – An Introduction" in Tziarras Zenonas (ed.), The New Geopolitics of the Eastern Mediterranean: Trilateral Partnerships and Regional Security. Re-imagining the Eastern Mediterranean Series: PCC Report, 3. Nicosia: PRIO Cyprus Centre, 5-10, https://cdn.cloud.prio.org/files/e0959cab-2a8c-4c7c-9e6e-5f2f3e32949e/The%20New%20Geopolitics%20of%20the%20Eastern%20Mediterranean%20PCC%20Report%203-2019.pdf?inline=true*

[8] *Tziampiris, A. 2019, "The New Eastern Mediterranean as a Regional Subsystem." in Spyridon N. Litsas and Aristotle Tziampiris (ed.) The New Eastern Mediterranean: Theory, Politics and States in a Volatile Era, 1-30. Cham, Switzerland: Springer.*

[9] *Tziarras, Z., 2018, The Eastern Mediterranean: Between Power Struggles and Regionalist Aspirations. Re-Imagining the Eastern Mediterranean: PCC Report, 2. Nicosia: PRIO Cyprus Centre, https://cdn.cloud.prio.org/files/631d7aa4-1c8f-4507-abce-b97b5007d2b5/ZTziarras%20EastMed%20Between%20Power%20Struggles%20and%20Regionalist%20Aspirations.pdf?inline=true*

Last but not least as far as geopolitical issues in the region are concerned is the evolving situation in Syria following the overthrow of the Assad regime which had governed the country with an iron fist for more than 54 years.

The undignified exodus of Bashar al Assad on December 8,2024 following the assault by the Islamist rebel group Hayat Tahrir al Sham (THS) saw the rise of a new revolutionary regime headed by Ahmed al-Sharaa. As the new provisional government is trying to secure control over the country tensions run high as daily incidents show between remnants of the old regime, minority groups such Alawites, Christians and Druzes and the government's security forces, with more than 2000 people already killed in hundreds of skirmishes since the start of the year.

Mr Al-Sharaa and his government are facing a Herculean hurdle as one the one hand they try to enforce security across vast areas of the country which they still do not control, and on the other they try to stabilise the economy from its free fall. Damascus gets only a couple of hours of electricity a day, it faces oil and gas shortages, while the price of bread has risen eight-fold since December. People wait hours to withdraw few bank notes from ATM's with little money in circulation. As the Economist notes, "In large part this economic misery reflects the ruin caused by decades of dictatorship, hers of civil war and months of post-revolutionary chaos. But Western sanctions, originally designed to punish the Assad regime, are also to blame[10,11,12].

Existing sanctions make the country a no-go area for law abiding financial institutions, businesses and governments. Consequently, Syria cannot import physical currency, it has limited access to the global banking system, it cannot generate export revenues and worst of all it cannot obtain the investment required to finance desperately needed reconstruction. Hence, the lifting of sanctions even on a one-year temporary basis, argue development specialists in international bodies such as the IMF and the World Bank, is of paramount importance. If Mr Sharaa takes advantage of the sanctions lift and sets up an Islamist dictatorship, thus undermining the economy, then the sanctions can be easily reinstated after 12 months.

In summary, the intricate interplay of geopolitical, security, and human security factors in the Middle East and Eastern Mediterranean has created a complex landscape with significant implications for regional and global actors. As the region navigates these challenges, the quest for stability and cooperation remains paramount, necessitating diplomatic efforts, international collaboration, and a nuanced understanding of the multifaceted dynamics at play[13].

Until very recently conflicts for control of the Mediterranean were about mastery over its coasts, ports and islands rather than battles for open spaces. However, over the last thirty years or so this has markedly changed and current conflicts also include antagonism over the exercise of sovereign rights over vast and open sea spaces as the tapping of offshore hydrocarbon and wind resources is now high in the agenda of all countries around the Mediterranean.

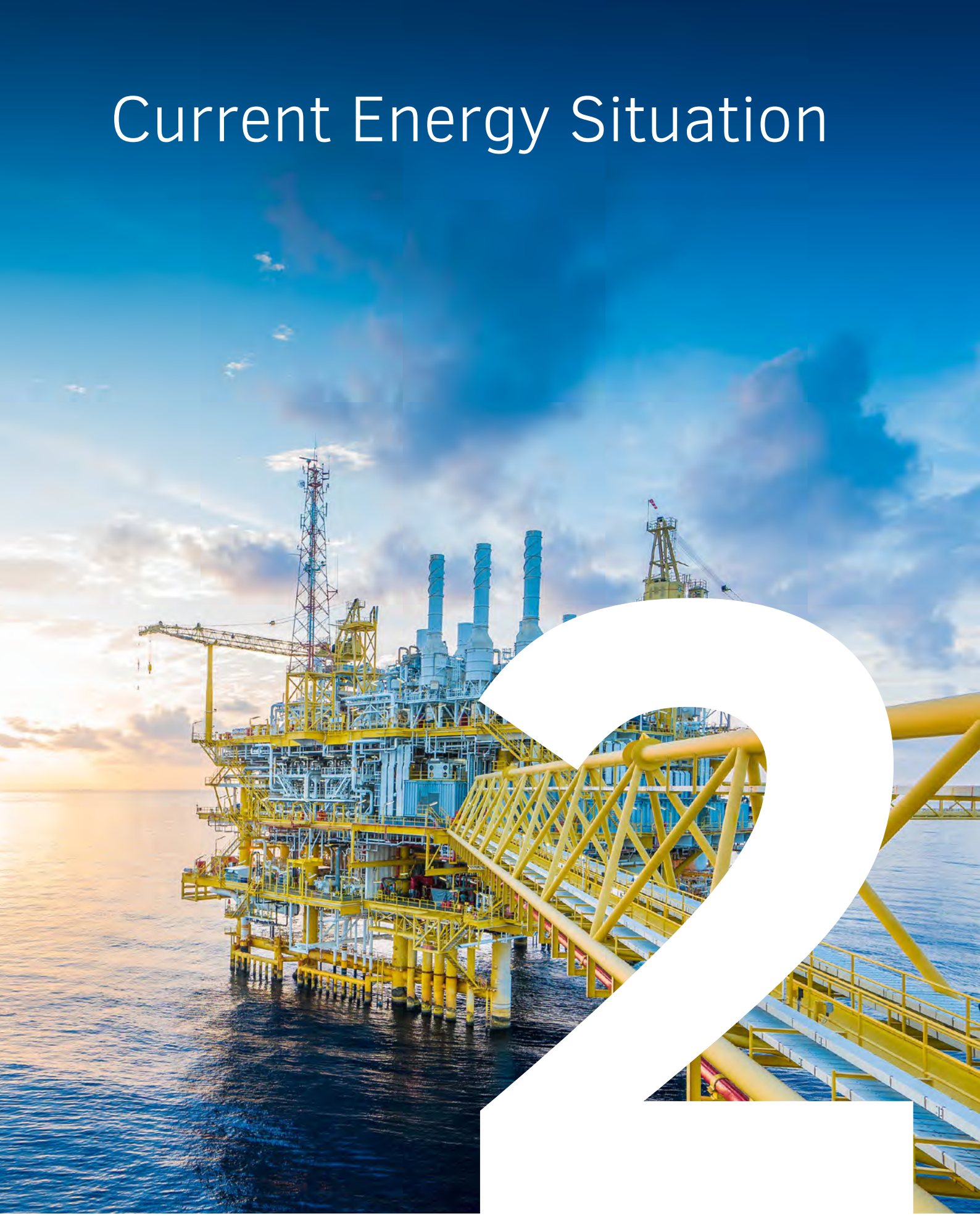
Looking ahead

The present study looks forward and well beyond the current geopolitical turmoil, associated problems and the difficult to manoeuvre economies of the region. The study examines the totality of the energy resources of the East Mediterranean and the prospect for their further development and the advancement of the energy systems in the countries in the region. This examination concerns both the prospects for the exploitation of the various energy sources for the benefit of the economies of the countries themselves but also looking at the export potential where abundance of a particular resource makes such a prospect a promising option. In this context the present study offers a holistic approach to the energy issues in the region.

Furthermore, the study adopts the view that the more development is sought of existing and potential energy resources in the various countries, this could be beneficial not only for their economic and social development, but it could help ease tensions and geopolitical rivalries. Regional cooperation based on joint development of certain resources and the establishment of new energy trade routes or the expansion of existing ones, can only help in establishing trust and mutual respect between countries and could eventually lead to peaceful coexistence and prosperity for the whole region. Hence, the aim of his study is to portray the various energy options that lie ahead and could indeed contribute toward this direction.

[10] *The Economist, "Lifting sanctions on Syria seems mad, until you consider the alternative", March 2025, https://www.economist.com/leaders/2025/03/06/lifting-sanctions-on-syria-seems-mad-until-you-consider-the-alternative*
[11] *European Parliament, "Jihadist terrorism in the EU since 2015", September 2021, https://www.europarl.europa.eu/topics/en/article/20180703STO07127/jihadist-terrorism-in-the-eu-since-2015*
[12] *European Parliament, "Terrorism in the EU: trends, terror attacks and arrests in 2023", January 2025, https://www.europarl.europa.eu/topics/en/article/20250124STO26468/terrorism-in-the-eu-trends-terror-attacks-and-arrests-in-2023*
[13] *Atlantic Council Global Energy Center, Charles Ellinas, "Energy and Geopolitics in the Eastern Mediterranean", February 2022, https://www.atlanticcouncil.org/wp-content/uploads/2022/03/Eastern-Mediterranean_Final.pdf*

Current Energy Situation



2. Current Energy Situation

The current energy situation in Greece, Cyprus, Türkiye, Israel, Egypt and Lebanon is shaped by a dynamic mix of domestic resource development, regional cooperation, and global energy transition pressures. These Eastern Mediterranean countries are navigating complex challenges and opportunities as they seek to balance energy security, economic growth, and climate commitments.

Natural gas continues to play a central role, especially with major offshore discoveries in the region, while renewable energy is rapidly gaining ground due to policy shifts and international investment. At the same time, geopolitical tensions, particularly around maritime boundaries and energy exploration rights, influence infrastructure development and collaboration efforts. Each country is pursuing a distinct strategy based on its resources, needs, and geopolitical position, yet they are increasingly interconnected through shared pipelines, electricity links, forums, and export ambitions. This evolving landscape reflects broader trends in the global energy market, where diversification, sustainability, and strategic partnerships are more important than ever.

Greece's energy transition is gaining momentum, driven by EU decarbonization goals and its own efforts to reduce dependency on imported fossil fuels. Greece has committed to phasing out lignite power plants by 2028 and is aggressively investing in renewables, particularly solar and wind while building more natural gas power generation capacity. The country's geography supports these efforts, with ample solar radiation and strong wind currents across the mainland and islands.

In 2024, Greece achieved a milestone. Over 50% of its electricity mix came from renewable energy sources. This trend is expected to continue, with multiple solar and wind farms under development. The government is also streamlining permitting processes to attract private investment and align with EU Green Deal objectives.

Despite renewable gains, Greece remains dependent on natural gas, much of which is imported via pipelines and LNG terminals. The Revithoussa LNG terminal has been expanded, and the Alexandroupolis FSRU, now in operation since October 2024, further diversifies supply and strengthens regional energy security. In spite of the rapid expansion of RES Greece remains highly dependent on oil and gas imports, having increased its energy dependency to 81% of overall energy use.

Geopolitically, Greece is becoming a critical energy hub for SE Europe. Projects like the Trans Adriatic Pipeline (TAP) and Interconnector Greece-Bulgaria (IGB) enhance its role as a transit point for Azerbaijani gas to Europe. These connections not only strengthen Greece's energy security but also contribute to broader EU energy diversification efforts. Cyprus's energy sector is still in a formative phase, but its offshore natural gas discoveries, including the Aphrodite, Glaucus, and Calypso fields, offer significant long-term potential. These discoveries have elevated Cyprus's geopolitical profile, drawing the interest of major energy companies and international stakeholders. The challenge for Cyprus lies in commercializing and monetising its offshore reserves. Development has been slow due to regional tensions, high costs, and market uncertainties. The island has proposed several export options, including a pipeline to Egypt for LNG export or a liquefaction facility on Cyprus itself, but these remain in the planning stage.

In the short term, Cyprus remains highly reliant on oil for electricity generation, making it one of the most expensive energy markets in the EU. However, it is expanding solar capacity rapidly, supported by EU funding and national incentives, with the goal of integrating renewables and upgrading its outdated grid infrastructure.

Türkiye's energy policy is driven by diversification, self-sufficiency, and geopolitical strategy. The discovery of significant natural gas reserves in the Black Sea—especially the Sakarya field—has been a major development. Türkiye aims to produce substantial gas volumes domestically by 2026, reducing dependence on Russian, Azerbaijani, and Iranian imports. Renewable energy in Türkiye is growing rapidly, especially in hydropower, wind, and solar. As of 2024, renewables accounted for nearly 45% of the country's installed capacity. Solar power, in particular, is expanding in Central Anatolia and southeastern regions, supported by government auctions and incentives.

Türkiye has positioned itself as an energy corridor, connecting suppliers in the Caucasus, Russia, and the Middle East to European markets. Key infrastructure includes the TANAP pipeline (linking to TAP), the TurkStream pipeline from Russia, and the newly emphasized role of Türkiye as an LNG hub with multiple terminals.

Türkiye is advancing its nuclear energy ambitions, with 2025 marking a pivotal year as the country prepares to launch (trial production) its first nuclear power reactor at the Akkuyu nuclear power plant. This $20 billion project, constructed by Russia's Rosatom in Mersin province, will feature four VVER-1200 reactors, collectively expected to supply about 10% of Türkiye's electricity once fully operational by 2028. Beyond Akkuyu, Türkiye plans to expand its nuclear capacity with additional plants in Sinop and the Thrace region, aiming for 7.7 GW by 2035 and 20 GW by 2050. The country is also exploring the adoption of small modular reactors (SMRs) to diversify its energy mix. However, the heavy involvement of Russia in Türkiye's nuclear sector has raised geopolitical concerns, particularly due to the build-own-operate model granting Russia significant control over the Akkuyu plant. Despite these challenges, Türkiye's nuclear initiatives are central to its strategy for energy diversification, economic growth, and reducing carbon emissions.

Israel has become an Eastern Mediterranean gas exporter, largely thanks to the Leviathan and Tamar

Table 1: Total Energy Supply and Total Final Consumption in Greece, Cyprus, Türkiye, Israel, Syria, Egypt and Lebanon in Mtoe, 2022[14]

Countries	Total Energy Supply	Total Final Consumption
Greece	20.5	15.6
Cyprus	2.2	1.6
Türkiye	156.5	112.8
Israel	23.9	15.9
Syria	10.2	5.2
Egypt	101.4	61.7
Lebanon	3.5	3.1
Total	**318.2**	**215.9**

fields. These offshore assets are central to Israel's energy independence and export strategy, with gas exported via pipeline to Egypt and Jordan and under consideration for future export to Europe. Israel's energy transformation includes a shift toward decarbonization, with strong growth in solar power, especially in the Negev Desert. While fossil fuels still dominate Israel's mix, renewables are projected to exceed 30% of electricity generation by 2030, up from under 10% in 2020.

Egypt is emerging as a regional energy powerhouse, leveraging both its domestic resources and strategic location. With large gas fields like Zohr, Egypt has become a net exporter of LNG and plays a central role in Eastern Mediterranean energy diplomacy and infrastructure. Egypt's two LNG liquefaction terminals—Idku and Damietta—are crucial for exporting Eastern Mediterranean gas, including from Israel and potentially Cyprus. However, LNG exports have recently faced disruptions due to huge increase in domestic gas demand linked to increased electricity demand and constraints in feed gas supply.

Domestically, Egypt faces growing energy demand, driven by population growth and industrial expansion. While natural gas remains dominant, the government is also promoting renewables. The Benban Solar Park, one of the largest in Africa, is a flagship project in Egypt's push toward cleaner energy.

Geopolitical competition and overlapping maritime claims — especially between Türkiye and Cyprus, and Türkiye and Greece — continue to cloud regional energy cooperation. These disputes affect licensing, exploration, and development timelines in the Eastern Mediterranean. The EU's shift away from fossil fuels affects the region's export prospects, as European demand for natural gas is expected to decline in the long term. This complicates investment decisions around pipelines and LNG projects, especially those with long payback periods.

Overall, the Eastern Mediterranean energy landscape is in transition, marked by a mix of opportunity and uncertainty. While the region holds vast hydrocarbon potential and strong solar and wind resources, its future depends on strategic cooperation, resolution of geopolitical disputes, and alignment with global energy trends toward decarbonization. The following Table summarises the total energy supply and total final consumption in Greece, Cyprus, Türkiye, Israel, Syria and Egypt in 2022, recording a total of 314.7 Mtoe and 212.8 Mtoe respectively. The year 2022 is used as a timeline because this is the latest year where reliable energy statistics are available for all seven countries concerned.

Greece's current energy mix, which corresponds to total energy supply, is in transition, with renewable energy taking a growing share; from 9% in 2012 to 17% in 2022. While lignite historically dominated the energy mix, it is being phased out as part of Greece's commitment to the EU's decarbonization goals. Thus, the share of lignite in the country's energy mix decreased from 31% in 2012 to 8% in 2022. Natural gas has become the main transitional fuel, recording a rise from 14% in 2012 to 22% in 2022. In contrast to the decarbonisation phase, the share of oil increased from 46% in 2012 to 52% in 2022.

Figure 1: Total Energy Supply by Fuel in Greece, 2012[14]

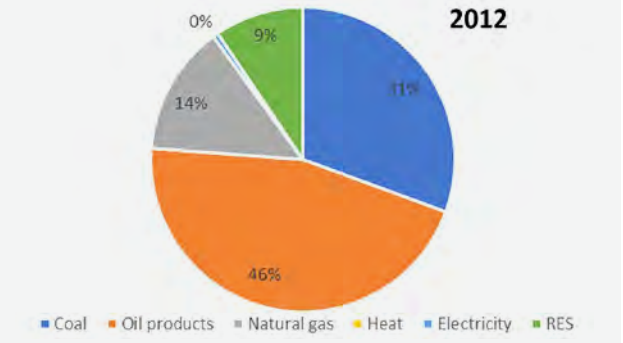
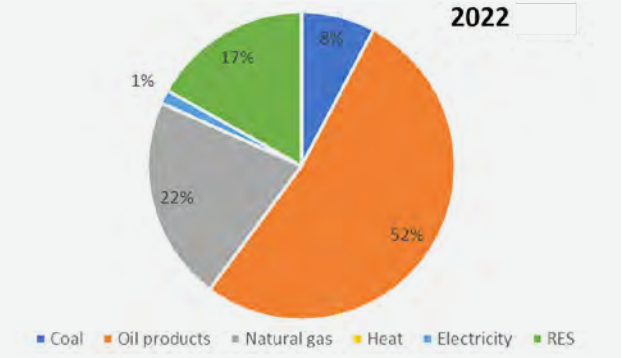


Figure 2: Total Energy Supply by Fuel in Greece, 2022[14].



[14] *IEA World Energy Balances*

In parallel, Cyprus relies heavily on imported fossil fuels, primarily oil, for electricity production, making it one of the most carbon-intensive and expensive energy systems in Europe. More specifically, oil contributed 94% to the country's energy mix in 2012, before decreasing to 85% in 2022. Despite this, Cyprus has begun integrating solar energy into its grid, capitalizing on its high levels of sunshine. Solar photovoltaic (PV) systems are being installed both at utility and residential scale, supported by EU funding and national incentives. Hence, the share of renewables in Cyprus increased from 6% in 2012 to 14% in 2022.

In 2022, Türkiye's energy mix was still dominated by fossil fuels, i.e. oil products (28%), natural gas (27%) and coal (27%), compared to 2012, where these shares were slightly higher, as shown in Figures 5 and 6. However, the share of renewables has grown significantly over the last decade; from 10% in 2012 to 18% in 2022.

Israel's energy mix has shifted dramatically over the past decade, with natural gas now being the dominant source, recording a rise from 9% in 2012 to 42% in 2022. Decarbonisation is under way in the country as the share of coal decreased from 35% in 2012 to 15% in 2022 and the contribution of oil products fell from 53% in 2012 to 36% in 2022.

Figure 3: Total Energy Supply by Fuel in Cyprus, 2012[14]

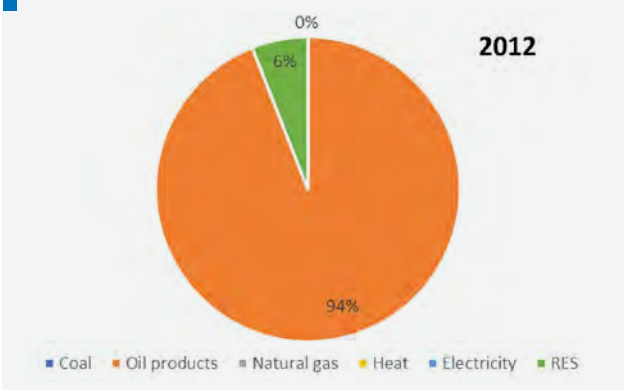


Figure 4: Total Energy Supply by Fuel in Cyprus, 2022[14]

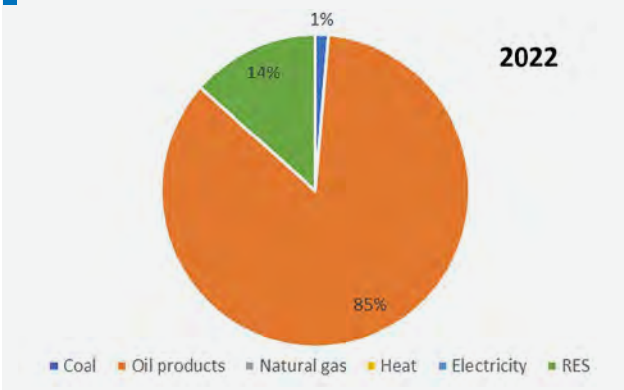


Figure 5: Total Energy Supply by Fuel in Türkiye, 2012[14]

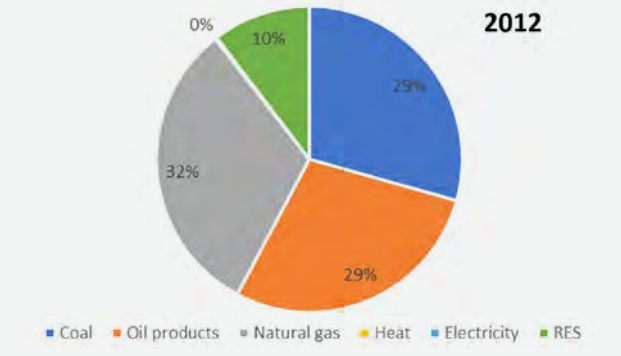


Figure 6: Total Energy Supply by Fuel in Türkiye, 2022[14]

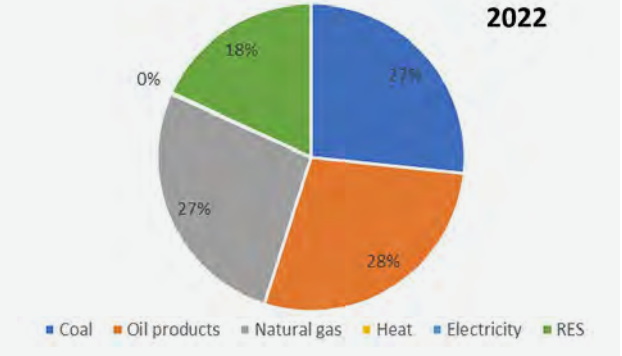


Figure 7: Total Energy Supply by Fuel in Israel, 2012[14]

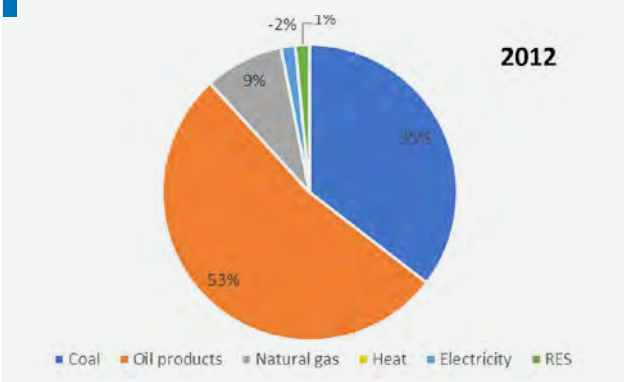
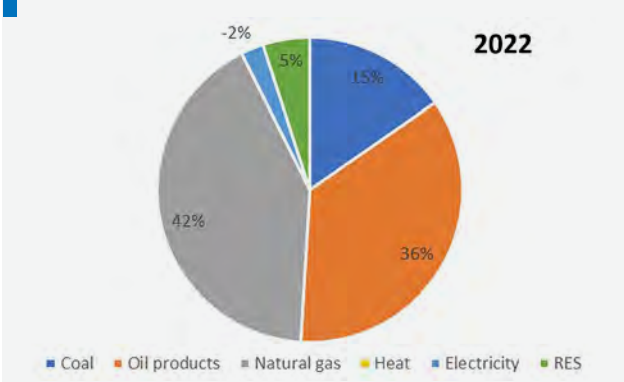


Figure 8: Total Energy Supply by Fuel in Israel, 2022[14]



[14] *IEA World Energy Balances*

Egypt's energy mix is centred on natural gas, which supplies the bulk of its electricity and also fuels its LNG export capacity. The Zohr gas field, one of the largest in the Mediterranean, has played a critical role in transforming Egypt into a regional gas hub. The share of natural gas increased from 48% in 2012 to 52% in 2022. Contrary to the increase of gas, Egypt's oil sector is in decline, decreasing its share from 45% in 2012 to 41% in 2022.

Syria's current energy mix is predominantly reliant on fossil fuels, with oil and natural gas constituting the majority of its energy supply. As of 2022, oil accounted for approximately 78% of the total energy supply, while natural gas contributed around 21%, compared to 2012, where the shares of oil and gas were 66% and 33% respectively.

Lebanon's current energy mix is heavily reliant on imported fossil fuels, particularly oil, with its share standing at 86% in 2022, compared to 94% in 2012. This dependence has led to chronic electricity shortages, frequent blackouts, and a reliance on expensive, polluting private generators. The situation reached a critical point in August 2024 when fuel reserves were completely depleted, resulting in a nationwide blackout that disrupted essential services across the country.

In response to these challenges, Lebanon has been significantly turning to renewable energy sources, notably solar power, increasing their share from 4% in 2012 to 11% in 2022. This growth has been driven by widespread adoption of off-grid solar installations by households and businesses, facilitated by supportive policies like net metering.

Figure 9: Total Energy Supply by Fuel in Egypt, 2012[14]

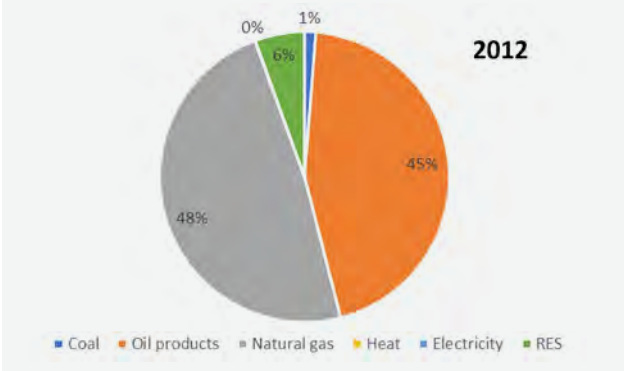


Figure 10: Total Energy Supply by Fuel in Egypt, 2022[14]

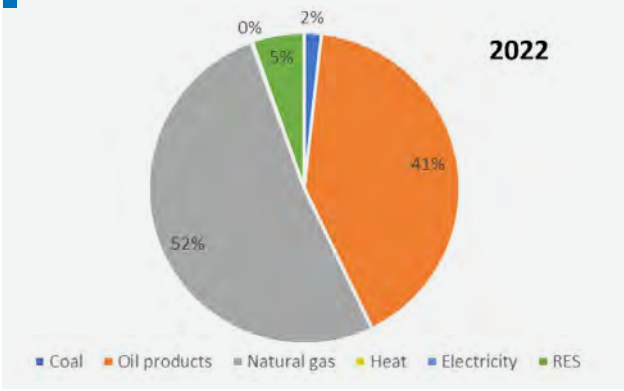


Figure 11: Total Energy Supply by Fuel in Syria, 2012[14]

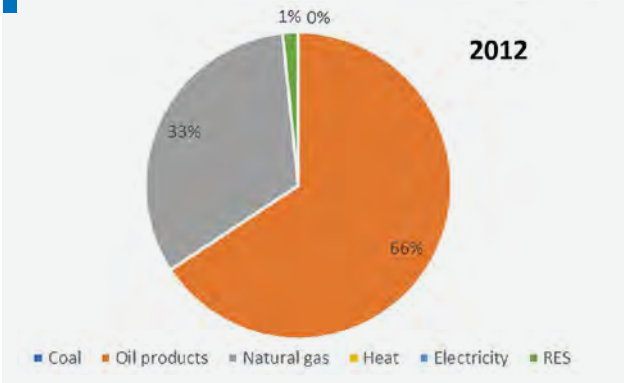


Figure 12: Total Energy Supply by Fuel in Syria, 2022[14]

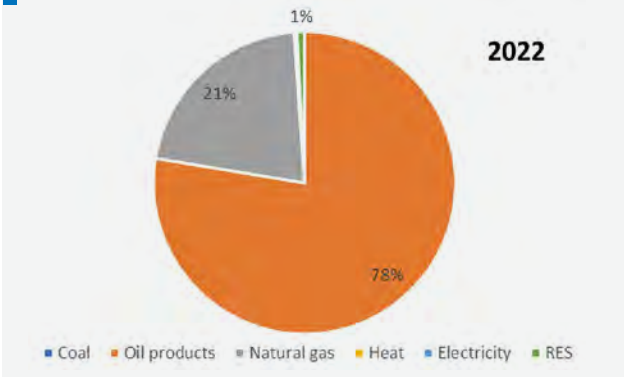


Figure 13: Total Energy Supply by Fuel in Lebanon, 2012[14]

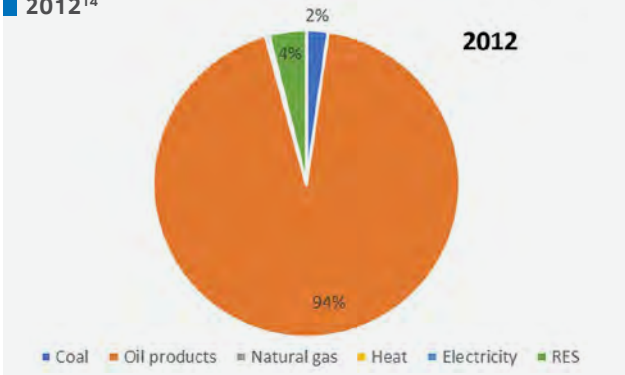
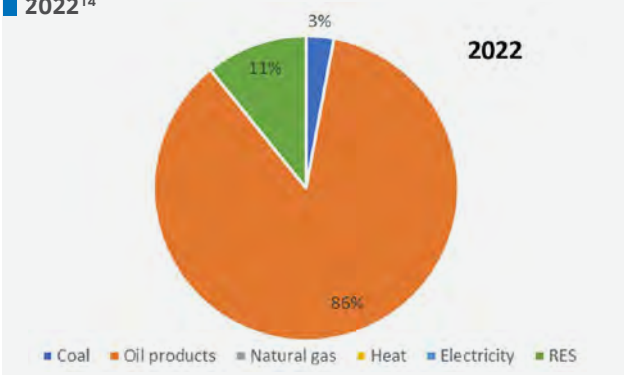


Figure 14: Total Energy Supply by Fuel in Lebanon, 2022[14]



[14] *IEA World Energy Balances*

Economic Background Overview

3

3. Economic Background Overview

The group of countries analysed in this study, i.e. Greece, Cyprus, Türkiye, Israel, Egypt, Lebanon and Syria, are characterised by different demographic, political, geopolitical and economic parameters, but energy plays a vital role on their economies and some of them have been developed important trade and cooperation ties.

In order to have a clear overview of the current status of their economies, the following Figure have been produced, based on data provided by the latest IMF's World Economic Outlook database (October 2024)[15], while a country-by-country analysis follows.

3.1. Greece

GDP is projected to grow by 2.3% in 2024, 2.2% in 2025 and 2.5% in 2026. Rising disposable income will strengthen consumption, as a tight labour market and minimum wage increases support wages. Employment growth is projected to ease progressively amid rising labour costs. Disbursements of EU Recovery and Resilience funds will support a spike in investment.

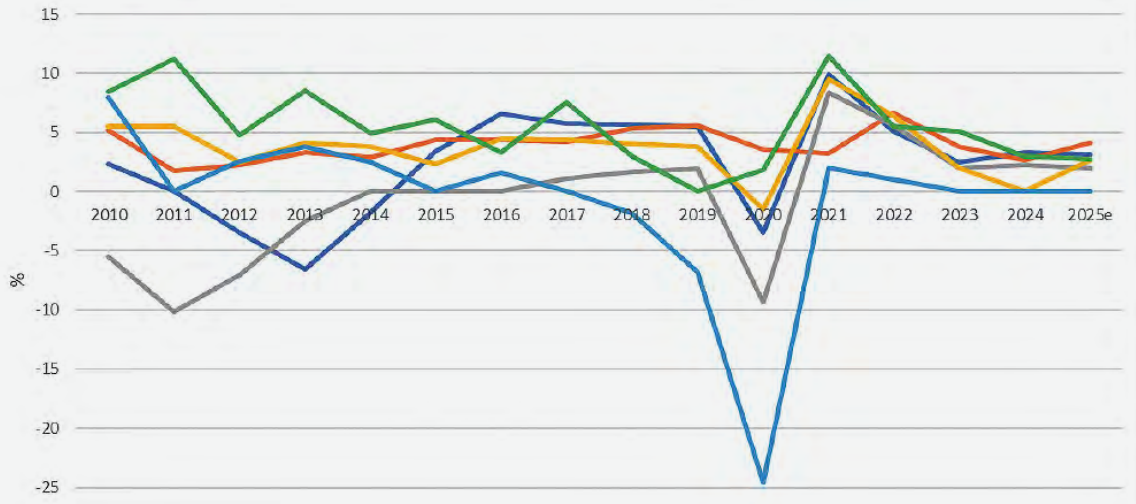
Inflation is expected to reach 2% in late 2026 amid persistent services and core inflation. Implementation delays in spending EU funds, excessive wage growth or renewed extreme weather events could dampen the outlook. Keeping public debt on a firmly declining path should remain a priority, as ageing costs and investment needs will add to future spending pressures. Improving further the efficiency of public spending and shifting its structure towards education, health care and investment would support growth and equity, while helping to achieve sustained primary surpluses. Limiting tax expenditures, notably for fossil fuels, and continuing efforts to combat tax evasion would also raise revenues and make room to reduce the labour tax burden for low-wage earners, encouraging further employment gains.

Real GDP grew by 1.6% in the year to the second quarter of 2024, driven by robust gross capital formation and consumption. Business expectations in manufacturing and services continued to point towards expansion in September. Employment rose by 1.6% in the year to September 2024, while nominal wages grew by 8.6% in the year to the second quarter of 2024, as labour shortages remain at historically high levels. Annual headline inflation was persistent at 3.1% in October 2024 and core inflation stood at 4.3%, driven by services inflation.

Business lending has increased, and the decline in housing loans has slowed amid improving but still tight financial conditions. Lending to non-financial corporations from January to September 2024 was 54% higher than a year earlier. Interest rates for new loans to households and firms fell from 6.2% in January 2024 to 5.4% in September. The trade deficit has widened, reflecting growth of imports, particularly of investment goods outpacing that of exports, though tourism receipts remained strong. Travel receipts over the first half of 2024 were 12% higher than a year earlier, while goods exports were 3.9% lower.

The fiscal stance will remain supportive, as disbursements of Recovery and Resilience grants and loans are projected to rise from 1.8% of GDP in 2024 to 3.6% in 2026. Growing revenues, reflecting high nominal GDP growth, improved tax collection and the new cruise fee will help to maintain primary surpluses, despite additional expenditures and tax cuts. A primary surplus of 2.4% of GDP in 2025 and 2026 will contribute to a further decline in the debt-to-GDP ratio to 148.1% in 2026 (Maastricht definition).

Figure 15: GDP growth (%) of the examined countries, 2010-2025e. Source: IMF's World Economic Outlook Database, October 2024



No available data for the economy of Lebanon from 2024 onwards.

[15] *https://www.imf.org/en/Publications/WEO/weo-database/2024/October*

A reduction in social security contributions (0.2% of GDP) and the indexation of pensions (0.2% of GDP) will support incomes in 2025. Public sector wages, previously frozen, will also be raised to align with future minimum wage increases. The minimum wage rose by 42% from 2018 to April 2024 and is set to increase further by around 4.6% in both 2025 and 2026.

GDP growth is projected to improve from 2.3% in 2024 to 2.5% in 2026. Consumption growth will pick up gradually with rising disposable incomes. Growing disbursements of Recovery and Resilience Funds, combined with improving financial conditions, will boost investment. Employment growth will moderate with rising labour shortages. Rising wages will slow the decline in inflation towards 2% in 2026 and could hold back low-wage employment. Possible implementation delays of the Recovery and Resilience Plan "Greece 2.0" could put the planned investment growth at risk. If wage growth were to persistently outpace productivity gains, this could weaken exports. Extreme weather events, such as last year's floods in Thessaly, could also weigh on domestic demand.

High public debt makes achieving sustained primary surpluses a priority. However, demographic change and climate change will add to domestic spending pressures. Moreover, more public investment will need to be financed through the national budget after the end of the Recovery and Resilience Plan in 2026. Rising labour-market shortages, despite relatively high unemployment, point to increasing skills mismatches that could weigh on growth prospects and could be addressed by strengthening vocational training, rebalancing labour-market policies towards training and counselling for unemployed workers, and ensuring high training quality. More efficient public spending, a broadening of tax bases and further productivity-enhancing reforms are key to boost growth and maintain debt on a firmly declining path. Gradually shifting public spending towards education and health care, building on regular spending and public investment reviews, while containing staff expenditures and maintaining efforts to reduce pension expenditures as a percentage of GDP, would raise growth and equity. Further reducing tax evasion and limiting tax expenditures – notably reduced VAT rates, which mostly benefit more well-off households – would raise revenue, making room for targeted social contribution cuts for lower wage earners.

3.2. Cyprus

Cyprus's growth is expected to remain robust in 2025 and 2026, based on the Autumn 2024 Economic Forecast for Cyprus[16]. Real GDP growth was resilient in the first half of 2024, expanding by 3.6% y-o-y. This was primarily driven by private consumption, which increased by 4.5%. Investment, excluding the volatile registration of ships and aircraft, grew by 4.8% y-o-y, supported by a positive sentiment in the construction sector. Strong foreign demand for services, particularly in sea transport and tourism, led to a solid export performance. For 2024, growth is projected at 3.6%.

This positive momentum is expected to continue, with economic growth forecast at 2.8% in 2025, and 2.5% in 2026. Investment is set to keep benefitting from the funds of the Recovery and Resilience Facility, and easing financial conditions are expected to provide a further stimulus. Export performance is projected to continue to benefit from growing tourist receipts and a dynamic outlook for services, particularly related to ICT. The ongoing recovery in household purchasing power due to an increase in nominal wages and declining inflation, is expected to boost private consumption.

HICP inflation is expected to converge to 2.0% over the forecast horizon, reflecting a gradual easing of base effects in particular for food, and declines in domestic energy prices. Services inflation is expected to remain

Table 2: Economic background of Greece, 2010-2025e. Source: IMF's World Economic Outlook Database, October 2024

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025e
Gross domestic product. constant prices (National Currency. bn)	216.113	194.179	180.418	175.879	176.715	176.369	175.510	177.427	180.387	183.777	166.656	180.621	190.659	194.494	198.928	202.826
Gross domestic product. constant prices (%)	-5.478	-10.149	-7.087	-2.516	0.476	-0.196	-0.487	1.092	1.668	1.880	-9.316	8.380	5.557	2.011	2.280	1.959
Inflation. average consumer prices (%)	4.704	3.118	1.035	-0.854	-1.394	-1.094	0.013	1.138	0.774	0.517	-1.262	0.574	9.300	4.155	2.909	2.096
Volume of imports of goods and services (%)	-3.082	-9.599	-5.585	-3.636	6.734	8.038	3.004	4.942	6.608	1.164	-1.443	8.973	3.365	-1.700	2..662	4.293
Unemployment rate (%)	12.725	17.850	24.425	27.475	26.500	24.900	23.550	21.450	19.300	17.325	16.325	14.775	12.425	11.075	10.520	10.072
Population (Million)	11.119	11.123	11.086	11.004	10.927	10.858	10.784	10.768	10.741	10.725	10.719	10.679	10.460	10.414	10.383	10.352
General government revenue (%)	41.560	44.612	47.303	48.441	46.914	48.545	50.559	49.724	49.639	47.989	49.636	50.172	50.628	48.949	47.586	47.676
General government total expenditure (%)	52.957	55.120	54.148	52.460	51.162	51.558	50.279	48.666	48.856	48.075	60.198	57.679	53.117	49.858	48.593	48.625
Current account balance (USD bn)	-29.861	-28.716	-6.202	-6.171	-5.872	-2.894	-4.583	-5.143	-7.589	-4.584	-13.840	-15.258	-23.390	-16.365	-16.476	-13.982
Current account balance (%)	-10.042	-10.149	-2.561	-2.583	-2.493	-1.479	-2.373	-2.575	-3.577	-2.233	-7.349	-7.103	-10.741	-6.868	-6.519	.-5.273

[16] *https://economy-finance.ec.europa.eu/economic-surveillance-eu-economies/cyprus/economic-forecast-cyprus_en*

elevated, mainly due to high nominal wage growth and increasing demand especially for tourism.

The current account deficit remains elevated but is projected to decline, to reach 8.2% of GDP in 2026. This declining trend is set to be supported by strong tourism flows and sustained improvements in the trade balance, despite persistently high net outflows of primary income resulting from the repatriation of profits by foreign-owned corporations.

Downside risks to the outlook persist. Ongoing tensions in the Middle East could disrupt supply chains and increase production costs. The tourism sector, a key contributor to the external balance, remains vulnerable to those risks. Additionally, energy prices pose a threat due to Cyprus's high oil dependence and limited integration with the European electricity market.

Employment grew by 2.7% y-o-y in the first half of 2024, reflecting increased hiring in tourism and the public sector. Over the same period, the unemployment rate fell by 1%, reaching 4.9% by the end of the second quarter. This is the lowest level in the last 15 years. Skills mismatches and labour market slack remain limited, partly due to the influx of foreign workers benefiting from the incentives provided under the government's initiative to attract multinational business to set up their base on Cyprus (headquartering). Employment is projected to grow by 1.9% in 2024, with a slight moderation at 1.2% by 2026. The unemployment rate is, projected to decline further and reach 4.5% in 2026.

The government surplus is expected to remain solid over the forecast horizon. In 2024, the surplus is projected at 3.5% of GDP in 2024, up from 2% in 2023. The budget balance of 2023 includes the temporary negative impact of 1.1% of GDP from the statistical treatment of some retroactive payment to civil servants' pension fund, which is eliminated in 2024. Further improvements of the 2024 surplus are stemming from revenue growth which is set to outpace the increasing expenditure throughout the year. Improved labour market conditions and higher contribution rates for employers and employees as of January 2024 contribute to increasing budget revenue from social security contributions. Higher receipts from corporate income tax, personal income tax and VAT are also expected to boost tax revenue, which is forecast to increase by around 11% overall. Public wage expenditure is projected to grow by more than 11%, primarily due to inflation indexation and higher social contribution rates for civil servants. Public investment is expected to remain high as RRP projects are maturing and other EU funds of 2021-2027 programming period are gaining speed. Investment financed by national state budget is expected to somewhat decrease.

The budget surplus is forecast to remain but to be lower at 2.7% of GDP in 2025 and 2026, as tax revenue increases are set to moderate in line with incomes and consumption and collection of tax arrears is assumed to flatten. At the same time, ad hoc increases in public wages adopted at the end of 2024 and measures to support housing are expected to be the main drivers of the growing expenditure in 2025.

The government debt-to-GDP ratio was at 73.6% in 2023. This figure was revised down by around 4% after the benchmark update of nominal GDP for the period 1995-2023. The revision incorporates statistical and methodological changes that had a level-shift impact on the entire forecast profile. The debt-to-GDP ratio is expected to continue declining to 66.4% of GDP in 2024 and to 56.7% in 2026, largely due to primary surpluses and continued strong nominal GDP growth.

Table 3: Economic background of Cyprus, 2010-2025e. Source: IMF's World Economic Outlook Database, October 2024

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025e
Gross domestic product. constant prices (National Currency. bn)	19.461	19.542	18.868	17.626	17.312	17.904	19.081	20.175	21.315	22.495	21.721	23.873	25.081	25.699	26.545	27.372
Gross domestic product. constant prices (%)	2.283	0.416	-3.447	-6.587	-1.776	3.418	6.575	5.733	5.648	5.537	-3.443	9.910	5.059	2.466	3.291	3.115
Inflation. average consumer prices (%)	2.559	3.482	3.088	0.380	-0.268	-1.541	-1.217	0.683	0.782	0.545	-1.098	2.243	8.084	3.943	2.176	2.000
Volume of imports of goods and services (%)	10.796	-2.592	-3.633	-4.556	7.719	8.062	10.164	14.303	4.325	9.503	3.245	15.364	18.282	1.716	1.778	2.384
Unemployment rate (%)	6.275	7.850	11.800	15.850	16.075	14.900	12.950	11.050	8.350	7.075	7.575	7.475	6.775	6.098	5.260	5.073
Population (Million)	0.819	0.840	0.862	0.866	0.858	0.847	0.848	0.855	0.864	0.876	0.888	0.896	0.905	0.921	0.921	0.929
General government revenue (%)	37.012	36.425	36.343	36.938	40.082	39.532	37.542	38.304	38.994	39.382	38.489	40.081	41.545	43.325	44.256	44.160
General government total expenditure (%)	41.696	42.075	41.894	42.098	40.316	39.464	37.286	36.410	42.612	38.127	44.225	41.902	38.813	40.243	41.115	40.993
General government net debt (%)	47.725	52.207	67.057	78.717	90.339	90.566	85.324	76.850	54.161	49.217	59.275	54.874	47.542	41.840	n/a	n/a
Current account balance (USD bn)	-2.764	-0.638	-0.967	-0.352	-0.942	-0.089	-0.880	-1.157	-1.013	-1.442	-2.513	-1.791	-2.321	-3.901	-3.526	-3.140

3.3. Türkiye

Economic growth will ease to 3.5% in 2024 and 2.6% in 2025 as necessary macroeconomic stabilisation policies will slow domestic demand. Tighter financial conditions and ongoing fiscal consolidation will limit household consumption. Investment and government consumption will also slow as the effects of the post-earthquake reconstruction wear off. However, exports should increase on the back of an improvement in the external environment and a continued revival of international tourism. GDP growth is projected to rebound in 2026, reaching 4% as the effects of the stabilisation policies ease.

The fiscal and monetary policy mix is rightly tight and should remain so until inflation is firmly on a path to target. Despite the ongoing price moderation, high inflation expectations and strong inertia uphold upside risks on the inflation outlook. Structural reforms can further support the current efforts to stabilise the macroeconomic framework and raise the long-term growth potential. In particular, labour market reform would help increase high-quality formal job creation

The economy has slowed in 2024, with year-on-year GDP growth dropping from 5.3% in the first quarter to 2.5% in the second quarter. Tight financial conditions weigh on domestic demand, causing household spending and investment to slow significantly. Leading indicators like manufacturing capacity utilisation, the purchasing managers' index, services production, along with an ongoing contraction in commercial loans in real terms, indicate that economic activity could slow further. Both the employment rate and labour force participation remained stable in the first half of 2024. In September, annual consumer inflation fell below 50%, largely due to base effects. However, core inflation remained high, driven by inflation in services and rising goods inflation. Inflation expectations are declining but are still elevated. The current account balance has improved due to the rebalancing of the drivers of economic growth, positive outlook in tourism and natural gas production in the Sakarya field.

Foreign exchange reserves have been increasing. Although, exports have been sluggish in recent months due to seasonal factors and escalating regional tensions, they are expected to contribute to further improvements in the current account balance, in line with the government's efforts to shift economic growth towards exports.

The monetary and fiscal authorities have both reiterated their commitment to keep policies tight as part of the multipronged effort to put Türkiye's economy back on a sustainable path. The central bank has recently kept the policy rate at 50% but indicated that it will decisively use all the tools at its disposal in line with its main objective of price stability. It also tightened macroprudential policies by introducing a 2% monthly growth limit for foreign currency loans, that has subsequently been lowered to 1.5%. The government published its Medium Term Programme, confirming the commitment to reduce the public sector general deficit from 5.6% in 2023 to 2.6% in 2026. This effort is partly based on tax revenue increases, including a new minimum corporate tax and the removal of exemptions. Larger deficit cuts will come from the expenditure side through reduced capital and transfer spending as earthquake-related investments will largely decrease in 2025.

Economic growth is expected to slow after years of robust but unsustainable growth driven by domestic demand. Tighter financial conditions coupled with restrictive monetary and fiscal policy will hamper household consumption, especially as the effects of post-earthquake reconstruction fade. Unemployment will rise slightly but stay around 9%. The measures to contain inflation will have an impact, but nevertheless inflation will decline only gradually, staying above the 5% target through the forecast period. The main risk to the outlook stems from the potential relaxation of the current macroeconomic stabilisation policies, which could lead to higher inflation and further instability. In contrast, further credible policy improvements in fiscal, financial, and monetary policy might improve investors' sentiment and strengthen growth.

Table 4: Economic background of Türkiye, 2010-2025e. Source: IMF's World Economic Outlook Database, October 2024

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025e
Gross domestic product, constant prices (National Currency, bn)	1.091.181	1.213.394	1.271.497	1.379.394	1.447.532	1.535.607	1.586.637	1.705.666	1.757.061	1.771.443	1.804.389	2.010.800	2.122.067	2.230.529	2.297.632	2.359.657
Gross domestic product, constant prices (%)	8.427	11.200	4.788	8.486	4.940	6.084	3.323	7.502	3.013	0.819	1.860	11.439	5.533	5.111	3.008	2.700
Inflation, average consumer prices (%)	8.566	6.472	8.892	7.493	8.855	7.671	7.775	11.144	16.332	15.177	12.279	19.596	72.309	53.859	60.916	32.974
Volume of imports of goods and services (%)	19.365	14.978	0.619	10.920	0.299	0.662	2.996	10.635	-6.172	-5.012	6.774	1.653	8.568	11.791	0.663	6.313
Unemployment rate (%)	11.000	9.000	8.300	8.900	9.900	10.300	10.900	10.900	10.900	13.700	13.100	12.000	10.400	9.400	9.255	9.878
Population (Million)	73.723	74.724	75.627	76.668	77.696	78.741	79.815	80.811	82.004	83.155	83.614	84.680	85.280	85.372	85.811	86.239
General government revenue (%)	32.463	32.458	32.348	32.490	31.653	31.957	32.121	30.733	31.160	30.733	29.953	28.234	26.213	27.876	29.154	29.127
General government total expenditure (%)	35.478	32.812	34.134	33.702	32.620	32.469	33.800	32.611	34.294	35.515	34.674	31.283	27.332	33.180	34.344	32.698
General government net debt (%)	34.667	30.878	27.265	25.753	23.707	22.841	23.275	22.111	24.130	26.459	30.746	34.037	23.504	22.150	20.284	21.802
Current account balance (USD bn)	-44.620	-74.402	-41.796	-49.327	-32.113	-21.355	-22.168	-35.143	-14.604	15.013	-31.085	-6.433	-45.799	-45.009	-29.052	-30.159

3.4. Israel

The evolving conflicts in the Middle East since October 2023 will continue to shape economic activity. GDP growth is projected to be 2.4% in 2025 and 4.6% in 2026. Military expenditure keeps government demand high. Partial normalisation in the business environment is assumed to allow a pick-up in exports and private consumption from mid-2025. Labour shortages are constraining construction and fuelling price pressures.

Risks loom large: an intensification of the conflicts would further weigh on activity and an already large fiscal deficit. On the other hand, a swift de-escalation could unleash pent-up demand. Fiscal policy should take action to steadily reduce the deficit in coming years. Revenue increases are needed to fund permanently higher defence expenditures while focussing spending on key areas, including research, education, and public investment. Monetary policy needs to remain restrictive to ensure inflation returns to the target range. Large arrivals of foreign workers and the reopening of work permits for Palestinians would reduce labour shortages.

Economic conditions are deeply impacted by the conflicts. The sharp increase in military activities has prompted government demand to rise by more than a fifth from its pre-war level in the second half of 2024. After a fast recovery from the slump in the aftermath of 7 October 2023, private consumption has grown sluggishly, with consumer confidence remaining weak in October 2024. Business confidence by contrast has been stronger, with respondents overall moderately optimistic, and local stock markets have recovered fully.

Persistent labour shortages in construction have constrained investment. Few new foreign workers (0.4% of employment) have entered Israel since work permits were suspended for Palestinians (4% of employment before the war).

Rocket attacks have significantly reduced industrial and farm production in Northern areas. Supply constraints contributed to inflation picking up from 2.5% to 3.5% over February-October 2024. The conflicts have been impacting foreign trade. Ship attacks in the Red Sea have made shipping more expensive, while reduced airline connections complicate services trade. Intensifying tensions since mid2024 have hurt the high-tech sector, halting the rally in high-tech shares. Inward foreign tourism remains nearly absent.

After a strong impulse as the budget balance moved from surplus in 2022 to an estimated 7.5% of GDP deficit in 2024, fiscal policy is set to tighten in 2025-26 by over 2% of GDP. The deterioration in public accounts led all three major credit rating agencies to downgrade Israel's government credit rating. Despite continued elevated military spending in 2025, the authorities are reducing the deficit by raising taxes and curbing civilian expenditure. Tax increases combine permanent measures, such a 1% increase in the main VAT rate, with changes that may be more challenging to maintain, such as freezes in income-tax thresholds. Defence spending is expected to decrease from mid-2025 albeit remaining at a higher share of GDP than before the war. The central bank is projected to keep policy interest rates on hold at 4.5% through the projection period. The fiscal drag and a gradual improvement in supply conditions from mid-2025 are projected to offset the price pressures that have been building since early 2024.

Growth is projected to pick up to 2.4% in 2025 and 4.6% in 2026 with the composition of demand changing over time. Export growth is anticipated to gain pace gradually, particularly from the latter half of 2025, including in high-tech services. Private consumption should follow a similar path. Government consumption will turn from supportive to restrictive over time.

Table 5: Economic background of Israel, 2010-2025e. Source: IMF's World Economic Outlook Database, October 2024

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025e
Gross domestic product, constant prices (National Currency, bn)	987.191	1.041.671	1.067.167	1.111.160	1.153.203	1.179.538	1.231.995	1.285.419	1.337.675	1.388.376	1.367.911	1.497.398	1.592.668	1.625.069	1.636.569	1.680.216
Gross domestic product, constant prices (%)	5.534	5519	2.448	4.122	3.784	2.284	4.447	4.336	4.065	3.790	-1.474	9.466	6.362	2.034	0.708	2.667
Inflation, average consumer prices (%)	2.694	3.450	1.708	1526	0.476	-0.632	-0.645	0.242	0.807	0.842	-0.587	1.492	4.395	4.208	3.082	2.983
Volume of imports of goods and services (%)	15.120	11.234	2.160	0.974	2.333	0.132	10.291	4.611	7.387	3.884	-7.930	20.993	12.062	-6.639	-0.140	1.471
Unemployment rate (%)	8.250	7.050	6.892	6.208	5.883	5.258	4.833	4.225	4.000	3.808	4.317	4.958	3.758	3.450	3.100	3.400
Population (Million)	7.621	7.763	7.907	8.056	8.212	8.377	8.543	8.710	8.879	9.051	9.214	9.367	9.551	9.756	9.943	10.133
General government revenue (%)	35.921	35.833	35.050	35.580	35.913	36.279	36.021	37.095	35.519	34.727	33.916	36.416	37.078	34.162	34.872	36.249
General government total expenditure (%)	39.646	39.277	38.518	38.646	38.212	37.496	37.815	38.231	39.072	38.526	44.585	39.792	36.635	39.001	43.915	41.691
General government net debt (%)	63.500	62.600	62.500	61.800	61.600	59.900	58.400	56.600	57.100	56.800	66.600	64.200	58.600	59.673	65.172	66.628
Current account balance (USD bn)	8.096	4135	1004	8876	13284	15857	12109	13.061	11.287	12.761	19.662	18.969	20.765	24.903	17.772	24.362

Investment remains constrained by labour shortages, in particular for construction. Inflation is projected to rise in 2025 to 3.6% including under the effect of the VAT increase before moderating to 2.9% in 2026 as supply constraints ease. Risks are very large. On the downside, a renewed intensification of the conflicts could substantially degrade public accounts while directly reducing activity. Loss of foreign-investor confidence could result in further increases in government bond yields and test the value of the currency. On the upside, an acceleration of the de-escalation could unleash pent-up foreign and domestic private demand prompting a much-faster-than-projected upturn and improvement in the fiscal accounts.

3.5. Egypt

Egypt, classified as a Lower Middle-Income country, had a GDP per capita of $3,512.6 in FY23 (July 2022-June 2023). The country possesses significant potential to leverage its existing manufacturing and services sectors, a large domestic market, and strategic geographic location as a gateway to Africa, Asia, and Europe. These factors can be harnessed to attract both foreign and domestic investments. Egypt is pursuing macroeconomic stabilization and structural reforms, underpinned by the IMF Extended Fund Facility (EFF), large-scale UAE investment deal in Ras Elhekma, and development partners' financing including the World Bank and the European Union.

Notwithstanding the monetary tightening and exchange rate adjustment of March 2024 that helped ease the two-year-long foreign currency crisis, the escalation of the Middle East conflict continues to impact foreign income sources, especially the Suez Canal revenues. Further, scarring effects of the longstanding challenges that intersected with global shocks continue to manifest in key economic activities, notably the manufacturing, Suez Canal, and energy sectors.

Growth is expected to start a gradual recovery from an estimated 2.5% in FY24 (July 2023-June 2024) to 3.5% and 4.2% in FY25 and FY26, respectively driven by favourable base effects, as well as investment, notably that financed by the UAE deal. The budget deficit is forecast to widen from 3.6% of GDP in FY24 to 7.0% of GDP in FY25, mainly due to the higher interest payments and the vanishing impact of the (one-off) Ras Elhekma transaction, before starting to decline thereafter, supported by fiscal consolidation. External financing requirements remain substantial, with maturing external debt and repayment of arrears to International Oil Companies. Further, the widened current account deficit may put pressure on foreign currency resources, especially if the Middle East conflict continues to cast a shadow on the economy.

Key factors to unlock productivity growth, exports, and job-creation include: (i) Reorienting the role of the state as an enabler of private activity. This is critical for fiscal and external sustainability; (ii) creating a conducive business environment; and (iii) addressing human development needs.

3.6. Lebanon

After years of neglect, corruption, financial mismanagement and the war next door in Syria, the Lebanese economy entered a full-blown crisis in 2019, sparking mass protests that demanded sweeping reforms[17]. The economic crisis deteriorated further since, due to the COVID-19 pandemic, rising public debt, a sovereign default, a currency collapse and an explosion at the port of Beirut. The traditional engines of growth in Lebanon (real estate, construction and tourism) have stalled and the banking sector, which until then had been praised for its resilience, has collapsed. Between 2022 and early 2023, the economy experienced a temporary stabilization after undergoing significant contraction in previous years, primarily attributed to the contributions of tourism and substantial remittances.

Table 6: Economic background of Egypt, 2010-2025e. Source: IMF's World Economic Outlook Database, October 2024

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025e
Gross domestic product, constant prices (National Currency, bn)	4.928.485	5.015.452	5.127.106	5.296.400	5.451.600	5.689.300	5.936.200	6.185.000	6.514.500	6.875.900	7.121.600	7.353.300	7.842.500	8.137.300	8.354.697	8.695.636
Gross domestic product, constant prices (%)	5.147	1766	2.226	3.302	2.930	4.360	4.340	4.191	5.327	5.548	3.573	3.253	6.653	3.759	2.672	4.081
Inflation, average consumer prices (%)	11.658	11.056	8.692	6.916	10.093	10.988	10.212	23.534	20.851	13.875	5.700	4.500	8.500	24.392	33.802	21.192
Volume of imports of goods and services (%)	-7.105	-3.197	3.429	1.230	3.879	19.341	5.360	1.186	-0.204	3.381	-0.307	-3.788	6.408	-17.552	9.736	2.820
Unemployment rate (%)	9.210	10.379	12.373	12.992	13.365	12.859	12.705	12.245	10.932	8.612	8.296	7.292	7.323	7.185	7.230	7.351
Population (Million)	78.700	80.500	82.500	84.600	86.800	89.000	91.000	95.200	97.100	98.900	100.600	102.100	103.600	105.200	107.304	109.450
General government revenue (%)	23.911	20.948	19.720	20.607	23.169	20.895	19.172	20.655	19.656	19.302	18.227	18.588	16.922	16.973	16.638	17.628
General government total expenditure (%)	31.358	30.549	29.191	32.886	33.892	31.265	30.968	30.553	28.631	26.898	25.695	25.543	24.701	22.741	26.779	27.693
General government net debt (%)	57.094	61.279	60.066	70.040	73.204	75.271	81.558	86.615	80.652	74.643	80.646	85.222	83.853	91.249	86.176	79.862
Current account balance (USD bn)	-4.318	-6088	-10146	-6390	-2746	-12143	-19831	-14.394	-5.962	-10.894	-11.167	-18.436	-16.551	-4.711	-24.928	-22.070

[17] *https://www.lloydsbanktrade.com/en/market-potential/lebanon/economical-context*

According to the World Bank's projections, the Lebanese economy was expected to see a modest growth of 0.2% in 2023, a positive projection for the first time since 2018, driven by a successful summer tourism season, strong remittances supporting consumption growth, and increasing dollarization of salaries. Signs of ongoing stabilization in private sector activity further contributed to the positive economic outlook. Nevertheless, with the onset of the conflict between Israel and Hamas and its repercussion in Lebanon, the latest estimates projected a recession in 2023 (-0.6% to -0.9%, depending on the extent of the tourism shock).

In 2023, the fiscal and primary deficits narrowed to an estimated 1.3% and 0.3% of GDP, respectively (World Bank). With the successful implementation of planned revenue measures, revenues reached 8.8% of GDP. However, expenditures, driven by increased current spending, transfers to Électricité du Liban, and the continuation of social assistance schemes for public servants, rose to 10.1% of GDP. With a sharp currency depreciation and economic contraction, sovereign debt stood at 179.2% of GDP in 2022 (latest data available), highlighting its unsustainability without comprehensive debt restructuring. However, since the default on sovereign debt on March 9, 2020, minimal advancements have been made in formulating a debt restructuring strategy or reaching an agreement with foreign creditors. Gross foreign currency reserves have increased by $425 million between end-July and mid-November 2023, reaching $14,213 million (World Bank). The temporary economic stabilization had a ripple effect on the exchange rate, which experienced a temporary steadiness. This stability was influenced by reduced demand for dollars due to widespread dollarization in the economy. In 2023, inflation surged to around 230%, primarily due to the ongoing decline in the overall macroeconomic conditions. This acceleration was predominantly influenced by the depreciation of the exchange rate in the first half of 2023 and the rapid dollarization of economic transactions, especially within the components of the consumer price index basket.

3.7. Syria

Since the revolution in 2011, the economy of the Syrian Arab Republic has faced significant challenges. These include civil conflict, international sanctions, the COVID-19 pandemic, the repercussions of the wars on Gaza and Lebanon, Israeli airstrikes on Damascus and other parts of the country and, most recently, the collapse of the Assad regime and uncertainty surrounding the transfer of power[18].

The country's GDP contracted by 6.8% in 2023, a result of the ongoing destruction of infrastructure and disruption across key sectors. Marginal GDP growth of 0.5% has been estimated for 2024, primarily driven by the arrival of displaced people fleeing Lebanon as a result of the Israeli war, as well as the resumption of diplomatic ties between the former Syrian regime and several Arab countries. However, this slight growth in GDP may be balanced out by the significant destruction of infrastructure by Israeli airstrikes and the forces of the former regime, which has had a significant impact on the manufacturing, agriculture and services sectors.

The Syrian pound has undergone significant devaluation since 2011. This has been aggravated by the enforcement of sanctions and restrictions on many financial and trade activities. The currency depreciated from 11 Syrian pounds to the dollar in 2010 to 460 Syrian pounds to the dollar in 2016, eventually reaching 2,505 Syrian pounds to the dollar in 2022. In 2023, the Syrian pound is estimated to have lost around two thirds of its value against the dollar, with significant consequences for prices.

Table 7: Economic background of Lebanon, 2010-2025e. Source: IMF's World Economic Outlook Database, October 2024

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025e
Gross domestic product, constant prices (National Currency, bn)	77,477	78,149	80,135	83,188	85,240	85,626	86,964	87,758	86,131	80,273	60,529	61,749	62,367	61,930	n/a	n/a
Gross domestic product, constant prices (%)	7.974	0.867	2.541	3.811	2.466	0.453	1.563	0.913	-1.853	-6.801	-24.597	2.016	1.000	-0.700	n/a	n/a
Inflation, average consumer prices (%)	3.962	4.986	6.573	5.559	1.128	-3.761	-0.807	4.485	6.058	2.891	84.880	154.759	171.195	221.343	n/a	n/a
Volume of imports of goods and services (%)	-10.217	-3.588	4.341	7.287	0.500	5.114	3.345	0.284	-1.464	-4.628	-50.752	2.502	25.550	-0.987	n/a	n/a
Unemployment rate (%)																
Population (Million)	4.996	5.045	5.178	5.679	6.274	6.399	6.259	6.109	5.951	5.782	5.663	5.593	5.490	5.354	n/a	n/a
General government revenue (%)	21.685	22.876	21.795	20.092	22.617	19.175	19.399	21.916	21.026	20.772	15.828	8.254	5.687	12.884	n/a	n/a
General government total expenditure (%)	29.151	28.821	30.229	28.915	28.834	26.659	28.282	30.570	32.326	31.287	23.214	10.920	12.242	13.276	n/a	n/a
General government net debt (%)	127.568	128.754	123.719	126.091	130.019	134.406	140.687	144.393	150.776	166.900	146.101	354.067	251.470	190.930	n/a	n/a
Current account balance (USD bn)	-7.955	-6.551	-11.407	-13.121	-13.883	-9.918	-12042	-14.030	-15.850	-14.375	-3.944	-3.576	-6.793	-5.647	n/a	n/a

[18] *https://www.unescwa.org/sites/default/files/pubs/pdf/syria-crossroads-stabilized-transition-english.pdf*

Inflation rates quickly hit double-digit levels after 2011, and they continue to weigh significantly on citizens, progressively eroding their purchasing power.

The inflation rate in the Syrian Arab Republic is projected to reach a record high of 40.2% in 2024. Persistent inflation and a lack of investment have dampened the country's economic recovery. The provisions of the Caesar Syria Civilian Protection Act – United States legislation placing sanctions on members of the former Syrian Government – have further tightened the constraints under which the country's policymakers are required to act. As a result of elevated inflation rates, the country's fiscal deficit increased from 2.0% of GDP in 2019 to approximately 6.5% in 2023.

The conflict, together with the former Government's loss of control over oil fields and the sanctions imposed during the period of civil unrest, severely depleted public resources. The former government had increased subsidies on many essential items to shield citizens from rapidly rising prices. However, the removal of subsidies on many items in 2023 and 2024 is projected to reduce the size of the fiscal deficit to 5.9% in 2024. This projection may change if the security situation allows for the reconstruction of destroyed areas, or if there is an influx of aid. Although the country's debt-to-GDP ratio has increased in recent years, it remains moderate as a result of the former Government's inability to access financial markets because of the aforementioned sanctions. The debt-to-GDP ratio of the Syrian Arab Republic increased from 10.0% in 2019 to 12.0% in 2023 and is expected to increase to 15.2% in 2024.

The Syrian private sector has been a critical component of the domestic economy, particularly in recent years, as public institutions have suffered from conflict-related destruction and underinvestment. Before 2011, the private sector accounted for 60% of GDP, 75% of total imports, and 56% of non-oil exports. It employed a significant portion of the country's workforce, with most jobs falling under the umbrella of small-scale businesses or self-employment.

Over the past five years, the contribution of the private sector has grown, driven by privatization and the decline of State-owned enterprises. In 2016, the former government enacted a law governing public-private partnerships. The law allowed the private management of State assets in almost all sectors except oil production. This has increased the role of private businesses, particularly in sectors such as real estate, construction and services. At present, around 56% of the country's workforce is employed in the private sector. However, employment conditions vary significantly, and wage inequality is more pronounced in the private sector than in the public sector.

Conclusion

The group of countries analysed in this study, i.e. Greece, Cyprus, Türkiye, Israel, Egypt, Lebanon and Syria, are characterised by different demographic, political, geopolitical and economic parameters, but energy plays a vital role on their economies and some of them have been developed important trade and cooperation ties. These countries are dynamic and despite their different size they are all interested in exploiting local resources and if possible, to export energy to other countries. The intense political and geopolitical environment (i.e. Israel-Hamas war) may affect in a variety of ways the countries, but energy can be characterised as a "weapon" for bringing peace and prosperity in the region.

Table 8: Economic background of Syria, 2010-2025e. Source: IMF's World Economic Outlook Database, October 2024

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025e
Gross domestic product, constant prices (National Currency, bn)	1,469.703	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Gross domestic product, constant prices (%)	3.440	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Inflation, average consumer prices (%)	4.398	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Volume of imports of goods and services (%)	5.004	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Unemployment rate (%)	8.613	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Population (Million)	21.393	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
General government revenue (%)	20.848	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
General government total expenditure (%)	28.638	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
General government net debt (%)	18.807	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Current account balance (USD bn)	1.707	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Oil and Gas Exploration and Production Activities

4

4. Oil and Gas Exploration and Production Activities

The East Mediterranean oil and gas sector has experienced significant growth and advancement over the last twenty years. Exploration and production activities have expanded as countries in the region tapped into their offshore reserves. Major discoveries, such as Israel's Leviathan field in 2010 and Cyprus's Aphrodite field in 2011, have positioned the East Mediterranean as a crucial player in the global energy market (Table 9).

Despite geopolitical challenges and tensions, investment in the East Mediterranean oil and gas sector has remained strong, fuelled by the region's substantial hydrocarbon potential and strategic significance. Governments and companies continue to pursue new opportunities and develop infrastructure to facilitate the extraction and export of oil and gas resources.

In 2022 alone, a series of gas discoveries in Israel, Cyprus, and Egypt marked a significant turning point in the Eastern Mediterranean region (Table 10). While these discoveries might not have rivalled the magnitude of major finds like Egypt's Zohr or Israel's Leviathan field, their proximity to existing production infrastructure is crucial. These newly found reserves, although individually not substantial, collectively pave the way for ongoing development and production in the area once integrated into the existing infrastructure.

The discoveries in Cyprus are particularly noteworthy, as they bolster the country's potential to become a gas exporter, aligning it with its neighbouring nations. However, the optimal route for exports remains uncertain or might face constraints. Despite the absence of a single substantial find, these discoveries will underpin the region's continued growth, especially when linked to the existing infrastructure.

Towards the end of 2022, a new discovery in Cypriot waters raised questions about export options for its yet-to-be-developed reserves. While past discussions have considered options like piping gas to the European mainland or building new liquefaction facilities on the island, the current viable alternatives seem to lean towards a floating liquefied natural gas facility (FLNG), a concept also being explored in Israel, or a connection to Egyptian LNG plants. The evolving landscape of these discoveries signifies a promising future for the Eastern Mediterranean's energy sector, albeit with strategic decisions yet to be made regarding the most efficient export routes[19].

The challenge lies in the fact that the current exploitable volumes of natural gas in the Mediterranean are not sufficient to support long-term investments in midstream activities, such as pipelines and liquefaction terminals. This necessitates the discovery of more gas reserves to provide the foundation for significant midstream investments. Consequently, the region is at a critical juncture where further exploration efforts are imperative to sustain the momentum of this burgeoning industry.

Upon the production of gas fields like Zohr in Egypt and Tamar in Israel a new era of energy independence has usher in for these nations. Additionally, future development plans are in progress for other significant reservoirs such as Karish, Tanin, Aphrodite, Kalypso, and Glaucus. These projects hold the potential to be linked to existing facilities in Egypt or Cyprus and may even connect to major proposed pipelines like the East Med Pipeline. However, the exploration of areas with varying water depths, ranging from 1,200 to 3,000 m, presents both technical and economic challenges, especially in Greece and neighbouring offshore regions in Libya and Türkiye.

Across the Eastern Mediterranean and the Adriatic, countries are investing in Floating Storage Regasification Units (FSRU) and liquefaction plants to enhance their gas infrastructure. Egypt, in particular, has positioned itself as a regional gas regulator, importing and exporting gas while constantly developing its infrastructure to meet the rising demand. Despite these advancements, global uncertainties, such as the ongoing impact of the COVID-19 pandemic, have raised questions about the future balance between Liquefied Natural Gas (LNG) facilities and additional offshore pipelines in the South-East Mediterranean.

Table 9: Major gas discoveries in the East Mediterranean from 2000.

Gas Discovery	Year	Country	Size (Bcm / Tcf)*
Mari-B	2000	Israel	28 / 1
Noa	2000	Israel	1.3 / 0.5
Dalit	2009	Israel	8 / 0.3
Tamar	2009	Israel	250 / 8.8
Leviathan	2010	Israel	500 / 17.7
Aphrodite	2011	Cyprus	116.1 / 4.1
Dolphin	2011	Israel	2.3 / 0.08
Tanin	2012	Israel	25 / 0.9
Karish	2013	Israel	31 / 1.1
Atoll	2015	Egypt	42.5 / 1.5
Zohr	2015	Egypt	275 / 10

Gas Discovery	Year	Country	Size (Bcm / Tcf)*
Calypso	2018	Cyprus	28 / 1
Nooros	2018	Egypt	113 / 4
Glaucus	2019	Cyprus	100 / 3.5
Karish North	2019	Israel	40 / 1.4
Bashrush	2020	Egypt	7.1 / 0.25
Cronos	2022	Cyprus	70.8 / 2.5
Zeus (Cyprus)	2022	Cyprus	70.8 / 2.5
Zeus (Israel)	2022	Israel	13 / 0.5
Narges	2022	Egypt	71 / 2.5
Athena	2022	Israel	13 / 0.5
Hermes	2022	Israel	13 / 0.5

[19] *Middle East Institute, "Eastern Mediterranean gas discoveries, progress, and what to watch in 2023", 10.01.2023, https://www.mei.edu/publications/eastern-mediterranean-gas-discoveries-progress-and-what-watch-2023*

Table 10: Most significant gas discoveries in the region in 2022 since 2008

Key Eastern Mediterranean Discoveries in 2022

Site	Estimated size (Bcm)	Operator	Country	Date
Athena	13 / 0.5	Energean	Israel	May
Cronos-1	70 / 2.5	ENI	Cyprus	August
Hermes	13 / 0.5	Energean	Israel	October
Zeus-1	13 / 0.5	Energean	Israel	October
Zeus-01	70.8 / 2.5	TotalEnergies	Cyprus	December
Narges-1X	71 / 2.5	Chevron	Egypt	December

Moreover, the emergence of Small Scale Liquified Natural Gas (SSLNG) technology has added a new dimension to the industry, offering a potential solution to efficiently handle smaller gas volumes. However, major projects like the East Med Pipeline, which aims to link the East Mediterranean to Europe, require substantial investments, with an estimated cost exceeding €7 billion. Similarly, financing new liquefaction LNG terminals in the Mediterranean is expected to cost approximately €3 billion. These high costs pose significant challenges in the context of global competition.

In this evolving landscape, existing liquefaction facilities in Egypt have proven to be competitive, allowing the nation to absorb a considerable portion of the available natural gas produced in the region. However, Cyprus faces economic viability challenges in developing its gas reservoirs, such as Glafkos, Aphrodite, and Calypso. Decisions regarding these projects are further complicated by the uncertainty inherent in the decision-making process, leading to a shift in the norm from a 50% probability to a more conservative 90% success probability.

Looking toward the long term, the exploration of not only natural gas but also oil deep beneath the Southeastern Mediterranean seabed presents intriguing opportunities. The presence of mud volcanoes and hydrates on the sea bottom, evidenced by the release of methane or its retention in the ice layers, opens new avenues for the industry. These resources, along with deep drilling efforts, are expected to be of significant interest to the sector for the next three to four decades.

Simultaneously, Greece is on a trajectory to increase its reliance on renewable energy sources, with an anticipated average share of 60% in power generation over the next decade. However, hydrocarbons, particularly natural gas, will continue to play a pivotal role during this energy transition. Imports of liquefied natural gas are expected to rise to balance the phasing out of lignite, the reduction in oil use, and the challenges posed by the low efficiency of renewables.

Unlike Greece, Israel has greatly enhanced its energy security and independence through significant gas discoveries and production within its territory. These discoveries have not only diversified Israel's energy sources but also diminished its reliance on imported fuels. Additionally, Israel's dedication to maximizing the utilization of its hydrocarbon resources highlights its resolve to utilize this newfound energy wealth for long-term economic growth and stability.

As the Eastern Mediterranean nations navigate these complex energy dynamics, Egypt emerges as a key player. Despite uncertainties, the country's oil and gas industry is regaining momentum. Efforts to expand the Zohr gas field and new exploration projects are set to revitalize Egypt's energy sector. However, challenges persist, especially in aging oil and gas fields, necessitating investments in innovative technologies to enhance production rates.

In this context, the partnership between Petrobel, a subsidiary of the Egyptian General Petroleum Corp., and the Italian energy company Eni is crucial. Accelerating drilling activities and adopting cutting-edge technologies are paramount to improving production rates. Despite Egypt's dependency on gas imports to meet its growing energy demand, the nation is poised for substantial domestic resource development in the coming decades.

This strategic vision aligns with Egypt's plans to boost its oil and gas output significantly. The Egyptian General Petroleum Corp, in collaboration with international oil majors like Eni, Chevron, ExxonMobil, Shell, and BP, is embarking on an ambitious plan to drill 35 exploration wells in the next two years, with an estimated cost of $1.8 billion. These endeavours reflect Egypt's commitment to strengthening its energy security and fostering economic growth through the responsible exploration and utilization of its hydrocarbon resources.

In summary, the Eastern Mediterranean's evolving energy landscape presents a multifaceted tableau of opportunities and challenges. The region's nations, particularly Egypt, are at the forefront of pioneering advancements in hydrocarbon exploration, production, and transportation. Navigating these complexities requires strategic investments, international collaborations, and a forward-looking approach to ensure sustainable energy development, economic prosperity, and energy security for the nations involved[20].

[20] *IENE, SEEE Outlook 2021/2022, https://www.iene.eu/media/iene-SEEE-outlook-2021-22-3rd-edition.pdf*

4.1. Greece

Hydrocarbon exploration work in Greece date back to the early 20th century, though there are reports of such attempts in the 1860s. However, it was only in the 1960s to mid-1970s that upstream activities were carried out in a systematic and organized approach.

During the same period, major oil companies were granted concessions in the country, and more than 40 onshore and offshore wells were drilled by companies like BP, ESSO, Texaco, Chevron, Anschutz and Oceanic-Colorado, leading to the discovery of the first commercial reserves offshore Thassos island (northern Greece), the Prinos oil field and the North Kavala gas field, in the early 1970s.

Based on the results of these surveys, it was decided in 1975 to establish the Public Petroleum Corporation (DEP A.E.), the first organisation responsible for managing the Greek state's rights in hydrocarbon exploration and exploitation. This period covered research activities by DEP A.E. from its establishment until the enactment of Law 2289/95, which reformed the licensing framework, allowing foreign companies to resume exploration activities.

In 1985, DEP-ECU, a subsidiary of DEP A.E., was established. Both companies were granted 24 exploration licenses in onshore and offshore areas without competition. Seismic surveys covering 73,000 km of 2D data and 2,500 km^2 of 3D data were conducted, along with 73 research drilling operations based on seismic findings. These efforts led to the discovery of oil reserves in the marine area of Katakolo (Western Peloponnese), natural gas reserves in the Epanomi area of Thessaloniki, and biogenic gas accumulations.

During this period, knowledge about petroleum systems in the Greek territory (tectonic/stratigraphic traps, reservoir rocks, cap rocks, source rocks) significantly improved, creating an extensive database and providing a solid foundation for future projects.

In 1995, Law 2289/95 was enacted, reforming the licensing framework to align with EU Directive 94/22/EC. In 1996, the first international round of concessions took place. Through international bidding, four areas in Western Greece were awarded to Triton (Northwestern Peloponnese & Aetolia-Acarnania) and Enterprise Oil (Ioannina & Gulf of Patras). Significant investments were made in seismic surveys and drilling operations. However, the explorations did not yield satisfactory results, and the drilling did not reach the depths specified in the initial agreements. The companies withdrew in 2000-2001.

After 2001, there was no further research activity for the next decade. Given this reality, the groundwork was laid for further modernization of the licensing framework for hydrocarbon exploration and exploitation.

In 2007, with an amendment to Law 3587 (Article 20), the Greek state revoked all concessions granted to DEP/DEP-ECU/ELPE (after the privatization of DEP ECU and the change in ELPE A.E.'s ownership structure).

These concessions were returned, with certain exceptions, to the Ministry of Energy & Climate Change (currently the Ministry of Environment and Energy). Subsequently, the legal framework governing the licensing process for hydrocarbon exploration, research, and exploitation (Law 2289/95) was modernized by the Greek government with the enactment of Law 4001/2011 (Chapter B), creating an attractive business environment. In 2011, the establishment of Hellenic Hydrocarbons Enterprise Management SA (HHRM SA, now HEREMA SA – Hellenic Hydrocarbons and Energy Resources Management Company), a state-owned company, marked a significant milestone in efficiently managing various activities related to the upstream industry. These activities included overseeing Exploration & Production concessions, monitoring lease agreements, ensuring offshore safety measures, and actively promoting Greece as an attractive destination for international oil and gas investors.

The establishment of HHRM SA was a strategic move by the Greek government to effectively manage and capitalize on the country's hydrocarbon resources. By centralizing the management of exploration and production concessions, HHRM SA ensured that all activities were conducted in accordance with international standards and best practices.

As a result, after a 15-year absence from the global exploration stage, Greece made a remarkable comeback in 2011 by introducing the above-mentioned new legal and regulatory framework for hydrocarbon exploration and production. This resurgence was supported wholeheartedly by the government. In 2014, the government further solidified its commitment by entering into new concession agreements for three onshore and offshore areas in western Greece – the first such agreements since 1996. Subsequently, an international round took place in 2015 followed by «Open Door» rounds that resulted in signing significant offshore concessions with prominent global oil leaders. These agreements covered three offshore areas in the Ionian Sea as well as regions located south and southwest of Crete[21].

Major international companies entered the country with the prospect to explore the onshore and offshore areas of western Greece and Crete. Companies such as Total, ExxonMobil, Repsol and Edison, together with the Greek operators – Hellenic Petroleum (now HelleniQ) and Energean. Greece had thirteen (12) active concessions and one (1) (the "Sea of Thrace" concession) under a force majeure clause suspension, which was the highest number than ever before (Fig. 16).

However, as of 2020 a shift in the Greek government's energy strategy to place all its bets on its "green" agenda which prioritizes the exploitation of large-scale Renewable Energy Sources against all other types of fuel, has resulted ever since in investor withdrawals. To date, out of the thirteen (13) live concessions in 2020, only nine (9) remain active (including the South of Thrace concession which is still suspended under a force majeure clause) (Fig. 17).

[21] *Lack of state support hinders Greece's oil exploration, https://www.financialmirror.com/2020/03/16/lack-of-state-support-hinders-greeces-oil-exploration/*
[22] *Hydrocarbon Exploration in Greece: the role of HHRM, https://www.greekhydrocarbons.gr/news_files/hhrm_book_2020_eng.pdf*

Figure 16: Oil and gas blocks in Greece in 2020 [21]

The active concessions are[23] :

1. Block 2: Energean (75%), HelleniQ (25%). The block is in its first exploration phase and in 2022 a 3D seismic survey was acquired (2,244 km2).
2. Ionian Block: HelleniQ (100%). In its second exploration phase, in 2022 a 2D and a 3D seismic survey (1,600 km and 1,150 km2 respectively) were acquired.
3. Block 10: HelleniQ (100%). The block is in its second exploration phase, in 2022 a 2D and a 3D seismic survey (1,200 km and 2,430 km2 respectively) were acquired.
4. West of Crete: ExxonMobil (70%), HelleniQ (30%). The block is in its first exploration phase.
5. Southwest of Crete: ExxonMobil (70%), HelleniQ (30%). The block is in its first exploration phase.
6. Ioannina: Energean (100%), onshore block, in its second exploration phase.
7. Katakolon: Energean (100%). The block is in its development stage, awaiting approval of Environmental Strategic Impact Assessment.
8. Prinos: Energean (100%). Production phase. The latest 3D seismic survey conducted in 2015 over the Prinos area led to an increase in the field's 2P and 2C reserves and in the identification of several other potential plays and prospects in the vicinity. The field complex is eligible for funding through the RRF to develop the 1st CCS facility.
9. Sea of Thrace: currently in force majeure.

HHRM underwent a transformation in 2022 and emerged as the Hellenic Hydrocarbons and Energy Resources Management Company (HEREMA) with an enhanced scope. Presently, HEREMA has broadened its involvement beyond hydrocarbon exploration and production to encompass licensing and management of carbon storage, underground gas storage, and offshore wind. Moreover, through the acquisition of DEPA International Works, HEREMA actively participates in infrastructure projects like the IGB and EastMed pipelines[23].

In 2023, 2D seismic surveys initiated in November 2022 were successfully completed in blocks «West» and «Southwest» of Crete. These surveys were conducted by PGS acting on behalf of the Licensees ExxonMobil and HelleniQ Energy and were executed under the supervision of the competent state company, HEREMA. A total of 12,278 km of seismic data were collected, exceeding the combined minimum contractual obligation of 6,500 km for the two blocks[24].

This year, the newly acquired seismic data is being analysed and interpreted, to inform a decision on whether to proceed with drilling. The decision will be taken in 2025. According to statements made by the Minister of Environment and Energy and ExxonMobil representatives at the East Med Gas Forum conference in Athens in May 2024, if the decision is made to go ahead with the first exploration well offshore Crete, drilling will commence by the end of 2025[25].

[23] *HEREMA SA official website, https://herema.gr/*
[24] *HEREMA press release, "Successful completion of the geophysical surveys in the blocks "West" and "Southwest" of Crete", 20.02.2023, https://herema.gr/successful-completion-of-the-geophysical-surveys-in-the-blocks-west-and/*
[25] *East Med Gas Forum, 27-28 May 2024, Athens, Greece.*

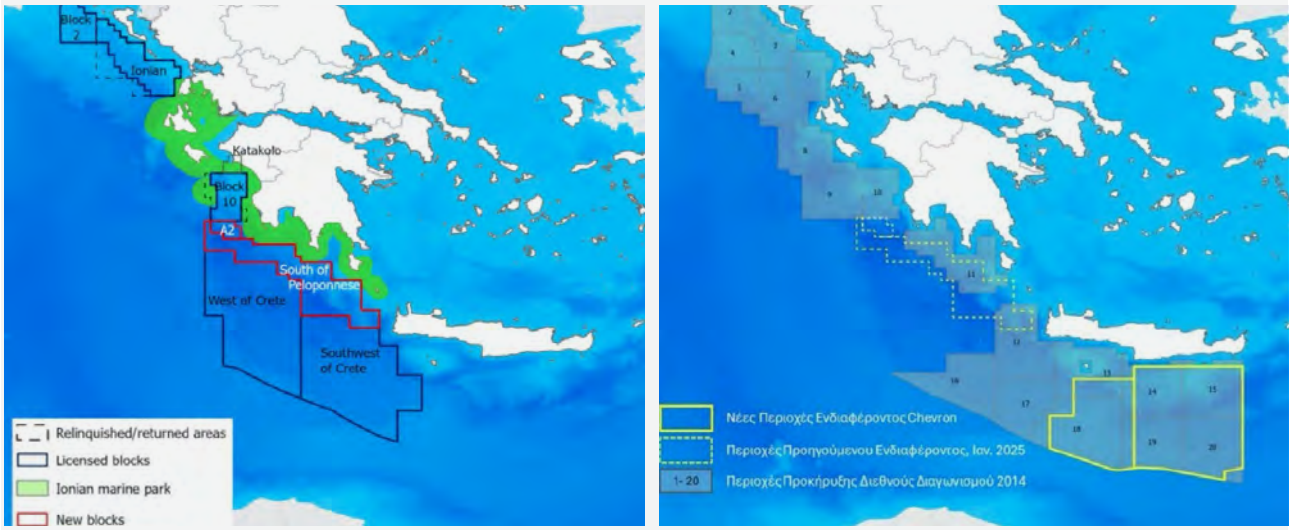
Figure 17: Greece current acreage map [26]

In January and March 2025, Chevron expressed its interest in hydrocarbons exploration in Greece. The US producer submitted a non-binding expression of interest for open acreage offshore Peloponnese and south of Crete.

The Ministry of Energy announced that the Greek government accepted Chevron's interest in exploring hydrocarbon deposits in the four (4) offshore areas (Block A2, South of Peloponnese, South of Crete I and South of Crete II). Greece will now enter international markets with four new areas for concession, covering a total area of 47,000 km^2. This effectively doubles the area of active marine zones available for exploration[27] (Fig 18).

[26] *HEREMA SA, 2024.*
[27] *Ekathimerini.com, "Chevron confirms interest in Greek offshore hydrocarbon exploration blocks", 26.03.2025, https://www.ekathimerini.com/economy/energy/1265202/chevron-confirms-interest-in-offshore-hydrocarbon-exploration-south-of-crete/*

Figure 18: The new blocks, Chevron expressed its interest in.



4.2. Cyprus

Back in 2007, the Cypriot government initiated its inaugural licensing round. During this round, 11 out of its 13 offshore blocks were offered to international investors. However, the response was limited. Only three bids were submitted, most likely as a result of protests from neighbouring Türkiye questioning the legitimacy of the licensing round and the high geological risk prevalent in the basin due to the absence of prior discoveries.

In 2008, an exploration license (Block 12) was granted to Noble Energy, a Houston-based company (later acquired by Chevron in 2020). Noble Energy, in 2011, announced Cyprus's first gas discovery, the Aphrodite field. Almost 90% of its estimated volume lies within Cypriot waters, with the remainder in Israeli waters, known as the Yishai field[28].

The Cypriot government has launched four more licensing rounds following the gas discovery of Aphrodite, in 2012, 2016, 2018 and 2021.

These rounds attracted interest from several investors and indeed the blocks were awarded to some of the world's largest energy companies, including TotalEnergies, ENI, KOGAS, ExxonMobil and Qatar Energy.

Although, two wells drilled in 2014 by the ENI/KOGAS consortium in Block 9 ("Onasagoras" and "Amathousa") and one well in Block 11 by TotalEnergies in 2017 ("Onesiphoros") failed to discover exploitable hydrocarbons, it was ENI's discovery – "Calypso" in 2018 in Block 06, that proved the extension of Zohr-type carbonate plays in Cyprus' Exclusive Economic Zone[29].

In 2019, the ExxonMobil/Qatar Petroleum consortium drilled the "Delphyne" well in Block 10, with non-commercial results. However, a second well drilled in the same block led to the discovery of Glaucus gas field. Two more discoveries were made in the Cypriot's Republic EEZ in 2022, in Block 06 by ENI/TotalEnergies – "Cronus" and "Zeus" gas fields (Table 11).

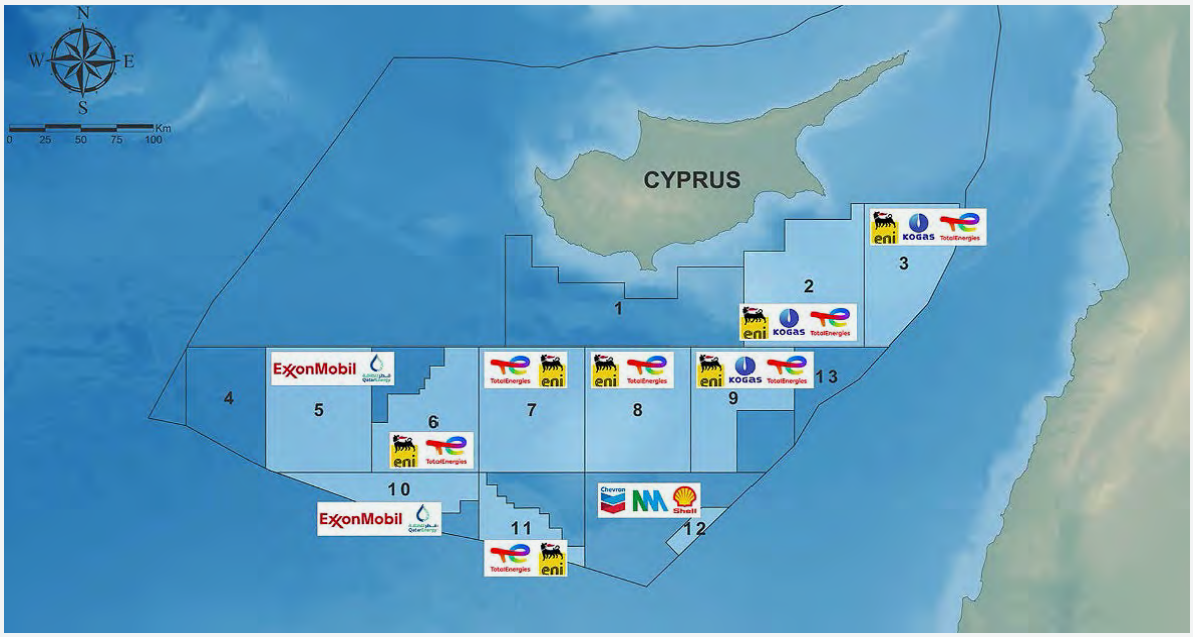
Table 11: Gas discoveries in Cyprus (Modified after IENE's SEEE Outlook 2021/2022)

Gas discoveries offshore Cyprus

Year	Block	Field	Discovered by	Size (Tcf)
2011	12	Aphrodite	Noble Energy	4.5
2014	09	Onasagoras	ENI/Kogas	-
2014	09	Amathousa	ENI/Kogas	-
2017	11	Onesiphoros	TotalEnergies	-
2018	06	Calypso	ENI/TotalEnergies	2.5-8 (estimated)
2019	10	Delphyne	ExxonMobil/Qatar Petroleum	-
2019	10	Glaucus	ExxonMobil/Qatar Petroleum	5-8
2022	06	Cronus	ENI/TotalEnergies	2.5
2022	06	Zeus	ENI/TotalEnergies	2-3.5

[28] *Cyprus's gas remains stranded, https://www.gisreportsonline.com/r/gas-2/*
[29] *IENE, SEEE Outlook 2021/2022, https://www.iene.eu/media/iene-SEEE-outlook-2021-22-3rd-edition.pdf*

Figure 19: Cyprus EEZ acreage map[30] - Blocks 2, 3 and 9 expired in February 2025



The current acreage offshore Cyprus is shown in Figure 19. Twelve years have passed since Cyprus's initial discovery of its first and largest offshore gas reserve, Aphrodite. Chevron failed with three proposals to develop the field, with the latest plan rejected by the Cypriot government in May 2024. The ministry had requested the Chevron-led consortium to state its consent within six months to revert with a commitment to commence the Front-End Engineering Design (FEED) based on a 2019 development plan[31]. Subsequent findings from 2018 to 2022, facilitated by major global energy corporations, followed suit. Surprisingly, despite these discoveries, Cyprus has neither harnessed nor utilised any natural gas up to this point.

On August 30, 2024, Chevron submitted an updated development plan for the Aphrodite gas field to the government of Cyprus for approval. The estimated cost of the revised plan stands at approximately $4 billion, pending further technical and economic feasibility studies as well as the completion of the FEED phase.

The updated plan proposes extracting and processing natural gas from the field through an initial setup of four production wells. These wells will be linked to a floating production unit (FPU) stationed above the field, with a nominal maximum production capacity of approximately 800 million cubic feet per day (Mcf/day)[32]. On February 14, 2025, Cyprus approved the Aphrodite Block 12 development plan. Then, on February 17, 2025, during the EGYPES energy conference in Cairo the Cronos Block 6 development plan was signed[33].

During the Energy Intelligence Forum in London (November 2024), ExxonMobil's outgoing upstream chief, Liam Mallon, identified the East Mediterranean and Guyana as the two most significant new hydrocarbon provinces discovered globally over the past three decades. He highlighted ExxonMobil's upcoming Electra well in Cyprus's Block 5 as a potential game-changer, with an estimated resource of up to 30 trillion cubic feet (Tcf) of gas in place. If realised, this would rival Egypt's Zohr and Israel's Leviathan fields as one of the largest discoveries in the region. ExxonMobil and QatarEnergy are planning to drill three wells in total by mid-2025, utilizing the Valaris DS-9 drillship[34]. On Friday 24th January, ExxonMobil and QatarEnergy spudded their first exploration well for the Electra prospect. ExxonMobil also plans to drill to the Pegasus target within Block 10 near Glaucus and adjacent to Block 6's Cronos find.

However, in February 2025, the exploitation licenses for Blocks 2, 3, and 9 expired without renewal after exploration failed to reveal commercially viable natural gas reserves. This development also marks the exit of the Korean energy company Kogas from the Cyprus EEZ, where it held a 20% stake in the blocks.

[30] *Cyprus Hydrocarbons Company, https://chc.com.cy/*
[31] *Ekathimerini.com, "Cyprus rejects Chevron's 'Aphrodite' plan", 06.05.2024, https://www.ekathimerini.com/economy/energy/1238025/cyprus-rejects-chevrons-aphrodite-plan/*
[32] *Offshore Energy, "Chevron takes another shot at making Aphrodite rise from the sea with revised $4 billion plan for offshore gas development", 05.09.2024, https://www.offshore-energy.biz/chevron-takes-another-shot-at-making-aphrodite-rise-from-the-sea-with-revised-4-billion-plan-for-offshore-gas-development/*
[33] *The Oxford Institute of Energy Studies, March 2025, "East Mediterranean: Cyprus upstream to help stabilize Egypt gas balances", https://www.oxfordenergy.org/wpcms/wp-content/uploads/2025/03/East-Mediterranean-Comment.pdf*
[34] *MEES, "Cyprus Hopes For Mega Exxon Elektra Find To Jolt Its Gas Sector To Life", 13.12.2024, https://www.mees.com/2024/12/13/oil-gas/cyprus-hopes-for-mega-exxon-elektra-find-to-jolt-its-gas-sector-to-life/19605080-b957-11ef-aa67-9587035416d7*

4.3. Türkiye

The history of oil exploration in Türkiye traces back to 1887 when Sadrazam Kamil Pasha obtained a petroleum concession near İskenderun through an Ottoman decree. The initial drilling in İskenderun Çengen in 1890 revealed gas samples, while a well in Gaziköy, drilled to a depth of 108 meters in 1898, yielded no oil. Concurrently, French companies and the Ottoman Bank discovered oil deposits of 82 meters and 74 meters in Şarköy and Mürefte, respectively. Experts from the European Petroleum Company found oil in Hora Dere in 1899, initially extracting 2 tons and later increasing production to 47 tons by 1901, before abandoning the well due to low productivity.

In 1914, as World War I commenced, the European Petroleum Company received permission for oil exploration in Mosul, but war conditions halted their efforts. Instead, during Mustafa Kemal's revolution and the establishment of the Turkish Republic in 1926 under Petroleum Law No. 792, the government gained rights over all petroleum resources within Türkiye's borders. The first refinery, Boğaziçi Tasfiyehanesi, was established in the same year with a daily processing capacity of 40 tons of crude oil from Romania. In 1935, Law No. 2804 created the Mineral Research and Exploration Institute (MTA), which conducted gold and oil exploration activities. The commercial discovery of oil in Türkiye occurred in 1940 with the Raman-1 well in Batman, and subsequent significant discoveries were made at Raman-8.

In 1945, a refinery with a daily processing capacity of 200 tons was established in Türkiye. In 1954, the Petroleum Law was abolished, and the government aimed to transfer oil exploration and operation rights to legal entities under the Mineral Research and Exploration Institute (MTA). The new Turkish Petroleum Corporation Law, known as Law No. 6327, authorised the establishment of the Turkish Petroleum Corporation and granted similar authority to the Petroleum Department Directorate, opening up oil exploration and operating activities to the private sector.

In 1957, Anadolu Tasfiyehane (ATAS) was formed in collaboration with Mobil, BP, California Texas, and Shell. Two years later, Istanbul Petroleum Refinery Inc. (IPRAS) was established as a joint venture between the Turkish Petroleum Corporation and California Texas. In 1973, the Petroleum Law adopted a more «statist» approach, reducing operating licenses from 40 to 20 years and only allowing the Turkish Petroleum Corporation to reapply for expired wells. In 1984, the Turkish Petroleum Institute was dissolved under new legislation transferring all shares of the Turkish Petroleum Corporation to Economic State Enterprise.

In 1998, fuel prices were determined by the Italian market, and an automated pricing mechanism was implemented. In 2000, Law No. 4586 regulated the transit passage of petroleum through pipelines in the Baku-Tbilisi-Ceyhan Crude Oil Pipeline. Finally, in 2013, the new Turkish Petroleum Law No. 6491 came into effect, extending exploration and production license periods, removing the state's right over exploration licenses, and creating an opportunity for swift expropriation[35].

Over the last three years, TPAO's extensive exploration activities have resulted in significant oil and gas discoveries. In May 2023, TPAO announced the largest onshore crude oil discovery, holding an estimated 1 billion barrels. The find was also made in the Sirnak province in a well that currently produces 10,000 barrels per day (bpd)[36] .

According to the Ministry of Energy and Natural Resources of Türkiye and TPAO, a total of 174 wells were drilled in 2021 and this number increased to 191 in 2022. Notably, three reserves containing approximately 180 million barrels were discovered in 2022, resulting in a significant increase in Türkiye's overall proven oil reserves at approximately 600 million barrels from 411.2 million barrels in 2021. Türkiye's gas reserves stand at 710 billion cubic metres (Bcm) (2023).

In 2023, a total of 389 exploration and 157 production licenses were active. In these, licensed areas 1,909 km of 2D and 11,578 km^2 of 3D seismic data were acquired and 214 wells were drilled – 176 of these by TPAO and the remaining 38 by other license holders.

In terms of daily crude oil production, there has been a notable growth trajectory. In 2017, daily production stood at around 40,000 barrels. However, by the year 2022, this figure had risen to an average of 72,000 bpd.

Annual gas production in 2022, was approximately 380 Mcm (Fig. 20 and 21). In 2023, annual gas production increased by approximately 113% to 807.3 million cubic metres (Mcm)[37], covering 1.7% of the country's demand (TPAO producing 683.9 Mcm, 84.7% of total production). Domestic gas production reached its highest level in 2008 with 1.01 Bcm.

Furthermore, with the recent discovery of oil on Mount Gabar in December 2023, the daily oil production is targeted to reach 200,000 barrels by the end of 2024[38].

[35] *https://www.smartcitizenship.com/oil-production-in-turkey/*
[36] *Turkey Hopeful After Recent Oil And Gas Discoveries, https://oilprice.com/Energy/Crude-Oil/Turkey-Hopeful-After-Recent-Oil-And-Gas-Discoveries.html*
[37] *Turkey Energy Market Regulatory Authority (EPDK), https://www.epdk.gov.tr/Home/En*
[38] *TSKB Energy Outlook 2022, https://www.tskb.com.tr/uploads/file/energy-outlook-final.pdf*

Figure 20: Average crude oil production in Türkiye (2010-Sept. 2024) in thousands of barrels per day [39]

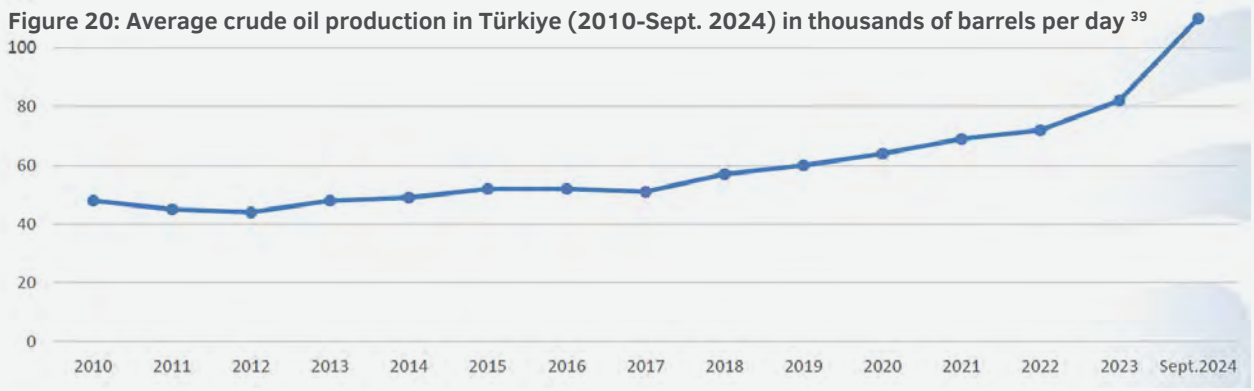


Figure 21: Natural Gas Production in Türkiye (2010-Aug. 2024) in million cubic meters per day[37]

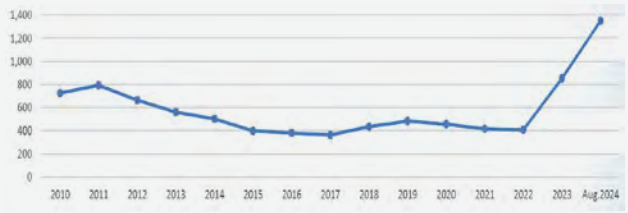
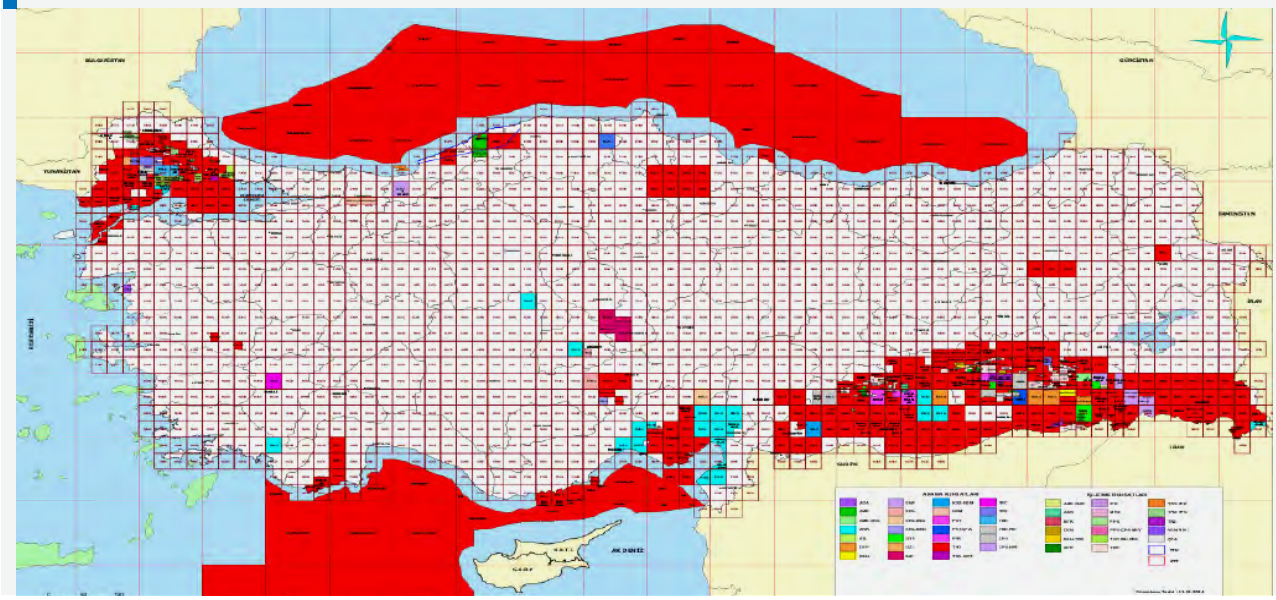


Figure 22: Sakarya's gas field production[41]

Production (MMcm)	Sep'23	Oct'23	Nov'23	Dec'23
Sakarya	74.71	99.90	94.66	68.52
Total Turkish Gas Production	110.55	139.59	138.31	113.81
% Total Increase From Previous Year	267%	311%	266%	196%
Sakarya % of Phase 1 10 MMcm/d Target	25%	32%	31%	22%

Figure 23: Exploration and Production acreage in Türkiye as of February 1st 2024[40]



Intensive and systematic exploration activities in the county have resulted in increased recoverable crude oil reserves, to 1,687 million barrels in 2023[40]. Additionally, the "Sakarya" gas field came into production in April 2023. The field's reserves were estimated at 320 Bcm initially and subsequently revised proved reserves were at 540 Bcm, enough to provide gas for all of Türkiye's households for the next 35 years. The first phase of production was fast-tracked with start-up ta around 10 Mcm a day, which will eventually increase to 40 Mcm.

Although production commenced in April 2023, zero commercial volumes were recorded until September 2023. In addition, there is talk of rushed development and serious problems regarding the overall project, that has pushed up costs significantly and according to official figures from Türkiye's Energy Market Regulatory Authority for December, Sakarya was producing at just 22% of the Phase 1 target (Fig. 22)[41]. Türkiye's acreage situation is quite noteworthy, with 414 active exploration licenses and 156 production licenses[39] (Fig.23).

[39] *Murat Kalay, Petform's presentation at the 3rd International Congress and Exhibition «Türkiye & Black Sea Oil and Gas», 11-12th December 2024.*
[40] *IENE, SEEE Outlook 2025.*
[41] *Energy Intelligence, "Turkey's flagship gas project runs into problems", 29.02.2024, https://www.energyintel.com/0000018d-f56e-d02b-abed-f76fd0dc0000*

4.4. Israel

In 1947, Israel initiated oil exploration activities in the Heletz moshav in southern Israel, leading to the discovery of oil on September 26, 1955, with full production starting in 1960. Subsequently, Israel gained control of Egyptian oil fields in the Sinai during the 1967 War. As part of the peace agreement with Egypt, Israel relinquished its fields in southern Sinai, including the Alma oil field, its largest energy source. Despite projecting energy self-sufficiency by 1990 through Alma's development, Israel became dependent on oil imports due to geopolitical shifts, such as the severed ties with Iranian suppliers after the 1979 Islamic revolution.

In 2015, oil was discovered in the Golan Heights, leading to over 470 oil wells in Israel. However, by 2012, the majority of Israel's crude oil imports came from Russia and Azerbaijan. Israel, while not a major oil producer, is the largest consumer of petroleum in the eastern Mediterranean[42].

The discovery of oil reserves in the Dead Sea's Hatrurim license in 2016 marked a potential breakthrough, with estimates of 7-11 million barrels. Despite historical dependence on oil imports, Israel achieved a significant shift with substantial natural gas discoveries in 2009, notably the Leviathan reservoir.

Historically, Israel had been an oil and gas importer until the late 1990s when significant offshore natural gas fields were discovered. The Tethys Sea Partnership's Noa field in 1999 marked the beginning, followed by the Mary B field in 2000. In 2009, the «Tamar» and «Dalit» fields were discovered, and in 2010, the Leviathan field, the world's largest natural gas find for that year.

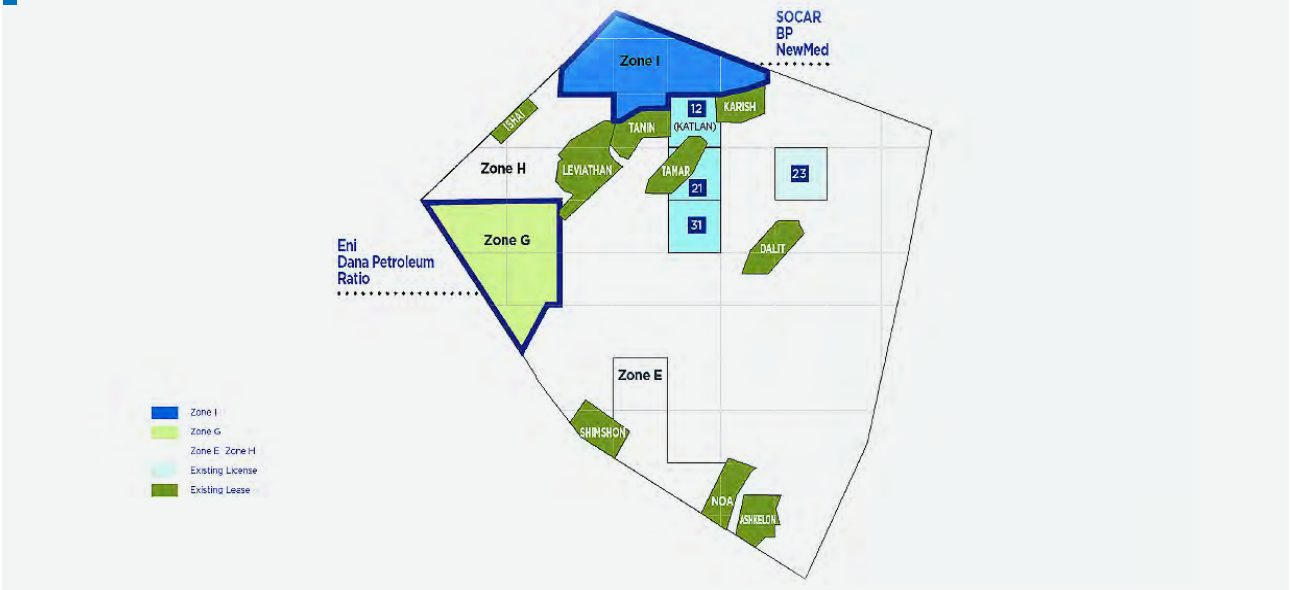
The Tamar, Leviathan and Karish fields began production in 2013, 2020 and 2022 respectively. Currently, around 21 Bcm of gas is produced annually, with over 9 Bcm exported to Egypt and Jordan. Israel's total amount of recoverable gas reserves is around 900 Bcm[43, 44].

During the latest bidding round – the 4th offshore bidding round – twelve (12) licenses, in two (2) zones were awarded to six (6) companies. These companies were: ENI, Dana Petroleum, Ratio Energies, SOCAR, BP, NewMed Energy[45] (Fig. 24).

At the end of 2022, Israel's gas reserves were 1,087 Bcm and production reached 21.9 Bcm, of which 9 Bcm was exported[46]. Gas production increased by 13% to 24.7 Bcm in 2023, driven by the ramp-up of the Karish field (despite its shut-down in October 2023 for a month because of security concerns). In 2023, 47% the total output was exported[46] (11.56 Bcm), with 2.9 Bcm going to Jordan and 8.7 Bcm to Egypt. For comparison, this output is now significantly higher than that of any EU producer, with the largest in 2022 being the Netherlands (15.1 Bcm) and Romania (8.8 Bcm). The distribution of gas between the domestic market and exports is now approaching an equal 50:50 split. Recently announced expansion plans for both the Leviathan and Tamar gas fields aim to increase total output to approximately 38 Bcm by 2030[47].

Regarding gas exports, the Leviathan gas field is responsible for most Israel's gas exports, with nearly all exports to Jordan and over 70% of exports to Egypt originating from this.

Figure 24: Zones awarded in the 4th Offshore Bid Round of Israel[45]



[42] *Jewish Virtual Library, Israel science and technology: oil and gas https://www.jewishvirtuallibrary.org/oil-and-natural-gas-in-israel?utm_content=cmp-true*
[43] *Ministry of Energy and Infrastructure of Israel, https://www.energy-sea.gov.il/home/oil-natural-gas-e-p-in-israel/*
[44] *Ministry of Energy and Infrastructure of Israel, https://www.gov.il/en/departments/general/gas_oil_history*
[45] *Ministry of Energy and Infrastructure of Israel, https://www.gov.il/en/departments/news/news-291023*
[46] *Israel's fossil fuel boon becomes less clear-cut, https://www.reuters.com/breakingviews/israels-fossil-fuel-boon-becomes-less-clear-cut-2023-10-19/*
[47] *The Oxford Institute for Energy Studies, "East Mediterranean Gas: a triangle of interdependencies", May 2024, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2024/05/Insight-151-East-Mediterranean-gas-%E2%80%93-a-triangle-of-interdependencies.pdf*

4.5. Egypt

Egypt stands as a well-established player in the oil and gas industry, boasting a rich history of over a century in Hydrocarbon Exploration & Production. Despite this legacy, the basins of the Mediterranean Sea, Nile Delta, and North Sinai remain largely untapped, harbouring potential significant hydrocarbon resources, particularly in the deeper Pre-Messinian targets.

In the early 1960s, the quest for gas exploration kicked off in the Mediterranean, Nile Delta, and Western Desert, leading to the discovery of numerous gas fields. The historic Abu Madi Field onshore the northeastern part of the Nile Delta Cone was discovered in 1967, followed by the offshore discovery of the Abu Qir gas field in the Mediterranean Sea northeast of Alexandria city in 1969. The substantial Abu-Gharadig gas field was discovered in 1971 in the North Western Desert of Egypt. In 1975, the country started using natural gas with the Abu Madi field put on production in 1978. By the early 1980s, EGPC (Egyptian General Petroleum Corporation) introduced new gas articles to existing and new concession agreements, fostering exploration for both natural gas and crude oil. The identified gas potential in these fields at that time spurred exploration activities in the onshore Nile Delta, offshore Mediterranean Sea (shallow water), and onshore Western Desert.

Exploration of the deep waters of the Mediterranean Sea started in 1975, gaining momentum in 1995. The ongoing exploration activities, both offshore Mediterranean and onshore Nile Delta, have resulted in acquiring over 177,000 km^2 (156,000 offshore + 21,000 onshore) of 3D seismic data and 180,000 km of 2D seismic lines. Additionally, 689 wells have been drilled. These endeavours have led to the discovery of more gas fields with substantial potential, contributing to the growth of Egypt's gas reserves. Presently, exploration efforts are concentrated on the Pre-Messinian deep targets, specifically the Miocene, Oligocene, and Cretaceous formations[48].

In 2015, Eni made the groundbreaking discovery – Zohr gas field – through the drilling of the Zohr-1 well in the deep waters of the Mediterranean Sea, approximately 160 km northeast of Port Said city. This find, deemed the world's largest gas discovery of the year and it was estimated to hold substantial in-place gas volumes of 30 Tcf (850 Bcm). It also marked a significant milestone in Egypt, being the first encounter of a gas-bearing reservoir in a Cretaceous carbonate build-up.

However, Zohr is now estimated to hold only 10 Tcf (275 Bcm) proved reserves and based on the amount of gas produced so far, its remaining reserves have now been revised to 5 Tcf (142 Bcm), limiting production to the mid-2030s. Production has also declined by approximately 30%, from its 2021 peak of 3 Bcf/day to a current 2 Bcf/day.

In 2023, ENI and Chevron discovered Nargis gas field. Chevron was planning to develop this field starting in 2024, however there are problems with delays and the estimated gas reserves. Initial estimates were approximately 3.5 Tcf (100 Bcm), but now it is estimated to be less than 2.8 Tcf (80 Bcm).

The country is the second-largest producer of natural gas in the continent following Algeria and the fourth-largest holder of natural gas reserves. As of 2021, Egypt held 63 Tcf (1.8 Tcm) of natural gas reserves and approximately 3.3 billion barrels of crude oil. Egypt hydrocarbon production comes from three main regions: the Mediterranean Sea, the Red Sea, and the Western Desert with leading Companies being ENI, BP, Rosneft, Mubadala, BASF, and Apache.

The key crude oil and condensate fields are: Belayim, Khalda, Meleiha, GPC Fields, Qantara, and Badr El-Din, while the key natural gas ones are Zohr, West Nile Delta, Nooros, Baltim, Atoll, and West Delta Deep Marine[49].

In 2023, twenty-nine (29) agreements with a total investment of about $1.2 billion for oil and natural gas exploration in the country were signed. Furthermore, 65 new oil and gas sites, including 51 for oil and 14 for gas, were discovered in the Western Desert, the Gulf of the Suez, Nile delta, and Sinai Peninsula, while 87 new wells were drilled[50].

According to Energy Institute's Statistical Review of World Energy, 2024, production of oil and gas in Egypt in 2023, was 610,000 bpd and 57.1 Bcm/year respectively[51] (Fig. 25 and 26) – a significant decrease of approximately 11%, from the 2022, 64.5 Bcm/year gas production.

Egypt's latest International Bidding Round included twelve (12) open offshore and onshore blocks in the Mediterranean Sea and the Nile Delta. In addition, the Egyptian Ministry of Petroleum and Mineral Resources is offering thirty-three (33) exploration blocks and fifteen (15) brownfields (Fig. 27)[52].

[48] *EGAS, https://www.egas.com.eg/activities/exploration*
[49] *Global Data, "Egypt Oil and Gas Exploration and Production Market Volumes and Forecast by Terrain, Assets and Major Companies", 28.03.2024, https://www.globaldata.com/store/report/egypt-oil-and-gas-exploration-and-production-analysis/*
[50] *Hellenic Shipping News, "Egypt seals 29 oil, gas deals in 2023, 30.12.2023, https://www.hellenicshippingnews.com/egypt-seals-29-oil-gas-deals-in-2023-ministry/*
[51] *Energy Institute (EI) Statistical Review of World Energy, 2024, https://www.energyinst.org/__data/assets/pdf_file/0006/1542714/684_EI_Stat_Review_V16_DIGITAL.pdf*
[52] *Egypt Upstream Gateway, https://eug.petroleum.gov.eg/dp/controller/PLEASE_LOGIN_PAGE*

Figure 25: Oil production in Egypt (2012-2023) in thousand barrels per day[51]

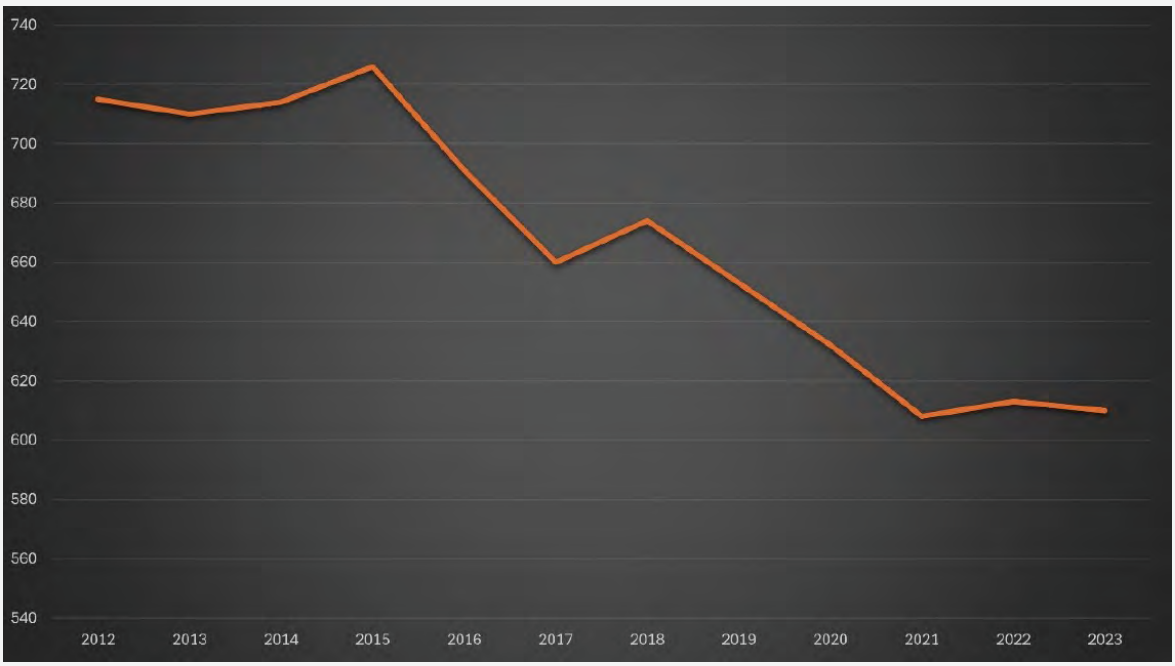


Figure 26: Gas production in Egypt Bcm (2012-2023)[51]

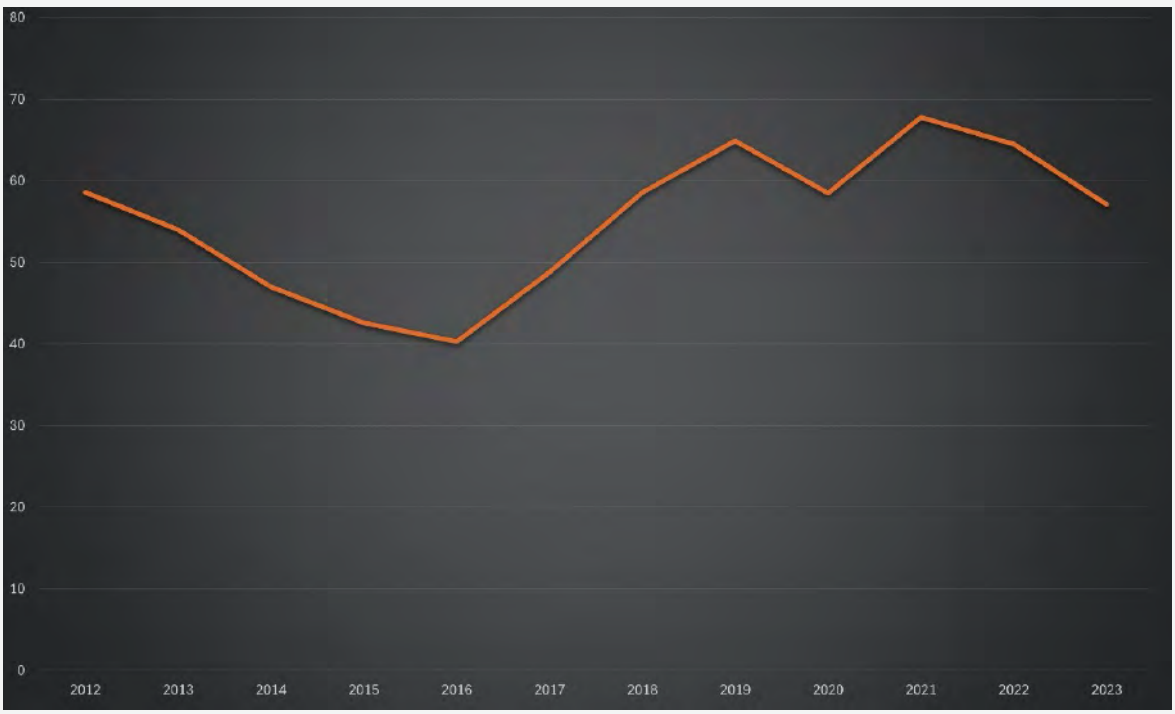
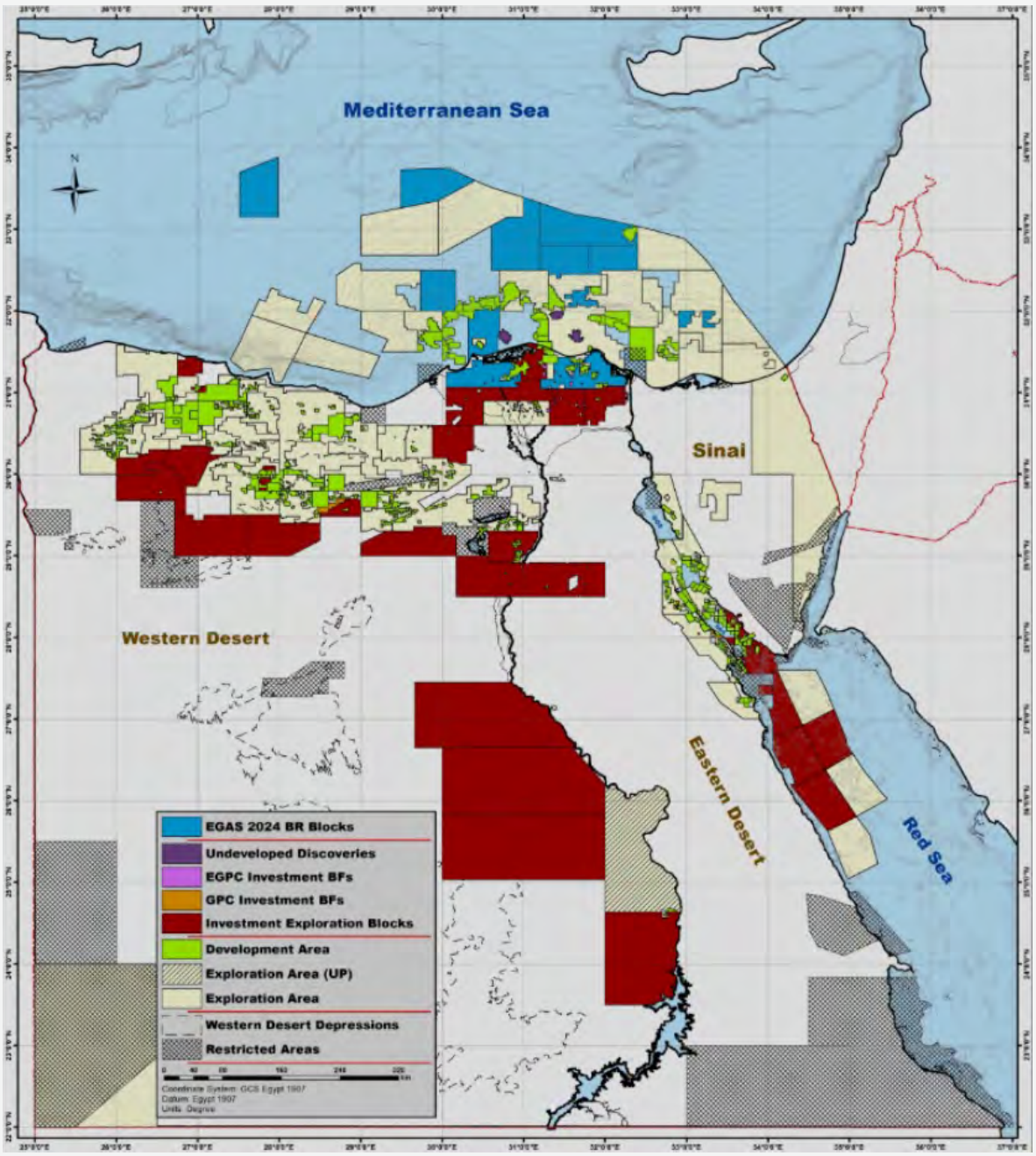


Figure 27: Egypt oil and gas concession map. Also shown, are the open blocks included in the current International Bidding Round, as well as the exploration and brownfields on offer[52]



4.6. Lebanon

Hydrocarbon exploration activities in Lebanon date back to the 1940s. It was in 1947, when during field work for «Nickel-cobalt sulphide» at the Bekaa valley geoscientists stumbled upon rocks and fossilised marine animals commonly associated with petroleum fields. This discovery sparked interest in drilling activities across various locations. For that reason, between 1947 and 1967, seven (7) onshore wells were drilled in Terbol, El Qaa, Aabrine, Tell Znoub, Yohmor, Sohmor and Aadloun. These drilling efforts yielded bitumen and gas shows; however, the extraction costs were deemed prohibitively high.

The first seismic survey offshore Lebanon was acquired in 1993; a 2D seismic survey in the northern part of the Lebanese waters. Several campaigns followed thereafter, 2D and 3D surveys by PGS and Spectrum, resulting in a dense grid. Today, the Lebanese waters are fully covered by 2D seismic surveys and 70% covered by 3D seismic surveys[53].

In August 2010, the Offshore Petroleum Resources Law (OPRL) was ratified by the Lebanese parliament. This law establishes the fundamental principles governing Lebanon's offshore oil and gas sector throughout its entire value chain, encompassing activities from reconnaissance to decommissioning.

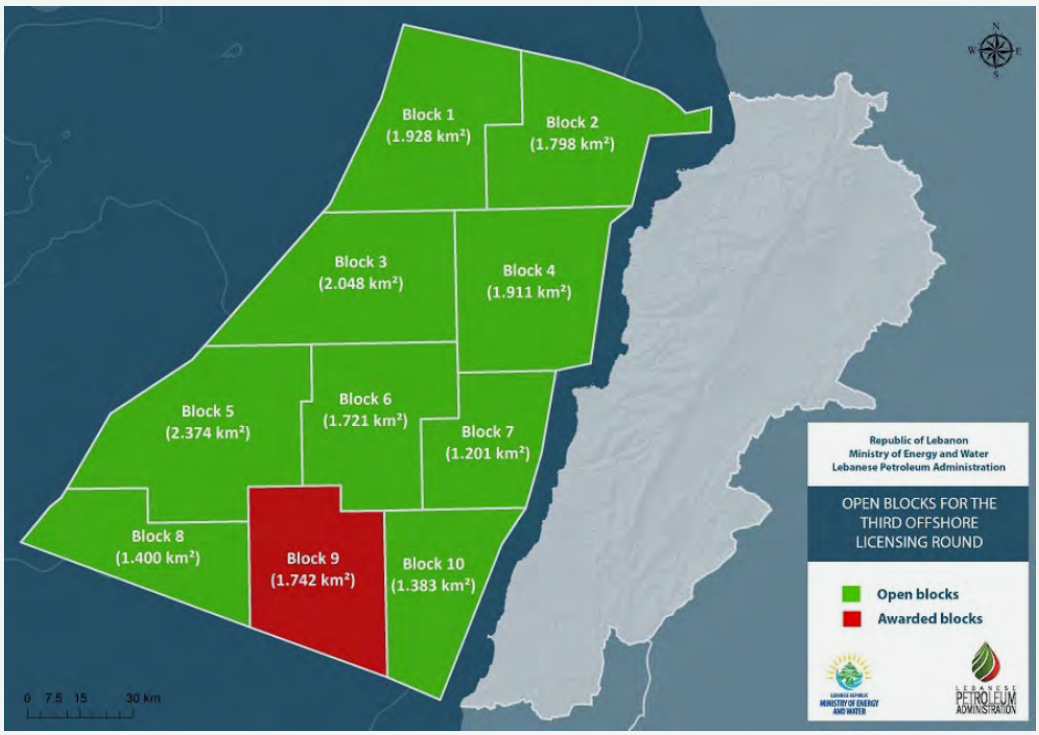
Two years later, in 2012, the Lebanese Petroleum Administration was established, as an independent public institution mandated to plan, manage and oversee the upstream offshore petroleum sector in the country[53].

In March 2013 Lebanon undertook its first prequalification round, as part of the First Licensing Round to prequalify companies based on legal, technical, financial and QHSE (Quality, Health, Safety and Environment) criteria. Such a round was again conducted in 2017.

The first offshore exploration blocks (blocks 4 and 9) were awarded in January 2018, to a consortium of companies, composed of Total, ENI and Novatek. However, exploratory drilling at these two blocks failed to find commercial quantities of oil or gas[54].

Nevertheless, Lebanon has launched its Third Licensing Round with an original July 2, 2024, closing date. However, Lebanon has extended the deadline for this Round again, to November 2025 (it was already extended to March 17, 2025)[55]. On offer all unlicensed blocks namely 1, 2, 3, 4 – which was relinquished in August 2023 – 5, 6, 7, 8 and 10. Regardless, blocks 8 and 10 are under negotiation since the Second Licensing Round (Fig. 28).

Figure 28: Lebanese oil and gas offshore acreage and the blocks on offer for the Third Licensing Round [56]



[53] *Lebanese Petroleum Administration, https://www.lpa.gov.lb/english/oil-amp-gas/major-developments*
[54] *Agnus Media, "Lebanon launches third offshore licensing round", 29.12.2023, https://www.argusmedia.com/en/news/2523354-lebanon-launches-third-offshore-licensing-round*
[55] *Lebanese Petroleum Administration, https://www.lpa.gov.lb/english/licensing-rounds/third-licencing-round/timeline1*
[56] *Lebanese Petroleum Administration, https://www.lpa.gov.lb/english/licensing-rounds/third-licencing-round/open-blocks1*

4.7. Syria

Oil was first discovered in Syria during the 1950s, and production commenced in 1968 in the Hasaka fields of northeastern Syria under the Syrian Petroleum Company (SPC). The arrival of foreign companies in the late 1970s led to the discovery of oil fields in Deir ez-Zor, triggering a production surge from 1985. The Euphrates Oil Company (Shell) initiated production, followed by the Deir ez-Zor Oil Company (French Elf Aquitaine Company), achieving a peak production rate of 620,000 bpd in 1996.

A surge in production during the second half of the 1980s played a pivotal role in alleviating Syria's economic challenges. However, from 1996 onwards, oil production gradually declined at an annual rate of 5%, reaching approximately 380,000 bpd by 2010[57]. Furthermore, in the 1990s, the Syrian government began expressing interest in gas production, aligning with the global surge in gas demand. SPC established gas plants to utilize gas extracted from oil fields for energy generation on-site. Shell later constructed a gas plant in the Al-Omar field near Al-Mayadeen to harness gas produced from oil extraction.

Following significant gas discoveries by SPC southwest of Palmyra, the government initiated the «Koniko Gas Plant» in the Tabiya field near Deir ez-Zor in 2004 through an investment contract with the American Konico Company. Other entities, including the Syrian Gas Company, Petro-Canada, and Croatia's Ina company, also established their facilities on oil fields. By 2009, the geological gas reserve totaled 698.6 Bcm, with approximately 409.8 Bcm considered viable for production. Up to 2008, 125.25 Bcm of gas reserves had been extracted, leaving a producible reserve of about 284.6 Bcm.

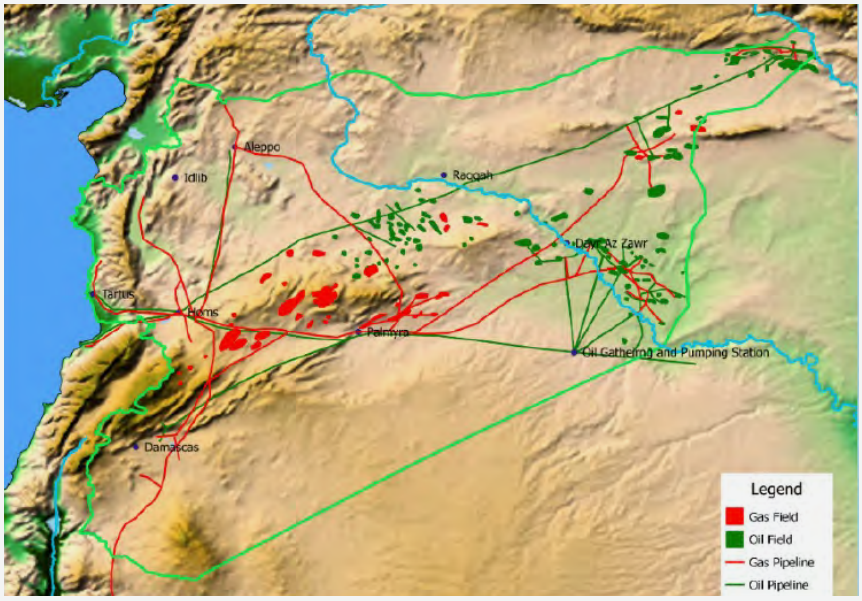
Apart from the oil fields in Al-Hasaka, Deir Ezzor, and Al-Reqqa, where gas is produced alongside oil, the gas fields in Syria are predominantly located in the central region of the country (Fig. 29).

In 2010, The regions of oil and gas production in Syria were divided into three (3) main areas: two producing heavy and light oil and a third producing gas. Until 2010, about 5 billion barrels were produced, but in that year no more than 2 billion barrels of crude oil were produced. Irrespective of the war, the decline in production along with the increase in internal demand would have turned Syria after 2013 into a net oil importing country.

The increase in oil production in Syria since 1985 played a key role in helping the country navigate its severe economic crisis during the second half of the 1990s. This contributed to a degree of economic stability during those years. Despite a subsequent decline in production, oil continued to supply a significant portion of domestic energy needs and provided a substantial share of the treasury's tax revenues.

In the 1990s, oil revenues accounted for 40-50% of state income, but this figure dropped to 24% by 2005 and further to 21.5% by 2010. Similarly, the oil sector constituted about 10-12% of GDP in the 1990s, compared to 7.1% in 2005, and 5.4% in 2010. Following the onset of conflict in March 2011, different factions, including opposition groups and ISIS, successively took control of a significant portion of Syria's crucial oil reserves.

Figure 29: Oil and gas fields map of Syria[58]



[57] *Harmoon Center for Contemporary Studies (2021): "The destruction of the energy sector in Syria during the war 2011-2020", https://css.wp.st-andrews.ac.uk/files/2021/07/The-destruction-of-the-energy-sector-in-Syria-during-the-war.pdf*

Western sanctions imposed on the oil sector led to the departure of foreign oil companies from the country. Until summer 2024, the Syrian Democratic Forces (SDF), a coalition backed by the United States, held a quarter of Syria's territory, particularly in the east of the Euphrates.

This means that the SDF controlled over 90% of oil and over 50% of gas fields, along with the infrastructure owned by foreign companies. The contracts signed with the Damascus government, involving companies like Gulfsands Petroleum, Total, and Shell, contributed to the SDF's control. Oil wells and facilities were secured by the US-led coalition forces and the SDF[59].

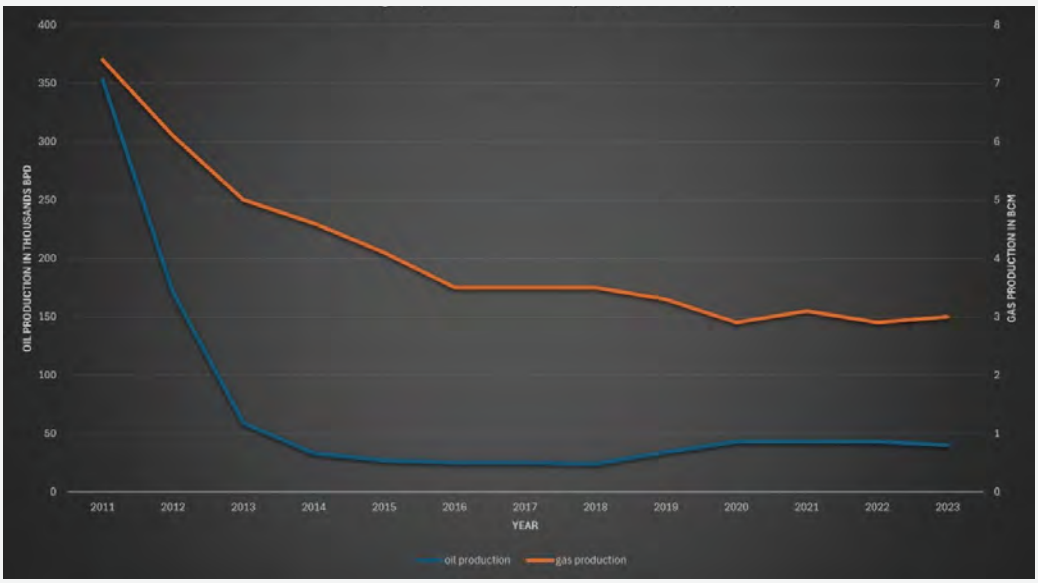
According to Energy Institute's Statistical Review of World Energy 2024, the oil and natural resources sector in Syria has undergone significant deterioration since the commencement of the Syrian crisis in 2011, Oil production has witnessed a staggering decline of 89%, plummeting from 353,000 bpd in 2011 to 40,000 bpd in 2023 (it had even reached 24,000 bpd in 2018). Similarly, gas production declined from 7.4 Bcm in 2011 to 3 Bcm in 2023 , down by 60% (Fig. 30)[60].

The role of the oil and gas industry in Syria's reconstruction remains an open question, especially considering the significant destruction endured by key fields in Deir Ezzor and Al-Reqqa.

Accurately estimating the damage to oil and gas reserves, infrastructure, and the costs of restoration is challenging and requires a comparison of repair expenses with the recoverable reserves, annual production rates, and the duration of resource availability.

Despite these difficulties, the industry retains its importance, as it can help meet domestic demand for petroleum products, support various sectors such as power generation, and holds potential for new discoveries[57].

Figure 30: Oil and gas production in Syria for the years 2011-2023[60]



[58] *The Energy Consulting Group, http://www.energy-cg.com/MiddleEast/Syria/Syria%20Oil%20and%20Gas%20Overview.html#Syrian%20Oil%20and%20Gas%20Overview%20Map*
[59] *Asharq Al-Awsat, "The Syrian Oil: Time for New Approach?" (2022) https://english.aawsat.com/home/article/3977206/syrian-oil-time-new-approach*
[60] *Energy Institute (EI) Statistical Review of World Energy, 2024, https://www.energyinst.org/__data/assets/pdf_file/0006/1542714/684_EI_Stat_Review_V16_DIGITAL.pdf*

4.8. Can the East Mediterranean supply the EU with oil and gas?

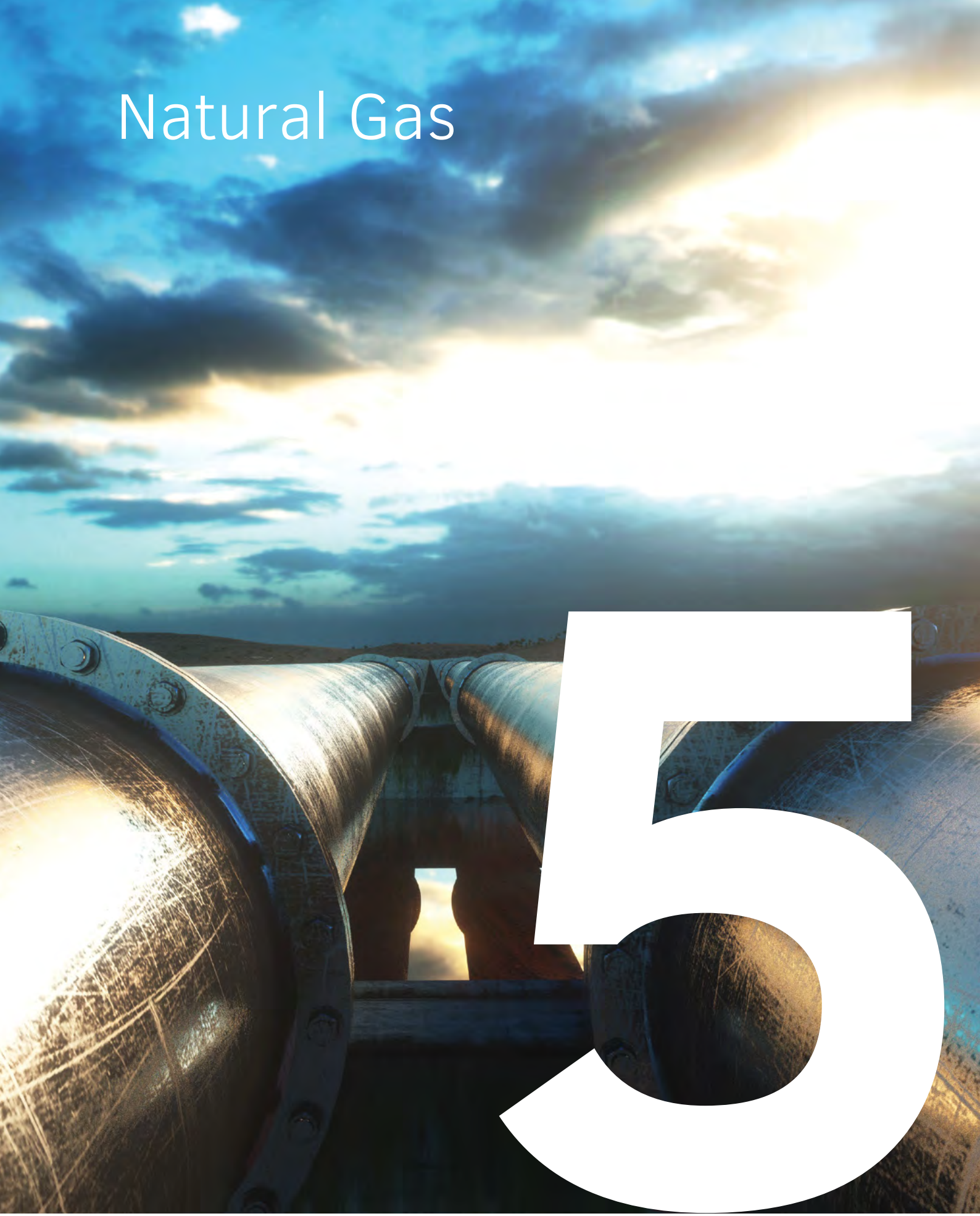
The East Mediterranean has become a region of growing strategic interest for the European Union, particularly since the energy crisis triggered by Russia's invasion of Ukraine. Large offshore gas discoveries in Egypt and Israel have raised hopes that the region could contribute to European energy diversification, particularly following the EU's accelerated efforts to reduce reliance on Russian fossil fuels. However, the region's actual capacity to deliver oil and gas to European markets is shaped by a complex interplay of geology, infrastructure, domestic energy needs, and geopolitics.

The 2015 discovery of the supergiant Zohr field Egypt's gas sector, allowing it to restart idle LNG facilities at Idku and Damietta. However, Egypt's surging domestic demand, driven by population growth and power generation needs, has increasingly constrained its ability to export.

Cyprus, once seen as an emerging producer, has faced setbacks. Although the 2011 Aphrodite discovery confirmed the presence of gas, development has stalled due to commercial and technical challenges. At the same time, Greece not been considered a hydrocarbon-rich country, traditionally, in recent years, interest has grown, especially in offshore western and southern areas. International operators have initiated seismic surveys and preparations for exploratory drilling south and west of Crete, targeting geological structures similar to those in Egypt. However, exploration is still at a very early stage, with no commercial discoveries to date. Moreover, environmental and seismic risks, deepwater technical complexity, and strong public opposition could slow or even halt development. Should Greece eventually confirm viable reserves, their contribution to European markets would still be a few years away.

Ultimately, East Med hydrocarbons may serve as a regional complement to Europe's energy mix in the near-to-medium term. But they are unlikely to form a cornerstone of EU energy security without significant new discoveries, stronger regional cooperation, and greater investment in export infrastructure.

Natural Gas



5

5. Natural Gas

5.1. Natural Gas Infrastructure

Gas pipelines are an essential infrastructure facilitating the long-distance transportation of natural gas from production to consumption centres. They ensure a reliable and efficient energy flow, addressing global natural gas demand. The construction involves meticulous planning, engineering, and adherence to safety standards, considering factors like geological conditions and environmental impact. Regional cooperation is a key goal, fostering cross-border connections to enhance energy security and economic integration. Economic viability, including cost-effectiveness compared to alternative methods, influences pipeline development. Geopolitical considerations impact decisions, potentially shaping alliances and regional dynamics. Energy security is enhanced by diversifying sources and ensuring a steady supply, reducing vulnerability to disruptions. Gas pipelines play a multidimensional role, requiring expertise in engineering, geopolitics, and global energy market complexities.

5.1.1. Existing and Planned Pipelines

Existing Pipelines

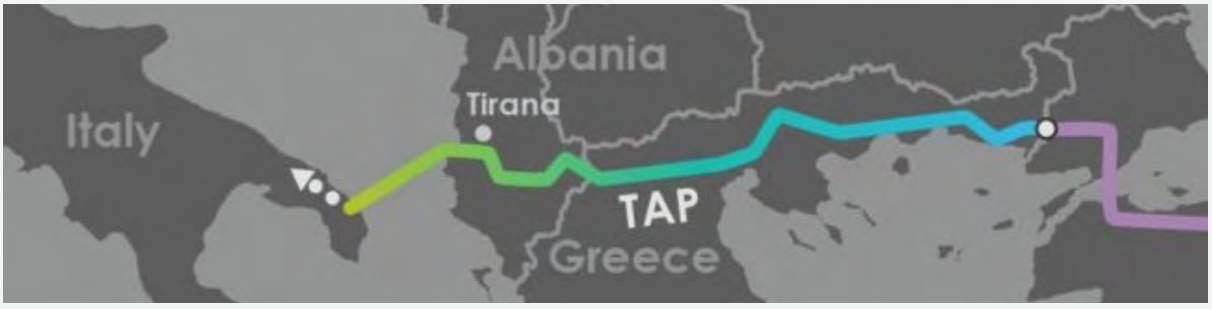
● Trans-Adriatic Pipeline (TAP)

The TAP pipeline is designed to transport natural gas from the Shah Deniz II field in Azerbaijan to European markets, specifically Italy. It serves as a crucial link in the Southern Gas Corridor, which aims to diversify Europe's energy sources and reduce reliance on Russian gas. The pipeline is 877km in length (772 km onshore and 105 km offshore) stretching from the Greece-Türkiye border, it traverses through Greece and Albania before reaching Italy[61] (Fig. 31 and Fig. 32). The project's transportation capacity is currently 10 Bcm/year. However, with the addition of two compressor stations and modification to the existing compressor stations, the existing pipeline capacity can be increased to a throughput of 20 Bcm/year.

Furthermore, TAP incorporates advanced technology and engineering standards to ensure safe and efficient transportation of natural gas. The pipeline is built with state-of-the-art materials that can withstand high pressures and extreme temperatures, ensuring reliable delivery of gas to European consumers. TAP started commercial operations in 2020 (November 15th), four and a half years after the inauguration of the construction work. One month later, December 31st the first gas flows from Azerbaijan started reaching Greece and Bulgaria, via the Nea Mesimvria interconnection point with DESFA, as well as Italy, via the Melendugno interconnection point with SNAM Rete Gas (SRG)[62]. TAP's shareholders are BP, Southern Gas Corridor Company (SGC), SNAM, FLUXYS and ENAGAS, each holding a 20% stake[63].

Figure 31: The South Gas Corridor (Azerbaijan-Italy)[61]

Figure 32: The Trans-Adriatic Pipeline route[61]



[61] *TAP official website, https://www.tap-ag.com/infrastructure-operation/pipeline-construction*
[62] *CEEnergy News, "TAP begins first gas deliveries from Azerbaijan to Europe", 03.01.2021, https://ceenergynews.com/oil-gas/tap-begins-first-gas-deliveries-from-azerbaijan-to-europe/*
[63] *South Gas Corridor, https://www.sgc.az/en/project/tap*

Trans-Anatolian Natural Gas Pipeline (TANAP)

TANAP is a gas pipeline located in Türkiye. Like TAP, it a pivotal component of the Southern Gas Corridor. It links the Shah Deniz gas field in Azerbaijan to Europe by seamlessly connecting with the South Caucasus Pipeline and TAP. TANAP is 1,811km-long and it is claimed to be the longest gas pipeline in Türkiye, Europe and the Middle East, passing through 20 cities, 67 districts and 600 villages[64] (Fig. 33).

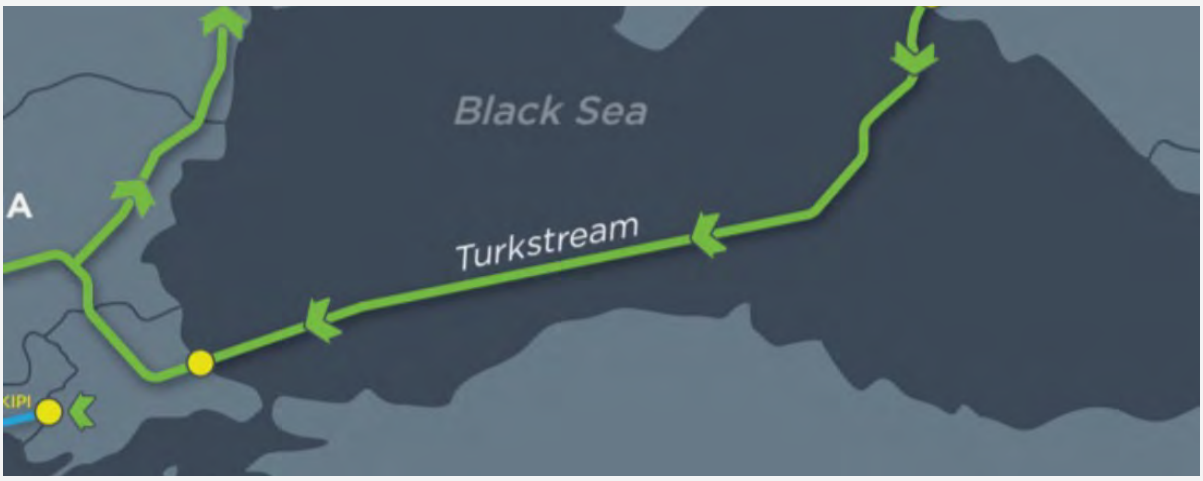
TANAP's commercial operations commenced on December 31st, 2020 with the initial delivery of gas to TAP. Initially, of the 16 Bcm/year of Azerbaijani gas transported via the TANAP pipeline, 10 Bcm/year are delivered to Europe and 6 Bcm/year to Türkiye. Additional investment will help to increase its annual capacity to 24 Bcm/year and finally to 31 Bcm/year. The shareholders of TANAP are the SGC (51%), BOTAŞ (30%), BP Pipelines (TANAP) Limited (12%) and SOCAR Türkiye Enerji A.Ş. (7%)[65].

Figure 33: TANAP's route, stretching from the Türkiye-Georgia borders to the Greece-Türkiye borders

TurkStream

TurkStream (former Turkish Stream) is a natural gas pipeline running 930 km from Russia to Türkiye with a total capacity of 31.5 Bcm/year. It starts from Russkaya compressor station near Anapa in Russia's Krasnodar Region, crossing the Black Sea to the receiving terminal at Kıyıköy. TurkStream comprises two parallel lines (each of the lines has a capacity of 15.75 Bcm/year) traversing the Black Sea. The pipelines commence from the Russian coastline, submerge in the water – laid at approximately 2,200 m of water-depth – and resurface on the Turkish coast in the Thrace region. Upon reaching the terminal in Türkiye, one of the two segments of the pipeline, links to the Turkish gas network. The second pipeline extends further to the Turkish-European border.[66] (Fig. 34) TurkStream was officially launched on the 8th of January 2020 and a few days later (27.01.2020) the first Bcm of gas was delivered[67].

Figure 34: TurkStream's route in the Black Sea[68]



[64] *SOCAR website, https://www.socar.az/en/page/tanap2*
[65] *ANAP official website, https://www.tanap.com/en/shareholders*
[66] *TurkStream official website, https://turkstream.info/project/*
[67] *IENE, SEEE Outlook 2021/2022, https://www.iene.eu/media/iene-SEEE-outlook-2021-22-3rd-edition.pdf*

Blue Stream

Blue Stream, spanning 1,213 km, serves as a conduit for natural gas transportation between Russia and Türkiye, crossing the depths of the Black Sea. It stands out as one of the deepest underwater pipelines globally and was constructed with a total investment of $3.2 billion (Fig. 35). The offshore segment of the Blue Stream pipeline is owned and operated by the Blue Stream Pipeline Company, a joint venture with Russia's Gazprom and Italy's Eni, each holding a 50% stake.

Gazprom manages the ownership and operation of the onshore section of the pipeline in Russia, while the Turkish onshore portion is under the ownership and operation of BOTAS. Commissioned in December 2002, the Blue Stream gas pipeline initiated commercial gas supplies in February 2003, boasting a transmission capacity of 16 Bcm of gas annually[69]. In 2021, the pipeline achieved a milestone by transporting 15.98 Bcm of Russian natural gas to Türkiye, representing the highest annual supply since the commencement of gas deliveries in 2003[70].

Figure 35: The Blue Stream route in the Black Sea. Also shown for reference the TurkStream's route [71]

[68] *Εκδόσεις Κέρκυρα, Greek Business File, "Towards the unification of the Balkan energy market — The role of Greece and Bulgaria", 05.06.2022, https://www.ekdoseiskerkyra.gr/en/towards-the-unification-of-the-balkan-energy-market-the-role-of-greece-and-bulgaria/*

[69] *NS Energy, https://www.nsenergybusiness.com/projects/blue-stream-natural-gas-pipeline/#*

[70] *Warsaw institute, Russia Supplies Record Natural Gas To Turkey Via Blue Stream, 2022, https://warsawinstitute.org/russia-supplies-record-natural-gas-turkey-via-blue-stream/*

[71] *Pipeline and Gas Journal, Putin, Erdogan Mark Key Phase in TurkStream Pipeline, 19.11.2018, https://pgjonline.com/news/2018/11/putin-erdogan-mark-key-phase-in-turkstream-pipeline*

Interconnector Greece-Bulgaria (ICGB)

The Gas Interconnector Greece – Bulgaria (ICGB) establishes a connection between Greece's natural gas transmission network and TAP. Covering a total distance of 182 km, the interconnector's operational capacity is 3 Bcm/year (Fig. 36). The pipeline, which extends from Komotini, Greece, and Stara Zagora, Bulgaria, can increase its capacity to 5 Bcm yearly after the construction of a compressor station in Komotini curently under construction and the LNG terminal near Alexandroupolis. Currently, the pipeline flows in the North-South direction, but with changes, it could also support reverse flow transport.[72,73] The ICGB AD Company based in Bulgaria has 50% shareholders in the state-owned Bulgarian Energy Holding (BEH) and 50% in UNGS Poseidon SA (IGI POSEIDON). Shareholders of IGI POSEIDON include half-half DEPA INTERNATIONAL WORKS and Italian Edison[74].

Figure 36: The gas Interconnector Greece-Bulgaria route

East Mediterranean Gas (EMG) Pipeline

The EMG pipeline – also known as Arish-Ashkelon pipeline – runs from the southern Israeli town of Ashkelon, located approximately 10 km north of the Gaza Strip, to El-Arish in Egypt, where it connects to an onshore pipeline[75](Fig. 37).The pipeline was built and is operated by the East Mediterranean Gas Company (EMG), a joint company of Mediterranean Gas Pipeline Ltd (28%), the Israeli company Merhav (25%), PTT (25%), EMI-EGI LP (a joint venture between European Middleware Initiative and European Gas Infrastructure-12%), and Egyptian General Petroleum Corporation (10%)[76] The pipeline's length is 90 km and it was originally intended as a branch pipeline to convey gas from the Arab Gas Pipeline to Israel. However, it has undergone reconfiguration to transport gas from Israel's offshore gas fields to Egypt.

Figure 37: EMG pipeline's route between Israel (Ashkelon) and Egypt (El Arish) (Modified after Eran, 2018) [77]

[72] *Caspian Policy Center, Interconnector Greece-Bulgaria (IGB) Pipeline Inauguration, 19.10.2022, https://www.caspianpolicy.org/research/energy-and-economy-program-eep/interconnector-greece-bulgaria-igb-pipeline-inauguration*
[73] *ICGB Pipeline official website, https://www.icgb.eu/about/igb-project/*
[74] *DEPA International Projects, https://depa-int.gr/en/en-igb-receives-independent-natural-gas-system-license-asfa/*
[75] *Reuters, "Chevron says natural gas flow resumes through EMG", 14.11.2023, https://www.reuters.com/business/energy/chevron-says-natgas-flow-resumes-through-israel-egypt-pipeline-2023-11-14/*
[76] *Gem wiki, Ashkelon Pipeline, https://www.gem.wiki/Arish%E2%80%93Ashkelon_Pipeline*
[77] *O. Eran, INSS, Israel's Stake in the Egyptian Natural Gas Pipeline: Strategic and Economic Benefits, 2018, https://www.inss.org.il/publication/israels-stake-in-the-egyptian-natural-gas-pipeline-strategic-and-economic-benefits/*

Arab Gas Pipeline

The Middle East's Arab Gas Pipeline, with its starting point near Arish in the Sinai Peninsula, was constructed to transport Egyptian natural gas to Jordan, Syria, and Lebanon. The pipeline includes both underwater and overland branches connecting to and from Israel, spanning a total length of 1,200 km. The infrastructure, commissioned in 2003 and built at a cost of $1.2 billion, has faced several challenges in exporting gas[78] (Fig. 38).

In March 2012, the supply of gas to Israel and Jordan came to a halt due to 13 separate attacks on GASCO's feeder pipeline to El-Arish. These attacks, which began with the onset of the 2011 Egyptian revolution, were carried out by Bedouin individuals protesting economic neglect and discrimination by the central Cairo government. Although the pipeline resumed continuous operation by spring 2013, persistent natural gas shortages in Egypt led to an indefinite suspension of the gas supply to Israel. Meanwhile, the supply to Jordan was resumed, albeit at a significantly reduced rate compared to the contracted amount. Subsequent to these events, the pipeline has been targeted by militants on multiple occasions, experiencing interruptions in its operations.

The Arab Gas Pipeline, operational since 2003 but stalled in 2009, saw renewed attention in June 2022. Egypt, Lebanon, and Syria signed an agreement to transport 650 Mcm of gas annually from Egypt to Lebanon via Syria. The signing ceremony, held at the Lebanese Ministry of Energy in Beirut, outlined the plan to pump the gas through a pipeline to the Deir Ammar power station in northern Lebanon.

Although an agreement among the Arab Gas Pipeline countries (Egypt, Jordan, Syria, and Lebanon) had been reached in September 2021 for delivering Egyptian natural gas to Lebanon via Jordan and Syria, the formal signing of the deal was delayed for several months. Egypt awaited U.S. approval to ensure that the US Caesar Act's financial sanctions on Syria would not adversely impact the deal, given that the Egyptian gas was set to pass through Syrian and Jordanian territories[79].

Figure 38: The Arab Gas Pipeline route in the Middle East[78]

[78] *The National News, Explainer: what is the Arab Gas Pipeline and why it matters, 2021, https://www.thenationalnews.com/business/energy/2021/09/08/explainer-what-is-the-arab-gas-pipeline-and-why-it-matters/*
[79] *Arab Gas Pipeline, https://www.gem.wiki/Arab_Gas_Pipeline*

Planned Pipelines:

Interconnector Türkiye-Greece-Italy (ITGI) – Poseidon

Poseidon is an offshore pipeline is approximately 210 km long crossing the Adriatic Sea from the Greek coast to Otranto, Italy[80]. Its initial capacity is 12 Bcm/year and can may be increased up to 20 Bcm/year. Poseidon links up with the planned EastMed project along the Greek coast in the Thesprotia region, serving as a vital conduit for transporting gas from the Eastern Mediterranean to Italy and to the European markets (Fig. 39).

As a well-established project, Poseidon has successfully completed all major studies and marine surveys and has acquired the necessary licenses for its development. The market test was planned to take place within 2024 and the project's timeline aligns with that of the EastMed pipeline[81].

In conjunction with the EastMed pipeline, Poseidon plays a pivotal role in the EU's Southern Gas Corridor, contributing to the security of gas supply and the European energy market. As a result, it has been recognised as an EU Project of Common Interest (PCI) and holds the status of a project of national significance and public interest by the Greek parliament[82].

Figure 39: Poseidon pipeline and its link with the planned East Med pipeline

[80] *IENE, "The Greek Energy Sector-Annual Report", July 2023, https://www.iene.eu//articlefiles/inline/the%20greek%20energy%20sector%202023_small_2new.pdf*
[81] *M. Stamatopoulou, DEPA international projects, presentation at IENE Energy & Development Conference, November 2023, https://www.iene.eu/articlefiles/inline/stamatopoulou%20e%20&%20a%202023.pdf*
[82] *DEPA international projects, Poseidon pipeline, https://depa-int.gr/en/poseidon-pipeline/*

EastMed Pipeline

The project consists of a pipeline spanning around 1,900 km. The pipeline has both offshore (1,350 km) and onshore (550 km) segments. It is designed to carry initially 10 Bcm/year and directly link the East Mediterranean resources to Greece's mainland via Cyprus and Crete. Additionally, it will connect to the offshore Poseidon pipeline, enabling gas transportation to Italy and other European markets (Fig. 39).The pipeline is being developed by IGI Poseidon S.A., a 50-50% joint venture between the Greek gas utility DEPA and the Italian gas utility Edison[83]. The EastMed is designated as a project of national importance of Greece and a priority project of Italy. Endorsed by the EU, the EastMed is a Project of Common Interest, included since 2013 in the EU PCI list and benefitting from the fast-track procedures provided by EU Regulation 347/2013[84].

Estimated to be completed in 2025, the FEED as the first marine surveys have already been completed[85]. In addition, the Environmental and Social Impact Assessment (ESIA) dossier has been submitted in Greece and a draft ESIA dossier in Cyprus, both in June 2022 awaiting approval. Final Investment Decision (FID) on the EastMed project, which is estimated to cost more than €6 billion ($6.42 billion), was originally expected last year (2024) but the Middle East conflict became a factor in delaying the decision until market testing is complete. Market testing is scheduled for 2025, and it is expected to be completed at the end of 2025 or early 2026.

5.1.2. Liquefied Natural Gas (LNG) Terminals

Greece

Revithoussa LNG Terminal

The Revithoussa LNG Terminal is located on the islet of Revithoussa, in the gulf of Pachi at Megara, 45 km west of Athens (Fig. 40 and 41). The Revithoussa LNG Terminal stands as one of twenty-eight (28) LNG terminals currently operational across the broader Mediterranean region and Europe. It can temporarily store, and regasify LNG shipments while also supply the National Natural Gas Transmission System. Additionally, the terminal has a storage capacity of 225,000 m^3 LNG and a regasification capacity of 1,400 m^3/h as a Sustained Maximum Send out Rate[86].

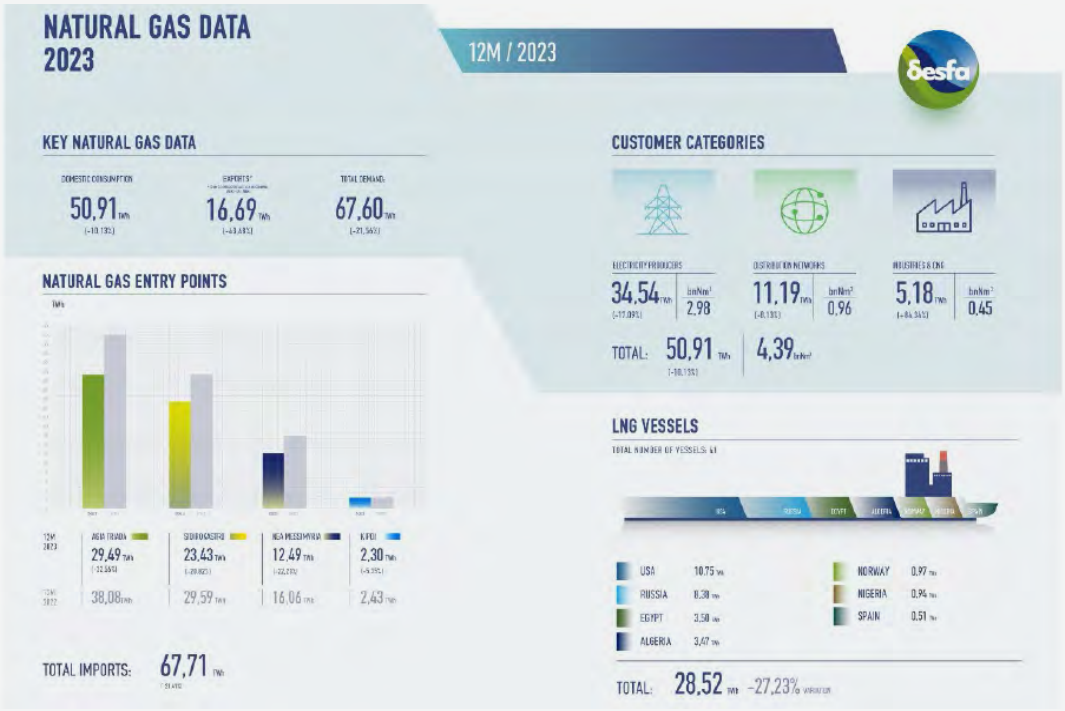
Revithoussa terminal is the main entry point for natural gas imports in Greece and in 2023, it covered 43.55% of the total natural gas imports (67.71 TWh) with approximately 28.52 TWh of LNG unloaded from 41 tankers from 7 countries (in 2022 imports were 39.19 TWh of LNG from 78 tankers from 7 countries[87]). More than 37% of the unloaded LNG quantity at the terminal, originated from the USA[88,89] (Fig. 42).

Figure 40: The Revithoussa LNG Terminal's location; in the Gulf of Pachi, 45 km west of Athens

[83] *Edison official website, https://www.edison.it/en/eastmed-poseidon-project*
[84] *DEPA official website, https://www.depa.gr/international-infrastructures/?lang=en*
[85] *M. Stamatopoulou, DEPA international projects, presentation at IENE Energy & Development Conference, November 2023, https://www.iene.eu/articlefiles/inline/stamatopoulou%20e%20&%20a%202023.pdf*
[86] *DESFA offiial website, https://www.desfa.gr/en/national-natural-gas-system/lng-facility*
[87] *DESFA offiial website, https://www.desfa.gr/en/national-natural-gas-system/lng-facility*
[88] *LNG Prime, "DESFA: Greece received record 78 LNG cargoes in 2022", 18.01.2023, https://lngprime.com/europe/desfa-greece-received-record-78-lng-cargoes-in-2022/71066/*
[89] *CEEnergy News, "Revithoussa LNG Terminal accounts for almost half the Greece's natural gas imports", 19.10.2023, https://ceenergynews.com/oil-gas/revithoussa-lng-terminal-accounts-for-almost-half-the-greeces-natural-gas-imports/*
[90] *DESFA Press Release, "DESFA's data for natural gas consumption in 2023", 16.01.2024, https://www.desfa.gr/en/desfas-data-for-natural-gas-consumption-in-2023/*

Figure 41: The Revithoussa LNG Terminal[90]

Figure 42: Natural Gas Data for 2023[90]



[90] *Energypress.gr, «Τρία φορτία LNG προβλέπει το πρόγραμμα του ΔΕΣΦΑ για τη Ρεβυθούσα τον Μάρτιο», 07.02.2024, https://energypress.gr/news/tria-fortia-lng-problepei-programma-toy-desfa-gia-ti-rebythoysa-ton-martio*

FSRU Alexandroupolis

The FSRU would be located 17.6 km southwest of the port of Alexandroupolis, in north Greece. It is Greece's first FSRU and it will serve as the second import point for LNG – adding to DESFA's Revithoussa LNG Terminal – in the country. (Fig. 43 and 44). The FSRU, anchored in December 2023, has a storage capacity of 153,500 m^3. It will deliver gas to the Greek Transmission System and onwards to the final consumers in Greece, Bulgaria, Romania, North Macedonia, Serbia and further to Moldova and Ukraine to the East and Hungary and Slovakia to the West. It will have a maximum sustainable regasification of 5.5 m^3/year.

Gastrade (Gastrade's shareholders include Elmina Copelouzou, GasLog, DESFA, DEPA, and Bulgartransgaz, each with a 20% stake) the owner of the FSRU is planning to install a second FSRU offshore Alexandroupolis, with a storage capacity of 170,000 m^3 able to regasify and deliver 5.5 m^3/year. The Project has been co-financed by resources of the European Regional Development Fund of the European Union through the Operational Programme "Competitiveness, Entrepreneurship, and Innovation (EPAnEK)" within the framework of the NSRF 2014-2020.

The first shipment was received at the terminal on February 16, 2024. The LNG carrier (GasLog Hong Kong), chartered by France's TotalEnergies, previously picked up a cargo at Sempra's Cameron LNG plant in the US state of Louisiana[92]. The American-origin LNG will be used for the trial operation of the FSRU, while the quantities that will be left over, according to the managing company Gastrade, will be available to users who have reserved capacity at the station's facilities[93].

Figure 43: The FSRU Alexandroupolis' location in north Greece

Figure 44: The FSRU Alexandroupolis off the port of Alexandroupolis town

[92] *OT, "FSRU off Alexandroupolis Receives First LNG Shipment", 17.02.2024, https://www.ot.gr/2024/02/17/epikairothta/fsru-off-alexandroupolis-receives-first-lng-shipment/*

[93] *EKathimerini, "First gas load to Alexandroupoli FSRU", 15.02.2024, https://www.ekathimerini.com/economy/1231731/first-gas-load-to-alexandroupoli-fsru/*

Türkiye

Marmara Ereglisi LNG Terminal

The Marmara Ereglisi LNG terminal is Türkiye's first LNG facility and has been in operation since 1994 and it is located in Tekirdag (Fig. 45 and 46). Operated by BOTAS, it has three tanks, each capable of storing up to 85,000 m^3 of imported LNG. Daily, it can supply 37 Mcm of natural gas to the national gas transmission system. The terminal's total LNG storage capacity amounts to 255,000 m^3, with LNG being regasified and transmitted to the national gas system as required. Significant infrastructural upgrades have been implemented to enhance the terminal's capabilities. A pier capacity project in 2017 expanded the terminal's ability to accommodate various LNG ships. Furthermore, an expansion project in 2018 doubled the regasification capacity, enabling the terminal to meet the natural gas demands of Istanbul.

Figure 45: The Marmara Ereglisi LNG terminal location

Figure 46: The Marmara Ereglisi LNG Terminal in Türkiye

Izmir Aliaga LNG Terminal

Türkiye's second LNG terminal is located at Aliaga north of Izmir and was completed in 2001 (Fig. 47). However, it was not used to import LNG until 2006. It is the first private sector investment in the Turkish natural gas industry, owned and operated by EgeGaz[94].

The Aliaga LNG Terminal, has two containment tanks of 140,000 m^3 each (280,000 m^3 in total) and a regasification capacity of 40 Mcm/day. LNG loading can be carried out by vessels and by trucks[95].

Figure 47: The Izmir Aliaga LNG Terminal location

Figure 48: The EgeGaz LNG Terminal at Aliaga[94]

[94] *Sigtto website, Ege Gaz, https://www.sigtto.org/membership/member-stories/ege-gaz-anonim-sirketi/*
[95] *ERRA Webinar on Regulation of LNG Supply and Terminals, May 2021, https://erranet.org/wp-content/uploads/2022/05/5.-A.Camci-TR-case-study-2-pre-recorded.pdf*

Etki Liman FSRU

The Etki Liman FSRU is located in Izmir, Türkiye (Fig. 49). It was the first FSRU to be commissioned in the country, in 2016, and it's owned by Kalyon and Kolin. In 2019, the original vessel was replaced by a new larger one – the FSRU Turquoise (Fig. 50). The new vessel has a storage capacity of 170,000 m^3 and a regasification capacity 28 Mcm/day.

Figure 49: The Ekti Liman FSRU location on the west coast of Türkiye

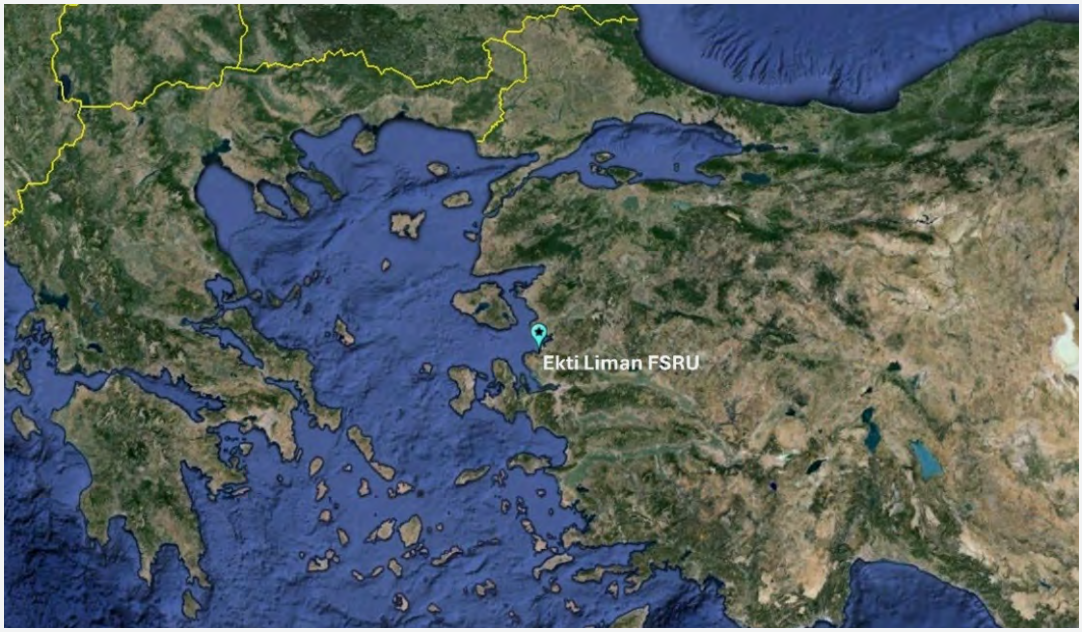


Figure 50: The Ekti Liman FSRU, docked at the terminal[96]

[96] *Ekti Liman official website, http://www.etkiliman.com.tr/en/Gallery/Gallery.html*

Ertuğrul Gazi FSRU

It is located at the Dortyol marine terminal in Hatay in south Türkiye (Fig. 51) and it is owned and operated by BOTAS. It has an LNG storage capacity of 170,000 m^3 and a regasification capacity of 28 Mcm/day. It commenced its operations in 2021[97, 98].

Figure 51: The Ertuğrul Gazi FSRU Terminal location in south Türkiye

Figure 52: BOTAS' first FSRU, the Ertuğrul Gazi, in southern Türkiye[99]

[97] *Anadolu Ajansi, «Ertugrul Gazi» FSRU vessel now flies Turkish flag, 03.04.2021, https://www.aa.com.tr/en/energy/general/ertugrul-gazi-fsru-vessel-now-flies-turkish-flag/32339*

[98] *Anadolu Ajansi, "Türkiye has 276 million cubic meters of LNG, FSRU and storage capacity", 24.10.2023, https://www.aa.com.tr/en/energy/projects/exclusive-turkiye-has-276-million-cubic-meters-of-lng-fsru-and-storage-capacity/39139*

[99] *Daily Sabah, "A year on, Turkey's first FSRU transfers 2.1 Bcm of gas to local system", 24.06.2022, https://www.dailysabah.com/business/energy/a-year-on-turkeys-first-fsru-transfers-21-Bcm-of-gas-to-local-system*

Saros FSRU Terminal

The Saros FSRU Terminal is also owned by the Turkish state-owned corporation BOTAŞ and it is located at the northeastern shore of the Gulf of Saros in Türkiye (Fig. 53). It is the third and newest FSRU-based terminal in the country, with a storage capacity at 180,000 m^3. The terminal commenced operations at the end of January 2023 and contributes to the energy supply of not only Türkiye but also Europe by allowing flexibility in the system through its daily re-gasification capacity of 28 Mcm/day[100].

Figure 53: The Saros FSRU Terminal location in Türkiye

Figure 54: The Saros FSRU Terminal, docked[101]

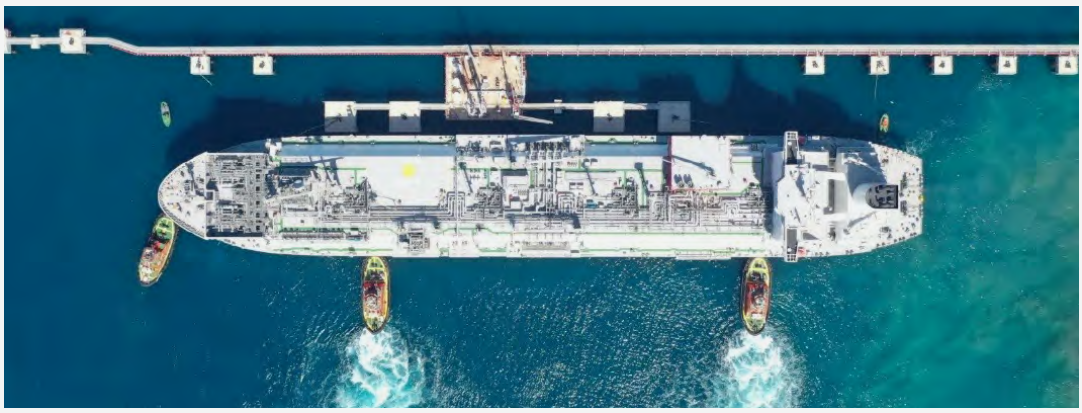


Figure 55: Overview of Türkiye's LNG terminals

[100] *Anadolu Ajansi "Türkiye among select countries with 3 strategic FSRU facilities", November 2023 https://www.aa.com.tr/en/economy/turkiye-among-select-countries-with-3-strategic-fsru-facilities/3046250*

[101] *LNG Prime, "Turkey's Botas to launch operations at Saros FSRU terminal", 20.01.2023, https://lngprime.com/lng-terminals/turkeys-botas-to-launch-operations-at-saros-fsru-terminal/71333/*

Egypt

Egypt is home to two major LNG plants equipped with liquefaction capabilities: the Idku and Damietta facilities. These plants are designed to convert natural gas into liquid form for export, playing a key role in the country's energy strategy. Together, they provide a combined export capacity of around 12 million tonnes per year (mmt/year). Although having being mothballed, both facilities are now operational, with the possibility of exporting a first cargo within the next year (2026). However, the timing and duration of potential exports remain uncertain, as Egypt may still need to import gas to meet power demand.

Egyptian LNG Plant

The Egyptian LNG Plant (also known as "Idku LNG Terminal") is located 50 km east of the city of Alexandria in Egypt (Fig. 56) and it is one of the two LNG terminals of the country on the Mediterranean Sea coast. In fact, in North Africa, Egypt and Algeria are the only countries which have LNG terminals[102]. The Egyptian LNG terminal commenced operations in 2001 following an investment of approximately $2 billion. It is currently managed by the Egyptian Liquefied Natural Gas Company (ELNG).

ELNG is Egypt's largest LNG joint venture comprising of both local shareholders, such as the Egyptian General Petroleum Corporation ("EGPC"), Egyptian Natural Gas Holding Company ("EGAS") and foreign shareholders, such as Shell Group plc (previously BG), PETRONAS and TotalEnergies S.E (previously ENGIE)[103]. The facility comprises two LNG trains but was designed to accommodate four more trains. It has a collective capacity of 7.2 million tonnes per year (mmt/year), enabling it to export up to 10 Bcm of gas to international markets annually. The terminal is supplied by Simian Sienna and Sapphire gas fields[104].

Figure 56: The Egyptian LNG Terminal location on the Mediterranean Sea cost in Egypt

[102] *Egypt Oil-Gas, "How The Tides Have Turned: How Egypt Became a Global LNG Leader", 06.10.2021, https://egyptoil-gas.com/features/how-the-tides-have-turned-how-egypt-became-a-global-lng-leader/*
[103] *Egyptian LNG official website, https://www.egyptianlng.com*
[104] *GEM wiki, https://www.gem.wiki/Egyptian_LNG_Terminal*

Damietta SEGAS LNG Plant

SEGAS' Damietta Plant started construction in 2001 in Damietta, Egypt (Fig. 57), with investments of $1.3 billion and came on-stream during 2004. It was established to export natural gas to the Spanish and European markets.

It is operated by Spanish Egyptian Gas (SEGAS). Following Naturgy's departure, ENI owns 50% in SEGAS, while EGAS owns 40%, and EGPC holds 10%[105]. The Damietta terminal has one train and an LNG production capacity of 5.5 mmt/year, which is expected to remain the same by 2030. After ceasing operations in 2012 due to diminishing domestic production, the discovery of new reserves like ENI's substantial Zohr field in the East Mediterranean enabled the partners to recommence operations at the plant and deliver the initial cargo in 2021[106,107]. During 2022, Damietta LNG produced and exported approximately 4 mmt of LNG, which is considered the largest volume in its history, making it the first LNG terminal in Egypt in terms of LNG exports[108].

Figure 57: The Damietta LNG Terminal on Egypt's northern coast

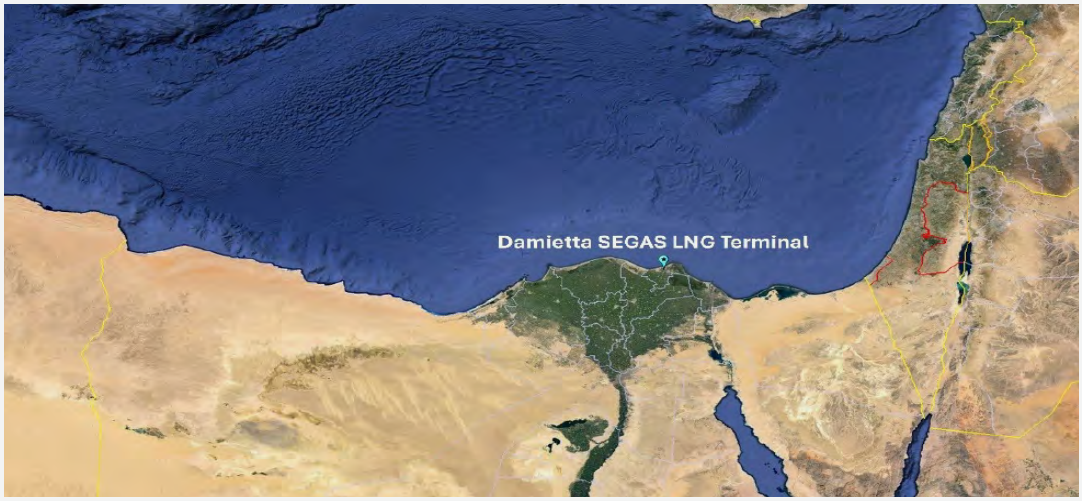


Figure 58: A view of Damietta's LNG termninal[106]

[105] *LNG Prime, "Egypt's Damietta LNG finally ships its first cargo since 2012", 23.02.2021, https://lngprime.com/middle-east/egypts-damietta-lng-finally-ships-its-first-cargo-since-2012/12842/*

[106] *Offshore Technology, "LNG terminal profile: Damietta LNG Liquefaction Terminal, Egypt", 21.07.2023, https://www.offshore-technology.com/data-insights/damietta-lng-liquefaction-terminal-egypt/*

[107] *LNG Prime, "Eni: Egypt's Damietta terminal ships 500th LNG cargo", 01.02.2023, https://lngprime.com/africa/eni-egypts-damietta-terminal-ships-500th-lng-cargo/72488/*

[108] *ENI official website, "Eni announces the 500th cargo from Damietta LNG facility, in Egypt", 01.02.2023, https://www.eni.com/en-IT/media/news/2023/02/kick-off-the-programme-semakenya-ii.html*

Ain Sokhna Hoegh FSRU (Egypt) and Sumed BW FSRU

The Ain Sokhna Hoegh FSRU, located in the Port of Ain Sokhna, Egypt, on the Gulf of Suez, is currently inactive (Fig. 59). It was commissioned as Egypt's import terminal in late April 2015 to address gas supply challenges and alleviate power shortages. Positioned adjacent to the Sumed BW LNG Terminal, the FSRU played a crucial role in Egypt's energy infrastructure. However, in 2018, the FSRU ceased operations as domestic gas production surged, fuelled by newly discovered gas fields in the West Nile Delta and the Zohr field. As of now, the FSRU at Ain Sokhna remains dormant, awaiting potential future utilization[109].

Sumed BW FSRU, (also known as "FSRU BW Singapore"), is an idle LNG terminal floating also in the Port of Ain Sokhna, Egypt, along the Gulf of Suez. It served as a second FSRU terminal in the region. However, the FSRU vessel (BW Singapore) departed in late 2023 to Italy, so this is also an inactive terminal[110,111].

Figure 59: Ain Sokhna terminal location in Egypt where the Hoegh and BW Singapore vessels were docked. The terminal is currently inactive

[109] *GEMwiki, Ain Sokhna Hoegh FSRU, 04.08.2023, https://www.gem.wiki/Ain_Sokhna_Hoegh_FSRU#cite_note-s1-1*
[110] *GEMwiki, Sumed BW FSRU, 04.08.2023, https://www.gem.wiki/Sumed_BW_FSRU*
[111] *WoodMackenzie Report, Ain Sokhna FSRU (BW) – LNG regas terminal (Suspended), 10.01.2024, https://www.woodmac.com/reports/lng-ain-sokhna-fsru-bw-lng-regas-terminal-suspended-43085998/*

Israel

Hadera Deepwater Terminal

Hadera Deepwater Terminal is an LNG import terminal in Sharon, Israel (Fig. 60). Hadera is an FSRU terminal located six miles offshore. This facility is Israel's first import terminal capable of up to 600 Mcf/day delivery rate[112].

As Israel increasingly tapped into its domestic gas reservoirs, notably the Leviathan and Tamar fields discovered in 2009 and 2010 respectively, the need for LNG imports gradually waned. This trend mirrored a broader 5.4% decline in LNG imports across the Middle East from 2020 to 2021, with Israel witnessing the most significant reduction in the region[113].

In December 2022, the Excelsior FSRU (138,000 m³) departed from the Hadera import terminal after receiving its final LNG cargo shipment in October 2021. The vessel was scheduled for dry docking before commencing a five-year contract in Germany's Wilhelmshaven port, starting in the autumn of 2023. With the departure of the Excelsior FSRU, Israel's LNG import capacity was effectively nullified[114].

Figure 60: The Hadera FSRU terminal location in Israel

Figure 61: The Deepwater LNG receiving terminal off the coast of Israel

[112] *Excelerate Energy official website, https://excelerateenergy.com/projects/hadera-deepwater-lng-terminal/*
[113] *International Gas Union, «International Gas Union 2022 World LNG Report», 2022 edition. https://safety4sea.com/wp-content/uploads/2022/07/IGU-World-LNG-Report-2022-2022_07.pdf*
[114] *Argus Media, "Excelsior FSRU leaves Israel", 08.12.2022, https://www.argusmedia.com/en/news/2398860-excelsior-fsru-leaves-israel*

5.2. The Expanded South Corridor

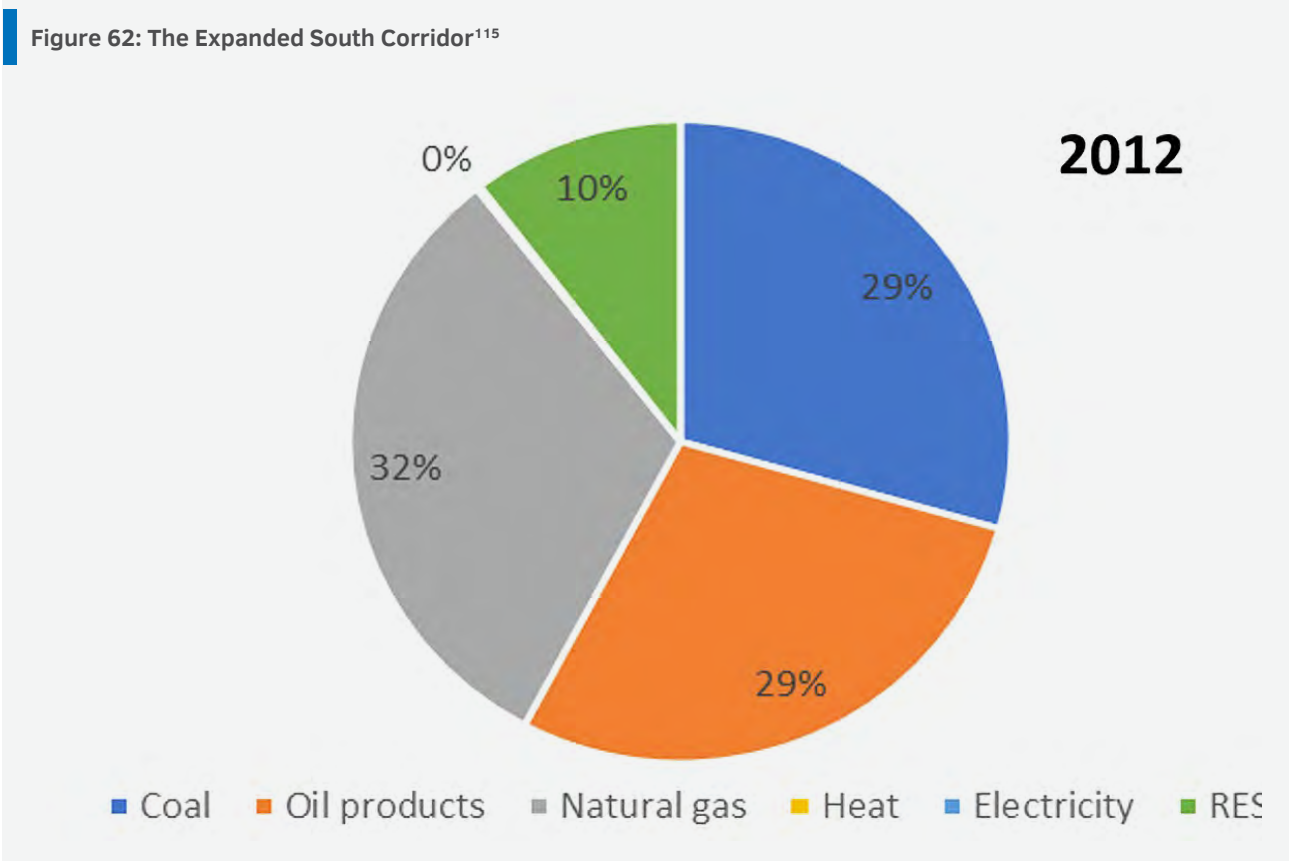
Building on the overview of East Mediterranean gas infrastructure, the concept of the Expanded South Corridor (ESC) (Fig. 62) emerges as a complementary and strategically important initiative for enhancing Europe's energy security. While the East Med region — through fields in Egypt, Israel, and potentially Cyprus and Greece — offers new sources of natural gas, its ability to supply European markets is constrained by limited export routes, domestic consumption needs, and political complexities. The ESC, as conceived by IENE, seeks to address some of these bottlenecks by expanding the existing Southern Gas Corridor into a broader, more versatile network.

The ESC does not replace the East Med's role but integrates it into a more connected regional system, allowing for additional sources — including East Med LNG and pipeline gas — to flow north and west through the Balkans and into Central Europe.

This could be achieved through a combination of infrastructure upgrades, such as enhanced interconnectors, new pipeline segments, and expanded LNG reception and regasification facilities. In doing so, the ESC provides a realistic outlet for East Med gas, particularly from Israel and Egypt, to reach European markets in commercially viable volumes.

Moreover, the ESC supports the development of regional gas hubs and enhances supply flexibility — two critical objectives for Southeastern Europe, where dependency on single suppliers remains a vulnerability. While long-term EU climate policy may ultimately reduce gas demand, in the near to medium term, the ESC could provide the infrastructure backbone that enables East Med gas to play a meaningful transitional role. As such, it aligns with both immediate energy security needs and the evolving structure of the European gas market.

Figure 62: The Expanded South Corridor[115]



[115] *IENE, SEEE Outlook 2021/2022, https://www.iene.eu/media/iene-SEEE-outlook-2021-22-3rd-edition.pdf*

5.3. Natural Gas Supply/Demand

Egypt

Figure 63 below illustrates the long-term evolution of the Egyptian balance. Until around 2003, supply and demand moved in tandem. However, production then significantly outpaced demand. In 2023, significant production decline occurred. Summer demand increased and LNG exports stopped and overall balance was achieved only due to imports from Israel (Fig. 64).

In April 2024, it was reported that Egypt had already purchased two cargoes for summer 2024, to be delivered to Jordan's Aqaba FSRU, and might be seeking up to 15-20 cargoes for the entire year. If this report is accurate, it clearly indicates that the Egyptians acknowledge a significant shift in the supply/demand balance, which cannot be rectified in the short term.

Platts added, "We estimate that summer LNG imports will likely be needed through 2027, depending on the pace of commercial agreements aimed at bringing new Israeli and Cypriot gas developments to the Egyptian market"[116]. In 2025 alone, the country is expected to spend about $8 billion on LNG imports, that could have a crippling effect on its economy.

Egypt is also in discussions with Cyprus to import gas from Cronos and Aphrodite gas fields. The two countries signed inter-governmental agreements on February 2025 enabling the export of gas from Cyprus's offshore fields to Egypt.

Figure 63: Gas supply/demand balance in Egypt, 1990-2023 (source: IEA)

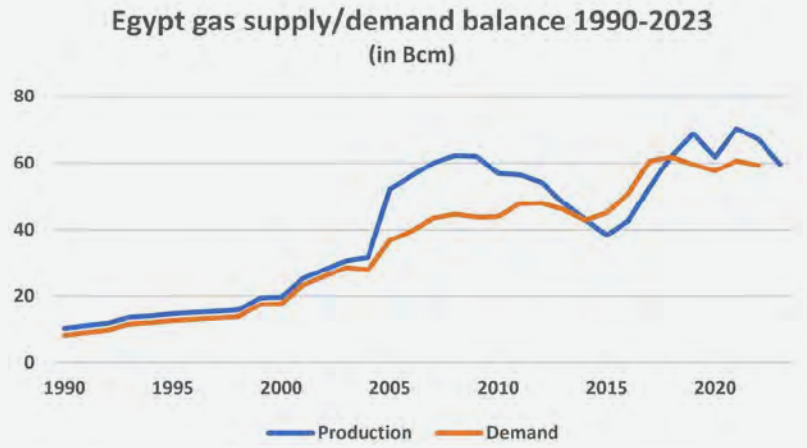
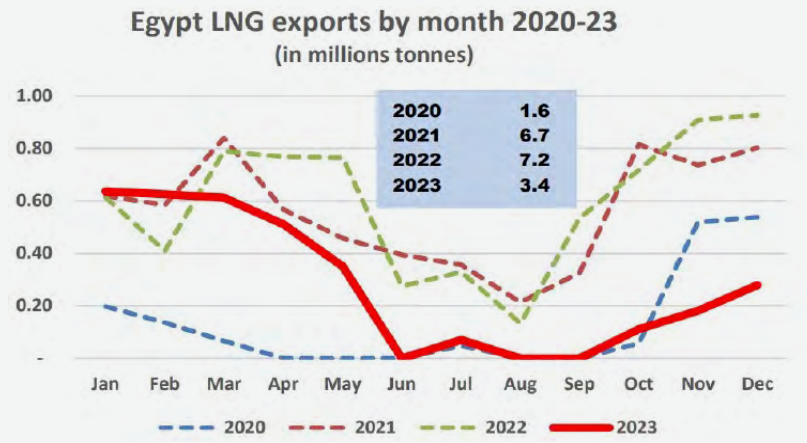


Figure 64: Egypt LNG exports by month 2020-2023 (source: Kpler)



[116] *The Oxford Institute for Energy Studies, "East Mediterranean Gas: a triangle of interdependencies", May 2024, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2024/05/Insight-151-East-Mediterranean-gas-%E2%80%93-a-triangle-of-interdependencies.pdf*

Israel

Over the past few years, Israel has strengthened its role as a gas exporter, becoming a key supplier for Jordan and Egypt. In 2023, combined production from the Leviathan, Tamar, and Karish fields reached 25.3 Bcm, marking a 15% increase from 2022. About 47% of this output (11.6 Bcm) was exported to Jordan and Egypt (Fig. 65 and 66)[117,118]. Gas exports to Egypt from about 10 bcm/year now are expected to increase to 21 bcm/year by 2028.

Figure 65: Israel's gas balance, 2016-2023[117, 118]

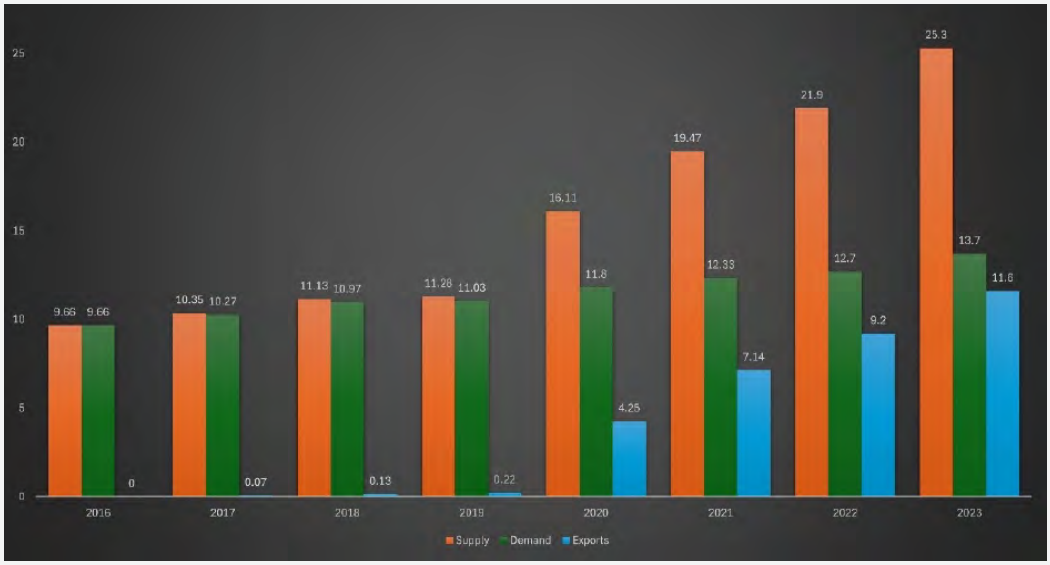
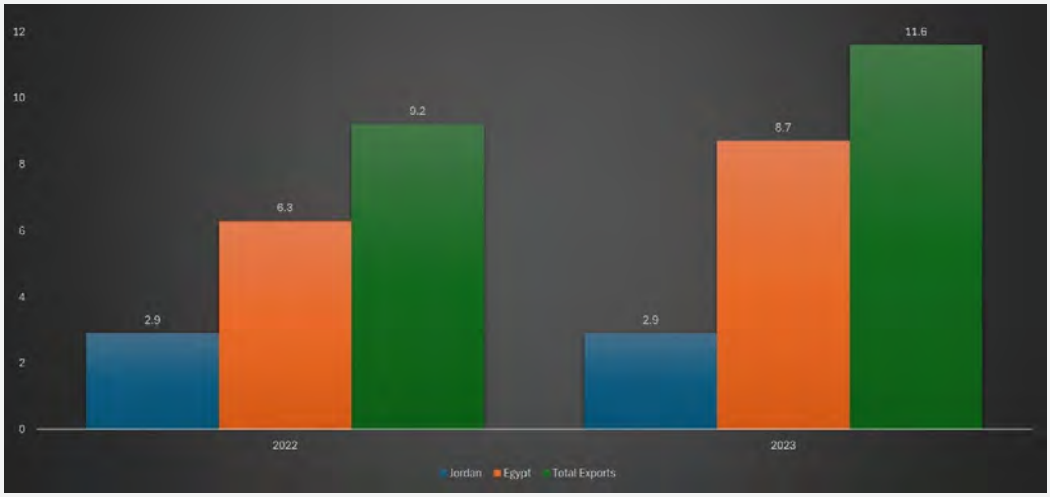


Figure 66: Israel gas exports 2022-2023[117, 118]



[117] *NewMed 2022 Periodic Report, 31.12.2022, https://newmedenergy.com/wp-content/uploads/2023/03/NM_FS31122022ENG-1.pdf*
[118] *NewMed 2023 Periodic Report, 31.12.2023, https://newmedenergy.com/wp-content/uploads/2024/03/NM_FS31122023_ACCESSIBLE.pdf*

Türkiye

In 2023, Türkiye's gas imports dropped significantly from 54.7 Bcm in 2022 to 47.5 Bcm (Fig. 67). This decline was primarily due to a reduction in domestic gas consumption, which fell by over 6% year-on-year to 50 Bcm, partly because of the ongoing financial crisis in the country. The most substantial decrease in gas imports was from Iran, which saw a 42% reduction to 5.4 Bcm. LNG imports also fell by a third to around 10 Bcm in 2023. In contrast, gas imports from Russia remained stable at approximately 21 Bcm.

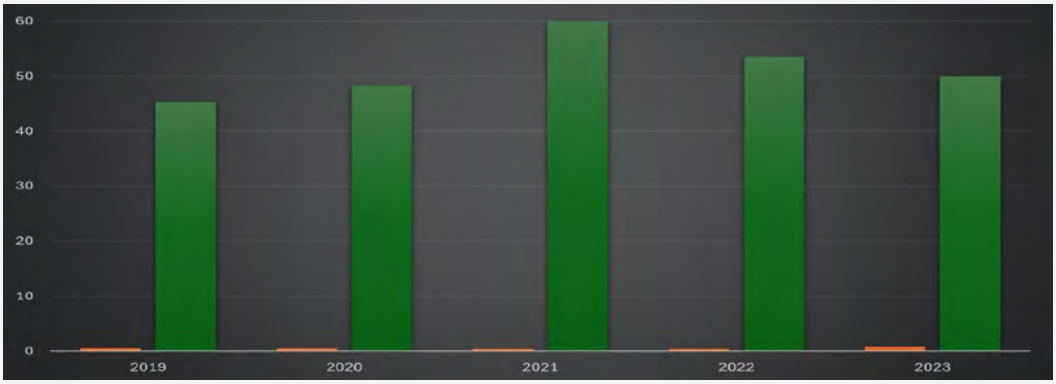
However, Türkiye increased its gas imports from Azerbaijan to 10.25 Bcm. Consequently, the share of Russian and Azerbaijani gas in Türkiye's import mix rose in 2023 to about 45% and 21.6%, respectively[119]. The reduction in gas imports is also linked to the commencement of gas production in Türkiye's Black Sea region, which increased from 0.38 Bcm in 2022 to 0.8 Bcm in 2023. According to the Turkish government, this domestic production currently supplies 1.8 million households. Additionally, Türkiye made its import and transmission capacity (exceeding 1.5 Bcm per year) available to Bulgaria and began exporting gas to Moldova and Romania last autumn, followed by Hungary in April this year[120].

In a move to diversify its gas supply sources, on May 8, 2024, the Turkish state-owned oil and gas company BOTAŞ signed a 10-year agreement with US energy giant ExxonMobil for LNG imports and trade. The agreement is expected to supply up to 2.5 mmt of LNG per year (3.5 Bcm of gas) to Türkiye, increasing the share of US gas in the Turkish market. Currently, Türkiye is the world's seventh-largest importer of gas from the United States[121]. On September 2, 2024, BOTAŞ signed a 10-year LNG contract with Shell. Under this contract, the country will buy 4 Bcm of LNG in 40 cargoes for domestic consumption and for re-exporting, starting in 2027.

Furthermore, BOTAŞ signed another 10-year LNG contract with TotalEnergies (September 17, 2024) to purchase 1.6 Bcm of natural gas in 16 shipments, starting in 2027. In general, Türkiye began diversifying its supply well before the war in Ukraine by increasing the share of LNG imports from several sources. In 2023, 71.7% of gas imports were pipeline gas and 28.3% were LNG[122]. As far as gas imports are concerned, Türkiye's gas exports reached 896.3 Bcm in 2023, increased by 47% from 2012 (611 Bcm).

Figure 67: Türkiye's gas imports 2019-2023

Figure 68: Türkiye's gas balance 2019-2023



[119] *The Energy Market Regulatory Authority (EPDK), https://www.epdk.gov.tr/*
[120] *OSW, "Turkey: opportunities and challenges on the domestic gas market in 2024", 06.03.2024, https://www.osw.waw.pl/en/publikacje/analyses/2024-06-03/turkey-opportunities-and-challenges-domestic-gas-market-2024*
[121] *Ankara Center For Crisis Policy Studies, "BOTAŞ-ExxonMobil LNG Agreement", 16.05.2024, https://www.ankasam.org/botas-exxonmobil-lng-anlasmasi/?lang=en*
[122] *IENE, SEEE Outlook 2025.*

Regional Hydrogen Potential

6

6. Regional Hydrogen Potential

The EU aims to bolster the supply of renewable hydrogen as part of a diversified and decarbonized energy system, reducing dependence on Russian energy imports. A proposed hydrogen and decarbonized gas market package will establish the market framework for hydrogen and streamline market access for renewable and low-carbon gases.

The European Hydrogen Bank is poised to address initial investment hurdles for renewable hydrogen by bridging the cost disparity between renewable hydrogen and fossil fuels.

Aggregating hydrogen demand could facilitate matchmaking between future producers and off-takers, leveraging the EU's political and market influence to negotiate more favourable prices with international hydrogen producers. Seeking partnerships with countries in the Mediterranean basin, the North Sea region, the Gulf countries, Saudi Arabia, and Ukraine, the EU explores potential imports of renewable hydrogen. Notably, at COP27 in Sharm el-Sheikh in 2022, the EU inked a partnership with Egypt aimed at fostering renewable hydrogen investments and trade facilitation[123].

6.1. Greece

In its new National Energy and Climate Plan (NECP), Greece has established an ambitious target for 2030 and beyond. By 2030, the NECP aims to install 1.7 GW of electrolyzers, enabling the production of 135,000 tons of green hydrogen. Looking ahead to 2050, the target expands to 30.6 GW of electrolyzers, with a projected output of 2.3 million tons. Also, by 2050, Greece anticipates a total annual consumption of 63.6 TWh of green hydrogen, with 70% of this utilized in transportation.

Furthermore, as stated by Mrs. A. Sdoukou, Deputy Minister of the Environment & Energy, the annual public funds required for the advancement of Hydrogen technology are estimated to be approximately €700 million[124]. To enhance the cleanliness of gas consumption, Greece plans to blend natural gas with green hydrogen, reaching 5.6% by 2030 and 15.4% by 2050. Biomethane is also expected to contribute, aiming for 15.4% and 20.4% respectively. To facilitate this transition, authorities are devising a mandatory annual minimum for gas suppliers, gradually escalating over time[125].

As far as the existing infrastructure is concerned, both the Ministry of Environment and Energy and operator DESFA are of the opinion that minimal investment is necessary for pipeline and compressor station upgrades to accommodate hydrogen.

Existing major international pipelines, like the Trans Adriatic Pipeline (TAP) and Interconnector Greece-Bulgaria (ICGB), are already equipped to manage hydrogen volumes, and upcoming transmission and distribution projects are factoring this capability into their design. In Greece, the utilization of several sites for hydrogen storage presents promising opportunities. Among these, Greek evaporites, in western Greece, which are saline formations, stand out as highly favourable geological formations for H2 storage. The potential for H2 storage in these areas has been calculated, with estimates reaching 26,600 MWh(e) for each of the regions encompassing Corfu, Achyra-Tryfos, and Kefallonia.

Furthermore, the presence of existing gas turbines in these areas offers additional advantages, as they can be repurposed for wind energy generation to facilitate the implementation of green H2 production. This synergy between renewable energy generation and H2 production underscores the potential for sustainable and environmentally friendly energy solutions in Greece. Moreover, the underground natural gas storage facility at Kavala presents another promising option for H2 storage. With the capacity to store between 1 to 2 TWh of H2, this facility offers significant potential to bolster Greece's H2 storage infrastructure[126].

Currently, a Hydrogen project – the Green HiPo project – is in its early stage having secured the necessary funds. The plan outlines a current budget of €60 million, with 40% of that funding (€24 million) as a grant from Greece's Just Transition Fund to launch the Green HiPo Project. It focuses on advancing, conceptualizing, and manufacturing HT-PEM fuel cell systems and electrolyzer systems for power and hydrogen production, respectively. Located in Greece's Western Macedonia region, this project is crucial for transitioning the area away from its coal-based economy toward a more environmentally sustainable model. The establishment of a state-of-the-art facility in Kozani will be central to the manufacturing of fuel cells and electrolyzers, driving economic growth and development in the region. The project is managed by Advent Technologies Holdings, Inc. in partnership with BASF[127].

[123] *IENE 27th National Energy Conference – Energy & Development, Athens, 14-15 November 2023, "Background Paper: Europe's Key Energy Issues: a SEE Perspective", https://www.iene.eu/articlefiles/inline/background%20paper%20-%20europe's%20key%20energy%20issues%20a%20see%20perspective_1.pdf*

[124] *Mrs. A. Sdoukou, IENE 27th National Energy Conference – Energy & Development, Athens, 14-15 November 2023.*

[125] *Balkan Green Energy News, "Greece plans 1.7 GW of electrolyzers, string of new projects to become green hydrogen leader", 24.08.2023, https://balkangreenenergynews.com/greece-plans-1-7-gw-of-electrolyzers-string-of-new-projects-to-become-green-hydrogen-leader/*

[126] *Dr. N. Koukouzas, IENE 27th National Energy Conference – Energy & Development, Athens, 14-15 November 2023, "Achieving a Carbon-Neutral Future: Sustainable Hydrogen" https://www.iene.eu/articlefiles/inline/koukouzas%20e%20&%20a%202023.pdf*

[127] *Advent Technologies official website, https://advent.energy/2023/11/16/advent-technologies-receives-funding-update-for-e60-million-to-launch-green-hipo-ipcei-project/*

In addition, the «H2-Hub» project, part of the «Just Development Transition 2021-2027» program, aims to establish a technology park in Greece for hydrogen production, storage, and utilization, featuring a 1 MW photovoltaic park and a hydrogen fuel station. With €19.8 million in co-financed public expenditure, the initiative will also focus on education, research, and certification of applied hydrogen research, supporting entrepreneurial activities.

Located within the former industrial area of AEVAL, granted to the National Center for Research and Technological Development (EKETA) for 30 years, the project expects to employ 17 personnel initially and train over 500 individuals within five years. Currently, the project is in the midst of an open tender process with the expectation of selecting a contractor by April 2024. The project targets completion by late 2025 and operationalization by early 2026. Additionally, plans include the integration of green economy business clusters and the establishment of a training centre for practical education of personnel, particularly focusing on student training[128].

Lately, geologists have been drawing attention to a new «gold rush» surrounding a previously overlooked carbon-free resource: hydrogen naturally generated within the Earth. According to the US Geological Survey, as much as 5tn tons of hydrogen lie within underground reservoirs worldwide. Notably, recent findings indicate that over 200 tons of hydrogen per year are flowing from the Bulqizë chromite mine in Albania[129].

The discovery of a vast deposit of pure natural hydrogen at the bottom of a mine in Albania raises hopes for the presence of the so-called «white» or «gold» hydrogen in Greece as well, since there is a geological continuity and the rocks are similar. In fact, Dr. Nikolaos K. Koukouzas, the Director of Research at EKETA, mentioned that they had been searching for suitable spaces for carbon dioxide storage in Western Greece and had observed bubbles emerging in certain drillings, indicating the presence of methane or hydrogen. Currently his team is taking samples and sending them abroad for analysis, among other activities[130].

6.2. Türkiye

In January 2023, the Turkish government announced the "National Energy Plan" and the "Hydrogen Technologies Strategy and Roadmap" both prepared to meet the country's 2053 net zero emission targets. The "Hydrogen Technologies Strategy and Roadmap" emphasizes the crucial role of green hydrogen, produced from renewable energy sources through water electrolysis, in achieving the nation's target of net zero emissions. By 2030 to 2053, the strategy aims for a 12% blend of hydrogen in natural gas and a 30% inclusion of synthetic methane.

The country set ambitious goals to reduce hydrogen production costs to $2.4 per kilogram by 2035, with plans to halve this cost by the 2050s. Water electrolysis is identified as the primary method for hydrogen generation under this new roadmap, with electrolyzer capacity projected to increase significantly – reaching 2 GW by 2030, escalating further to 5 GW by 2035, and culminating at 70 GW by the year 2053[131].

In July 2023, Türkiye launched its inaugural hydrogen valley project (budget of €37.8 million), commencing pilot production of green hydrogen derived from renewable sources at the Enerjisa Production Bandirma Energy Base. Dubbed the «South Marmara Hydrogen Coast Valley Project,» it boasts participation from Enerjisa Üretim and 16 domestic and international stakeholders, securing a €8 million grant from the European Commission. The initiative aims to produce and distribute green hydrogen (500 tonnes annually) at the base, with project partners including Sabancı University, Şişecam, Eti Maden, Turkish-German University, Linde Gaz AŞ, Bandırma Onyedi Eylül University, Hydrogen Peroxide AŞ, Universite Mohammed Vi Polytechnique, Alma Mater Studiorum- Universita Di Bologna, Software AG (SAG), PwC Sworn InFinancialConsultancy Inc., TENMAK, and TUBITAK.

The green hydrogen will initially serve industries such as chemistry, ceramics, and glass, expanding to iron and steel, petrochemical, energy, and transportation sectors. The project aims to achieve an average annual production of 500 tons of green hydrogen by 2025, harnessing energy from the sea to produce emissions-free hydrogen.

Additionally, the project will curb carbon emissions by employing hydrogen for generator cooling.The green hydrogen generated from the hydrogen valley project will find applications across various sectors including energy, transportation, and petrochemicals. Feasibility studies are underway for utilizing green hydrogen in products like ammonia and methanol, with future investments slated for the production of «green methanol» and «green ammonia»[132].

In 2023, signalling a commitment to sustainable transportation and decreasing oil imports, the Turkish government announced plans to bolster investment in hydrogen fuel cells, their components, and hydrogen-powered engines. This decision comes on the heels of Türkiye's inaugural domestic electric car launch last year, the Togg – an electric car equipped with a 160-kW battery featuring a range of 195 miles on a single charge, but with a price tag exceeding $50,000[133].

[128] *ΟΤ, "Κόμβος Καινοτομίας Υδρογόνου: Το 2026 θα λειτουργήσει με δικό του «υδρογονάδικο»", 04.01.2024, https://www.ot.gr/2024/01/04/green/komvos-kainotomias-ydrogonou-to-2026-tha-leitourgisei-me-diko-tou-ydrogonadiko/*

[129] *Financial Times, "Geologists signal start of hydrogen energy 'gold rush'", 18.02.2024, https://www.ft.com/content/81819f64-1025-489b-959a-c3d9b14cc77a*

[130] *Οικονομικός Ταχυδρόμος, "«Χρυσό» υδρογόνο: Ενδείξεις για κοιτάσματα σε Ήπειρο και Μακεδονία", 20.02.2024, https://www.ot.gr/2024/02/20/green/xryso-ydrogono-endeikseis-gia-koitasmata-se-ipeiro-kai-makedonia*

[131] *Anadolu Ajansi, "Türkiye announces national energy plan and hydrogen strategy", 19.01.2023, https://www.aa.com.tr/en/energy/invesments/turkiye-announces-national-energy-plan-and-hydrogen-strategy/37344*

[132] *Energy News Biz, "Turkey's first hydrogen valley starts pilot production", 20.04.2023, https://energynews.biz/turkeys-first-hydrogen-valley-starts-pilot-production/*

[133] *Energy News Biz, "Turkey Boosts Hydrogen Fuel Cell Investment for Sustainable Transportation", 20.10.2023, https://energynews.biz/turkey-boosts-hydrogen-fuel-cell-investment-for-sustainable-transportation/*

6.3. Egypt

Egypt aims to position itself as a major global player in the industry, leveraging its strategic location, substantial domestic market, and abundant solar energy resources. Key drivers behind this ambition include the pursuit of energy security and resilience against price fluctuations, particularly those stemming from geopolitical tensions like the Russia-Ukraine conflict. Additionally, the development of a robust hydrogen sector is expected to create job opportunities, enhance exports, attract foreign investment, and stimulate domestic technological innovation.

The green hydrogen strategy unveiled in 2022 by Egypt's leadership during COP27 in Sharm El-Sheikh outlined key sources of future hydrogen demand. These include fertilizer products, ammonia, methanol for marine fuels and energy exports, jet fuel, as well as road and rail transport[134].

To support this strategy, extensive land near the Nile River has been allocated for wind and solar power generation, with dedicated transmission lines to facilitate the transfer of renewable energy to a planned $5.5 billion hydrogen project in Ain Sokhna port.

Recognising the potential of this initiative, the European Bank for Reconstruction and Development (EBRD) has committed to providing Egypt with an $80 million loan for its burgeoning green hydrogen industry, marking the bank's first such investment in the sector.

The EBRD's financing will be used to acquire and construct a 100 MW electrolyser facility to be powered by renewable energy. When fully developed, the facility will deliver up to 15,000 tonnes of green hydrogen annually. This, in turn, will be used as an input for the production of green ammonia to be sold on the Egyptian and international markets[135].

Regarding legislation, the government has enacted Law No. 2 of 2024, known as the Green Hydrogen Incentives Law. Issued on January 27, 2024, following approval by the Egyptian House of Representatives earlier in the month, this law offers significant tax incentives for new green hydrogen production projects within Egypt and the expansion of existing ones. It builds upon decisions made by the Egyptian Cabinet in May 2023 and introduces tax credits and VAT exemptions to foster growth in the sector.

Additionally, the Green Hydrogen Incentives Law streamlines regulatory processes for project investors by exempting them from certain registration requirements typically imposed on inward investment projects.

This legislation complements existing measures, including the «Golden Licence» provisions outlined in Investment Law No. 72 of 2017, which simplifies project approval processes. Moreover, Cabinet decrees issued in 2022 further delineate strategic areas for development, particularly emphasizing green hydrogen projects, underlining the government's commitment to fostering a conducive environment for investment in this sector.

Furthermore, these legislative reforms align with Egypt's aspirations to become a leading global producer of green hydrogen. While these reforms provide a robust legal framework to achieve this ambition, their effective implementation amid economic and geopolitical challenges remains a pivotal task. Nonetheless, these legislative strides signal Egypt's dedication to realising its long-term vision and enhancing its position in the green hydrogen market[136].

Ultimately, Egypt's advancement towards prominence in the green hydrogen sector can be aided by its comparative advantages in the renewable energy sector. This is primarily due to the fact that green hydrogen is produced using renewable energy sources like solar and wind. Egypt boasts extensive energy infrastructure, significant renewable energy potential, and ample storage facilities. Its capacity to harness large-scale solar and wind projects can be pivotal in realizing sustainable and carbon-neutral hydrogen production.

However, advancing towards a hydrogen economy, Egypt must ensure renewable energy supply, balance production with sectoral demands, address hydrogen generation and transportation challenges, combat water scarcity, boost R&D efforts, secure funding, and establish strong regulations. Each endeavour demands innovative strategies for success[137].

6.4. Israel

The Israeli Ministry of Energy & Infrastructure proposes a dynamic roadmap for integrating hydrogen into the country's energy sector, recognizing its potential and unique characteristics. It emphasizes proactive measures to prepare for substantial hydrogen demand, advocating for investments in regulation, infrastructure, and policy at both national and international levels. Israel's strategic position suggests a pivotal role as a bridge between hydrogen-exporting and importing nations, necessitating investment in local technology development and infrastructure. Additionally, Israel's innovative prowess positions it to lead in hydrogen technology development.

[134] *European Commission, "COP27: EU and Egypt step up cooperation on the clean energy transition", 16.11.2022, https://ec.europa.eu/commission/presscorner/detail/en/ip_22_6925*
[135] *EBRD official website, EBRD supports first green hydrogen facility in Egypt, 15.11.2022, https://www.ebrd.com/news/2022/ebrd-supports-first-green-hydrogen-facility-in-egypt-.html*
[136] *Dentons, "Egypt incentivising green hydrogen projects: Egypt Vision 2030", 08.02.2024, https://www.dentons.com/en/insights/articles/2024/february/8/egypt-incentivising-green-hydrogen-projects-egypt-vision-2030*
[137] *Carnegie Endowment For International Peace, "Positioning Egypt as a Global Green Hydrogen Leader", 05.12.2023, https://carnegieendowment.org/2023/12/05/positioning-egypt-as-global-green-hydrogen-leader-pub-90716*

In the near term, Israel's use of hydrogen is expected to be limited due to its unique characteristics and the current technological maturity of hydrogen. While there is anticipation for hydrogen demand, especially in industry and transportation sectors, preparations should align with this scaled-down expectation. The transition to broader hydrogen integration hinges on various conditions, including technological advancement, economic feasibility, and global hydrogen usage. Therefore, the roadmap suggests a gradual approach, responsive to technology maturity, Israel's needs, global trends, and specific prerequisites. Key areas of focus include research and development, establishment of a hydrogen valley, infrastructure development, policy formulation, and international collaboration[138].

Between 2023 and 2030, significant investment will be directed towards pilot projects, feasibility studies, and regulatory adjustments in the hydrogen sector. Immediate policy initiatives include infrastructure development, such as fuelling stations and underground storage mapping, as well as substantial investment in research and development. Efforts will also focus on establishing hydrogen valleys, formulating policies and regulations, and fostering international cooperation for importation and R&D.

Looking ahead to 2030, preparations will intensify for widespread hydrogen adoption, including infrastructure preparation, regulatory frameworks, and policy adjustments tailored to hydrogen usage in various sectors. Notably, the ministry is already integrating hydrogen into Israel's energy sector through R&D investments, transportation infrastructure preparation, and the establishment of a hydrogen valley. Initial funding has been allocated for hydrogen refuelling stations, hydrogen-powered trucks, and a hydrogen valley, aiming to advance research and facilitate field demonstrations for hydrogen utilisation. This aligns with global trends, with over 30 hydrogen valleys worldwide, mainly in Europe, funded through government and private partnerships[139].

6.5. Can Hydrogen from the East Med region be exported to the EU?

Based on the national strategies and early-stage infrastructure described in Greece, Türkiye, Egypt, and Israel, the East Mediterranean region holds meaningful long-term potential to export hydrogen to the EU. However, this potential remains largely aspirational for the time being, and several technological, economic, and logistical challenges must be addressed before hydrogen can flow at scale.

Greece appears to be at the forefront among East Med countries, with well-defined targets and a roadmap for large-scale green hydrogen production. Its National Energy and Climate Plan envisions significant electrolyzer capacity, a blend of hydrogen into natural gas pipelines, and the readiness of infrastructure like TAP and IGCB to carry hydrogen blends. Moreover, Greece's geological formations offer viable storage options, and projects like Green HiPo and the H2-Hub demonstrate political will and public investment. This positions Greece as a credible future supplier, especially if domestic consumption does not absorb the full production capacity.

Egypt also shows considerable promise due to its renewable energy potential and recent legislative actions to incentivize green hydrogen production. With large-scale projects such as the $5.5 billion Ain Sokhna development and financial backing from institutions like the EBRD, Egypt could emerge as a significant hydrogen producer and exporter. Its proximity to Europe, established LNG and port infrastructure, and policy support further enhance its prospects. Still, the country faces critical challenges such as water scarcity, infrastructure limitations, and the need for extensive grid expansion.

Türkiye and Israel are taking more cautious but strategic approaches. Türkiye has set clear hydrogen blending goals and initiated pilot-scale hydrogen valleys, while Israel emphasizes R&D, infrastructure preparation, and international partnerships. Both could play supportive roles in a regional hydrogen export network, potentially as transit countries or technology leaders.

In conclusion, the East Med region has a credible, albeit long-term, opportunity to export hydrogen to the EU. This will depend on scaling up production, aligning domestic and export priorities, and ensuring that transmission infrastructure—both existing and future—is adequately hydrogen-ready.

[138] *EIsraeli Ministry of Energy and Infrastructure, "Israel Hydrogen Strategy, 2nd Edition, November 2023", https://www.gov.il/BlobFolder/news/news-150523-2/en/israel-hydrogen-strategy-english.pdf*

[139] *Israeli Ministry of Energy and Infrastructure, "The Ministry of Energy and Infrastructure Presents: Strategy for Integrating Hydrogen into the Israeli Energy Economy", 24.12.2023, https://www.gov.il/en/departments/news/news-150523-2*

Electricity

7. Electricity

Southeast Europe and the East Mediterranean region have diverse energy landscapes and face unique challenges in power generation and electricity transmission. Historically, many countries in SE Europe and the East Mediterranean have relied heavily on fossil fuels, particularly coal and natural gas, for power generation. Countries like Greece, Bulgaria, Serbia Türkiye and all the Balkan nations have significant coal-fired power plants capacity.

In recent years, there has been a growing emphasis on renewable energy sources. Solar and wind energy, in particular, are being harnessed across the region due to the abundant sunlight and wind resources. Countries like Greece and Türkiye have made substantial investments in solar energy projects, and wind farms are being developed in several countries along the Mediterranean coast.

The electricity transmission infrastructure in SE Europe and the East Mediterranean varies widely among countries. Developed economies like Greece and Türkiye generally have well-established electricity grids. However, some countries in the Balkans and Eastern Mediterranean may face challenges in grid reliability and efficiency.

Cross-border electricity connections are crucial for regional energy security and stability. Initiatives and projects are underway to enhance interconnectivity among countries. The European Network of Transmission System Operators for Electricity (ENTSO-E) plays a significant role in coordinating these efforts to create a more integrated European electricity market.

However, political, regulatory, and economic challenges have historically hindered the development of a seamless regional electricity market. Diverse regulations and policies in different countries have complicated cross-border energy trade and infrastructure development in the region.

In November 2021 the European Commission published the fifth edition of the Projects of Common Interest (PCI) catalogue, which highlights the crucial infrastructural endeavours, pivotal for realising the European internal energy market and attaining the Union's energy and climate policy objectives[140]. Central to achieving European decarbonization targets and facilitating the transition to renewable energy sources is the pivotal role of the Mediterranean region.

A decarbonized Europe hinges on a decarbonized Mediterranean region. The evolving landscape of final energy consumption, exemplified by the urge of governments to adopt heat pumps and electric vehicles, forecasts a trajectory where electricity assumes a greater share at the expense of traditional fossil fuels.

The conception of a Mediterranean electricity network stands as one of the most ambitious undertakings in the annals of Euro-Mediterranean relations, pivotal in fostering stability and security across the region. While past initiatives, such as the DESERTEC consortium spearheaded by Germany, faltered due to technological and political challenges, the imperative of an integrated Mediterranean electricity network persists as a strategic necessity. The advantages of transnational electricity interconnections are widely acknowledged, offering cost efficiencies and bolstered energy security. Expanding networks across larger territories mitigates costs and enhances the reliability of energy supply, adept at managing fluctuations in demand and supply, thus alleviating grid congestion issues[141].

In the Eastern Mediterranean, initiatives like EuroAfrica and EuroAsia, the latter recently included in the PCI list, aim to interconnect Greece and Cyprus with Egypt and Israel, respectively. Nevertheless, territorial disputes and geopolitical tensions, particularly concerning maritime sovereignty and the Turkish-Cypriot conflict, pose formidable obstacles to project realization.

Additionally, the design phase of the GREGY submarine cable, spanning over a thousand kilometres between Egypt and Greece with a capacity of 3000 MW, underscores ongoing efforts to bolster interconnectivity. In the meantime, Greece and Saudi Arabia have advanced discussions and signed a bilateral agreement on a joint interconnection endeavour, establishing the «Saudi Greek Interconnection» company to assess the commercial viability of such a venture[142,143].

7.1 Country overview

Greece

In 2023, Greece's net electricity generation in the interconnected system totalled 44.6 TWh, marking a decrease of 5.6% compared to the 2022 level of 47.2 TWh. Within the domestic power generation landscape, natural gas emerged as the primary energy source, contributing 14.6 TWh in 2023. Renewable energy sources also played a significant role, albeit with a slight increase in their share from 11.3 TWh in 2022 to 11.8 TWh in 2023. However, this figure represents a decline from the 2021 level of 17.2 TWh.

[140] *European Commission, "Questions and Answers on the fifth list of energy Projects of Common Interest (PCIs)", 19.11.2021, https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_6093*

[141] *ECCO, "Integrated electricity grids in the Mediterranean? A bridge for energy cooperation between Europe and North Africa", December 4 2023, https://eccoclimate.org/integrated-electricity-grids-in-the-mediterranean-a-bridge-for-energy-cooperation-between-europe-and-north-africa/*

[142] *Reuters, "Greece, Saudi Arabia to look at linking their power grids, 27.09.2023, https://www.reuters.com/business/energy/greece-saudi-arabia-look-linking-their-power-grids-2023-09-27/*

[143] *Offshore Energy, "Special purpose company established for potential Greek-Saudi electricity interconnector", 08.02.2024, https://www.offshore-energy.biz/special-purpose-company-established-for-potential-greek-saudi-electricity-interconnector/*

Meanwhile, electricity generated from lignite experienced a further decline, dropping from 5.6 TWh in 2022 to 4.5 TWh in 2023. This downward trend reflects lignite's diminishing contribution to power generation, which has notably decreased over the past six years, plummeting from 14.9 TWh in 2018[144,145], (Fig. 69 and 70).

Over the past four (4) years, the contribution of different energy sources to electricity availability has displayed notable fluctuations, as illustrated in the following figures. In 2022, RES took centre stage, comprising 38.8% of the mix, surpassing natural gas, which held a 35.4% share. This shift occurred alongside a decrease in electricity output from hydropower plants compared to 2021, and a marginal uptick in lignite production, while net imports remained consistent.

In terms of their contribution to net electricity generation in 2022, there was a 5-point decrease in the percentage of natural gas, dropping to 38% and another 5-point decrease in 2023 to 32.8%, while RES penetration accelerated from 35.3% in 2021 to 41.6% in 2022 and 47.9% in 2023.

According to IPTO data, 2022 marked a significant milestone, as RES emerged as the dominant fuel, accounting for 41.6% of production, totalling 19.7 TWh. Natural gas followed closely behind with 38%, generating 17.9 TWh, while lignite secured third place with 11.8%, yielding 5.6 TWh. This trend has continued into 2023 and 2024.

Hydropower trailed with 8.5% and 4 TWh. Together, RES and hydropower comprised 50.1% of total electricity production, slightly surpassing the combined participation of all fossil fuels at 49.9%, thereby categorizing most of the kilowatt-hours produced in 2022 as «clean.» (Fig.71, 72 and 73).

Figure 69: Total Generation in Greece 2020-2023[144, 145]

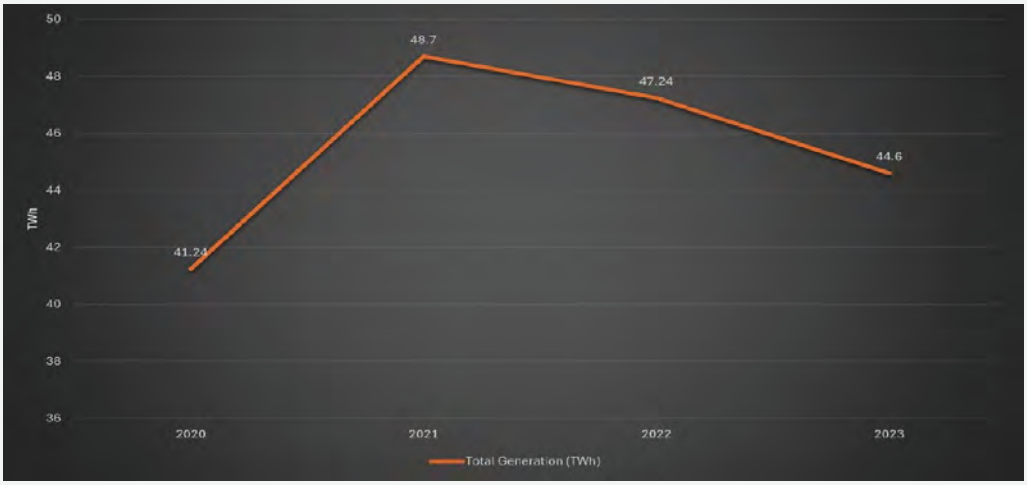
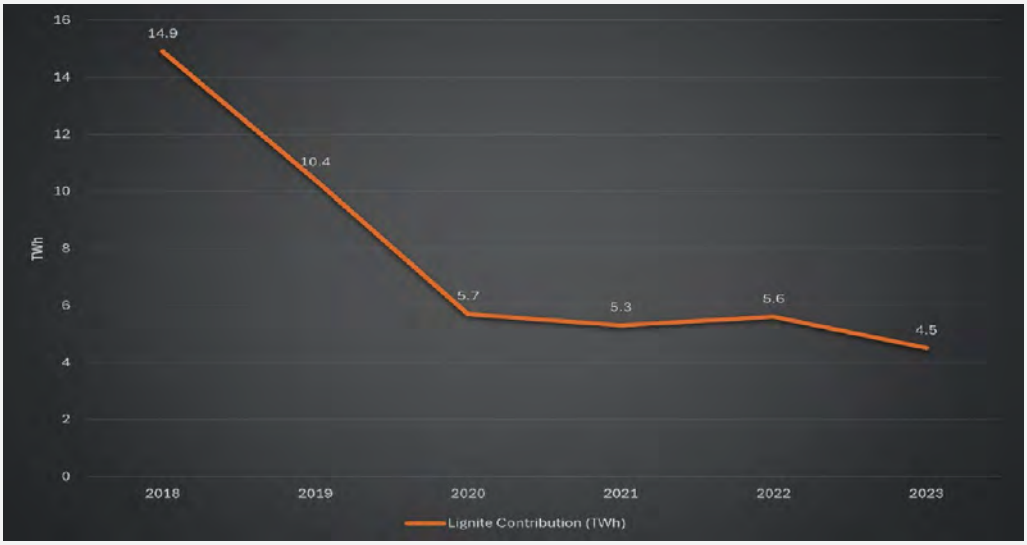


Figure 70: Lignite contribution in power generation in Greece 2018-2023[144, 145]



[144] *Independent Power Transmission Operator (IPTO) Monthly Energy Reports (December 2023, December 2022, December 2021, December 2020), https://www.admie.gr/sites/default/files/attached-files/type-file/2024/02/Energy_Report_202312_v2_en_0.pdf, https://www.admie.gr/sites/default/files/attached-files/type-file/2023/02/Energy_Report_202212_v2_en.pdf, https://www.admie.gr/sites/default/files/attached-files/type-file/2022/02/Energy_Report_202112_v2.pdf, https://www.admie.gr/sites/default/files/attached-files/type-file/2021/05/Energy_Report_202012_v2b.pdf*

[145] *IENE, SEEE Outlook 2021/2022, https://www.iene.eu/media/iene-SEEE-outlook-2021-22-3rd-edition.pdf*

Figure 71: Electricity production in Greece by source 2020-2023

	2020	2021	2022	2023
Lignite	5722	5341	5586	4513
Natural Gas	17815	20873	17949	14631
Hydro	2901	5294	4004	4047
RES	14800	17193	19662	21373
Other	5,9	20,3	26,9	15,5
Net Imports	8207	3683	3448	4912
Net Generation	41243	48721	47228	44580
Total Electricity	49450	52404	50676	49492

Figure 72: Fuel Share in Electricity Production in Greece 2020-2023

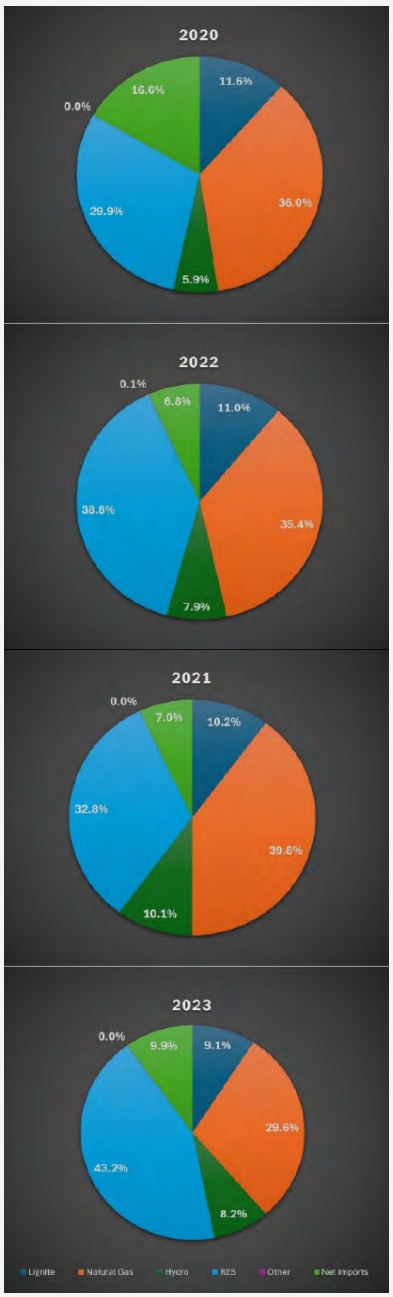
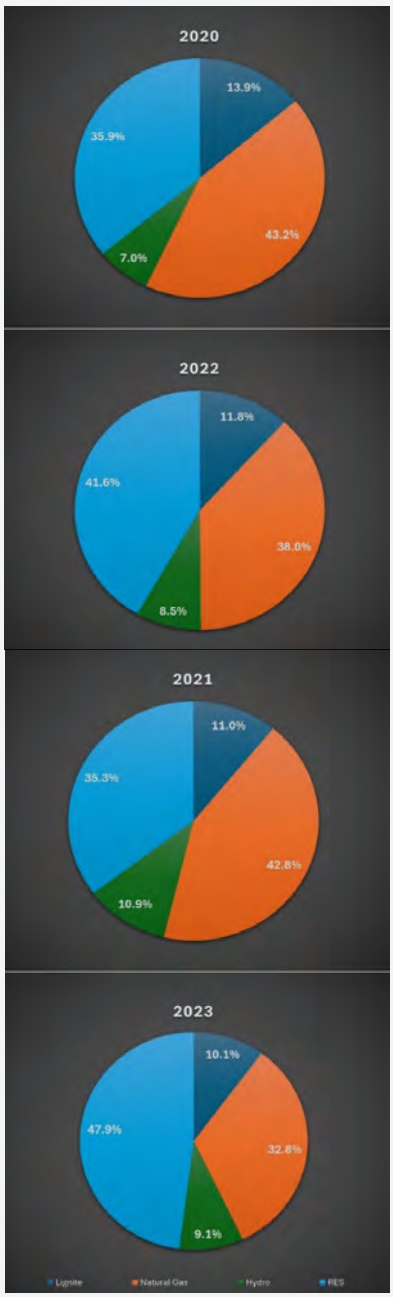


Figure 73: Fuel Share in Net Electricity Generation in Greece 2020-2023



In 2023, Greece's interconnected system witnessed a rise in total installed capacity, reaching 24.0 GW, marking a 7.7% increase from the previous year's level of 22.2 GW. RES have experienced a significant growth over the last few years, from 7.4 MW in 2020 to 11.9 GW in 2023 (Fig. 74 and 75)[146,147].

Greece has been a net importer of electricity for many years. Electricity imports in Greece amounted to 8.2 TWh in 2023, compared to 7.8 TWh in 2022, increased by 5% (Fig. 76)[148]. Greece's imports come mainly from Bulgaria, Albania and North Macedonia.

Recently, January 2024, a second electricity interconnector between Greece and Bulgaria was inaugurated. The new 400 kV Ultra-High Voltage Transmission Line became operational during summer 2023, significantly increasing the scope for energy exchanges between the neighbouring systems of Greece and Bulgaria[149].

Figure 74: Total installed capacity in Greece 2020-2023

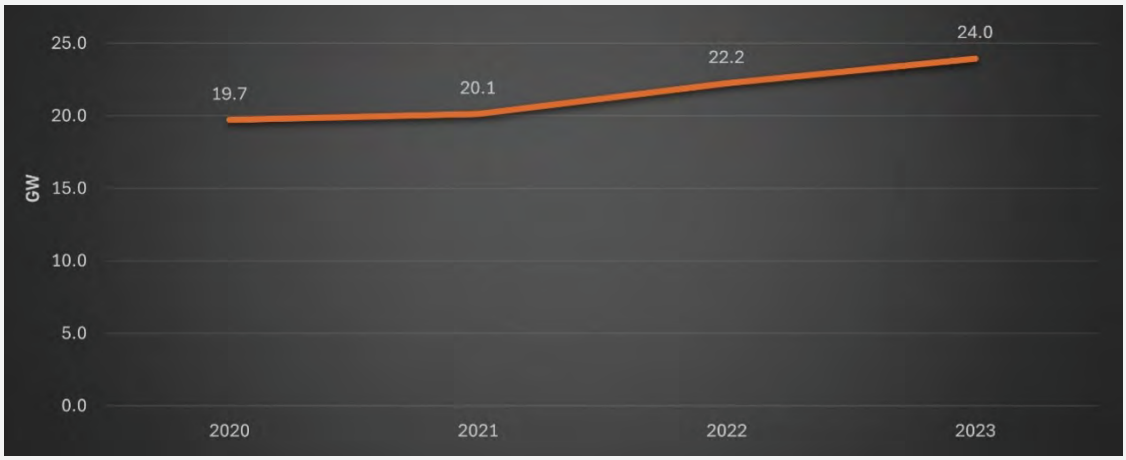
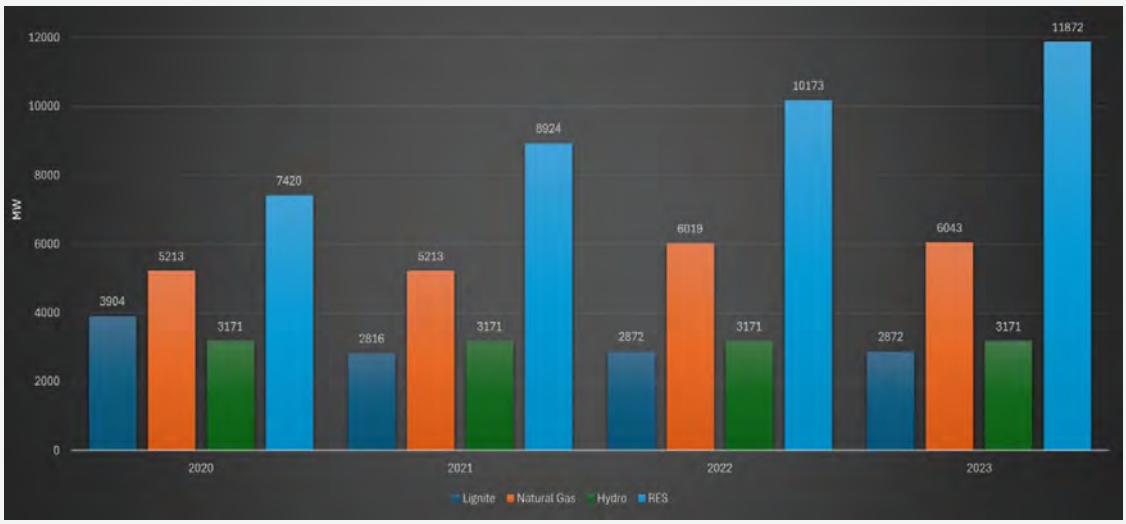


Figure 75: Total installed capacity per fuel in Greece 2020-2023



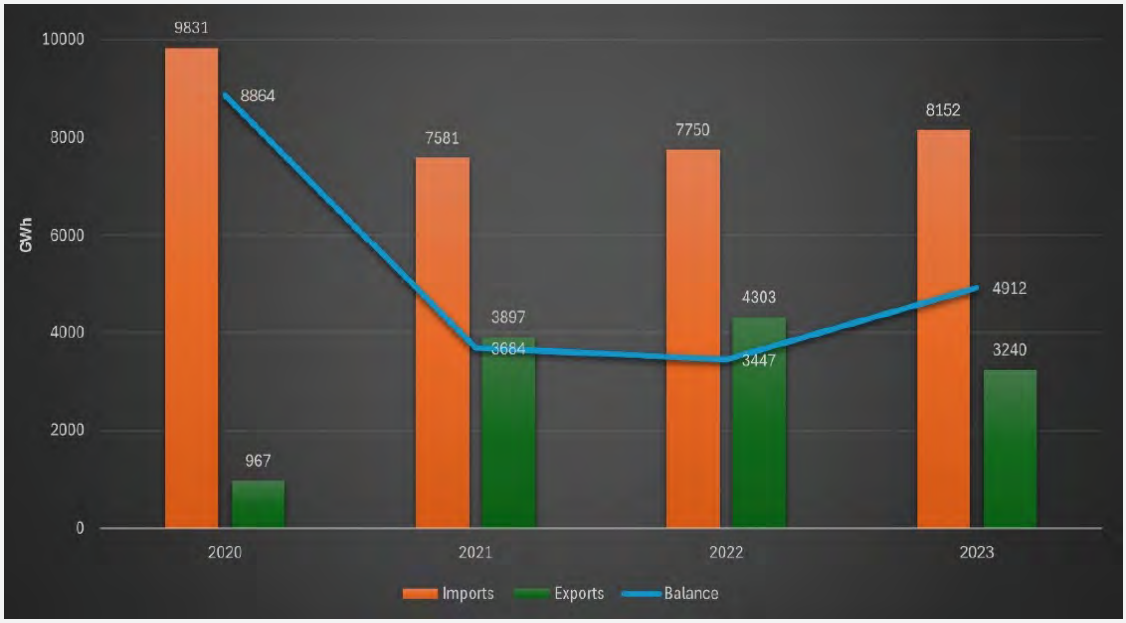
[146] *Independent Power Transmission Operator (IPTO) Monthly Energy Reports (December 2023, December 2022, December 2021, December 2020), https://www.admie.gr/sites/default/files/attached-files/type-file/2024/02/Energy_Report_202312_v2_en_0.pdf, https://www.admie.gr/sites/default/files/attached-files/type-file/2023/02/Energy_Report_202212_v2_en.pdf, https://www.admie.gr/sites/default/files/attached-files/type-file/2022/02/Energy_Report_202112_v2.pdf, https://www.admie.gr/sites/default/files/attached-files/type-file/2021/05/Energy_Report_202012_v2b.pdf*

[147] *Renewable Energy Sources Operator & Guarantees of Origin (DAPEEP SA), Monthly Reports, December 2022, December 2023, https://www.dapeep.gr/wp-content/uploads/2023/03/06_OCT_NOV_DEC_2022_DELTIO_ELAPE_v3.3_13.03.2023.pdf?_t=1680190419, https://www.dapeep.gr/wp-content/uploads/2024/02/09_DEC_2023_min_DELTIO_ELAPE_v_1.0_06.02.2024.pdf*

[148] *IEA reports, Greece, 2023, https://www.iea.org/countries/greece/electricity*

[149] *Independent Power Transmission Operator (IPTO), Greece-Bulgaria Interconnection, 20.01.2024, https://www.admie.gr/en/nea/deltia-typoy/inauguration-new-electricity-interconnection-between-greece-and-bulgaria*

Figure 76: Electricity imports and exports in Greece 2020-2023[148]

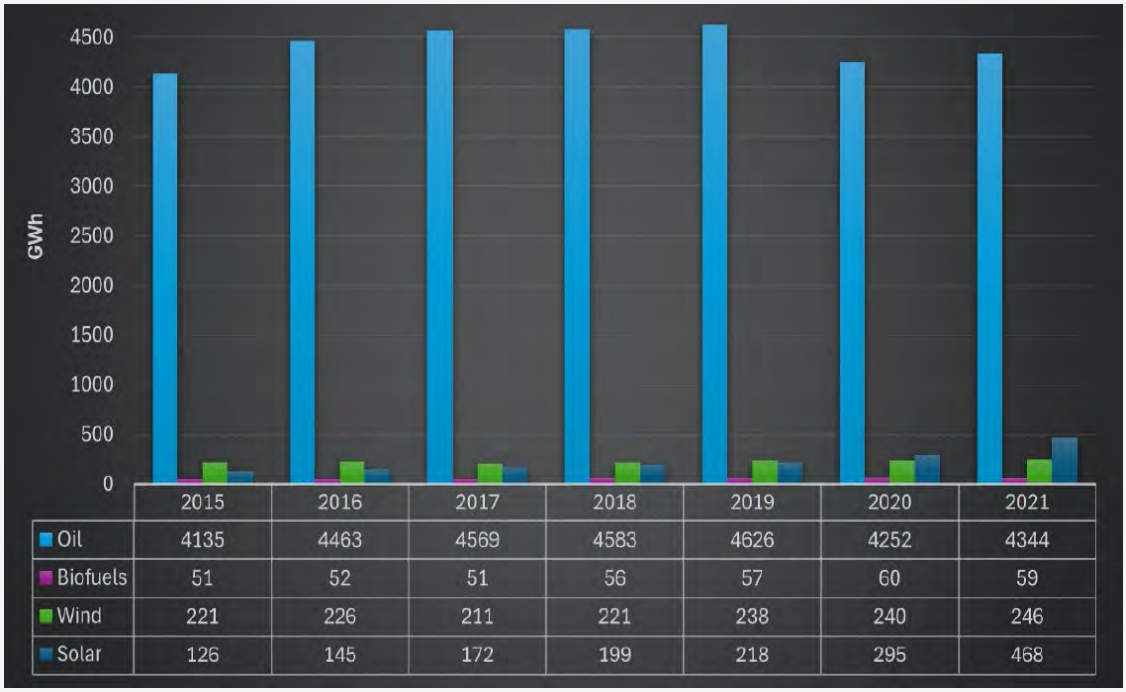


Cyprus

Cyprus as an island is totally isolated from EU energy links and electricity networks and remains the most energy dependent country in the EU. Cyprus is completely isolated from EU energy interconnections.

Cyprus's electricity production is mainly based on imported oil. According to IEA, 85% of the electricity produced in Cyprus in 2021, came from oil[150]. Solar and wind are the next main source of electricity generation. Power generation has been approximately 5,000 GWh since 2015 (Fig. 77 and 78).

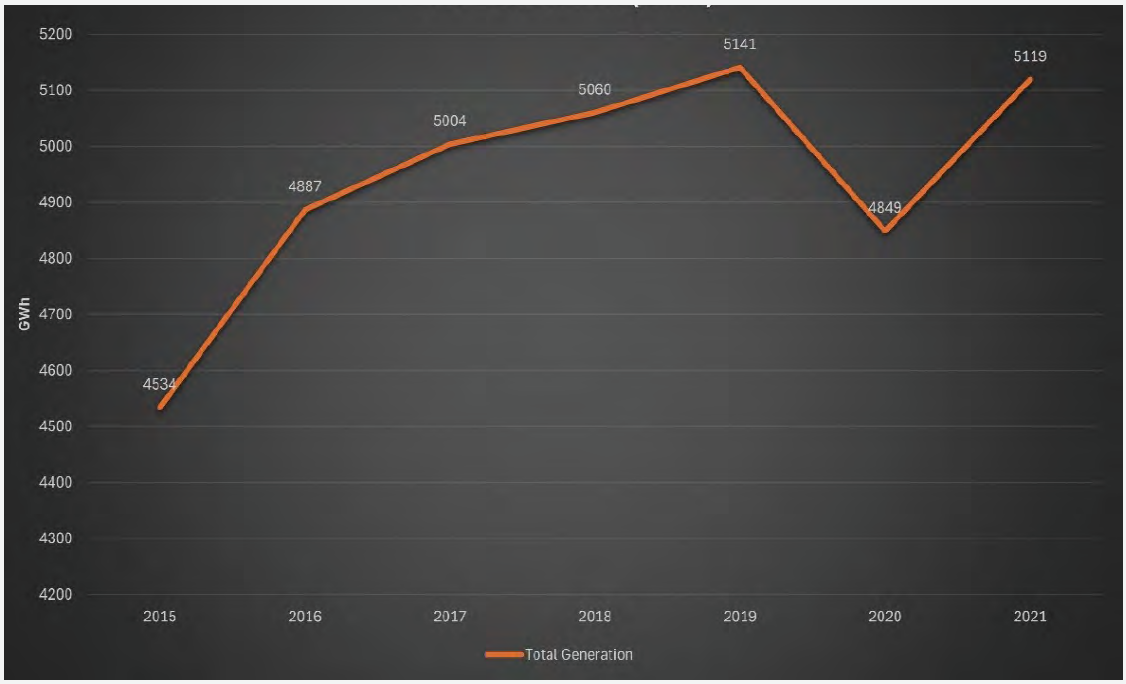
Figure 77: Electricity production by source in Cyprus 2015-2021[150]



	2015	2016	2017	2018	2019	2020	2021
Oil	4135	4463	4569	4583	4626	4252	4344
Biofuels	51	52	51	56	57	60	59
Wind	221	226	211	221	238	240	246
Solar	126	145	172	199	218	295	468

[150] *IEA reports, Cyprus, 2022, https://www.iea.org/countries/cyprus/electricity*

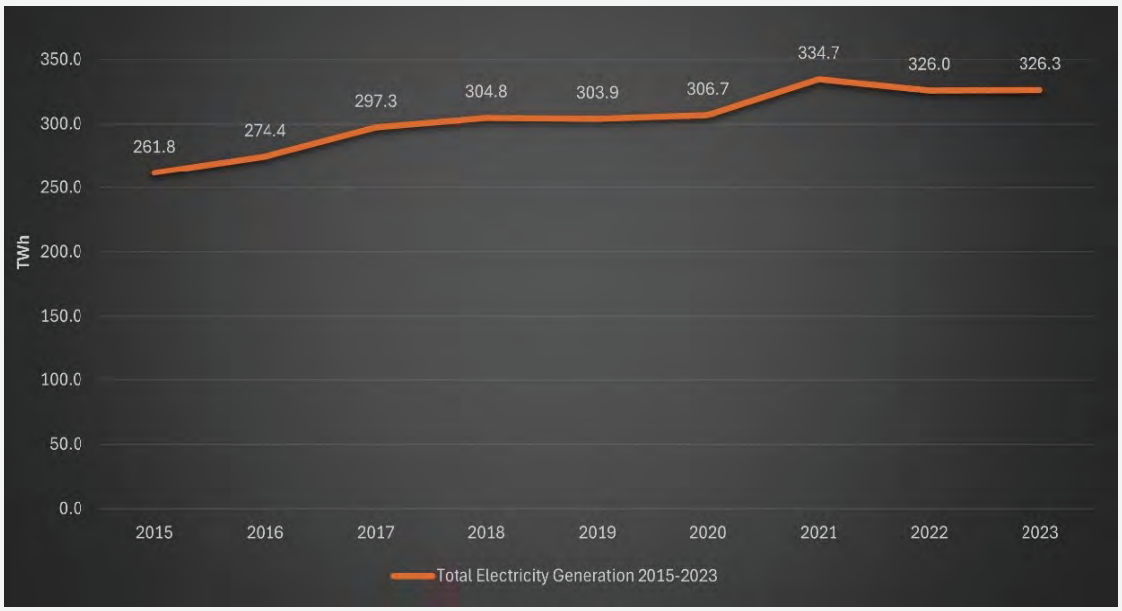
Figure 78: Electricity generation in Cyprus 2015-2021[150]



Türkiye

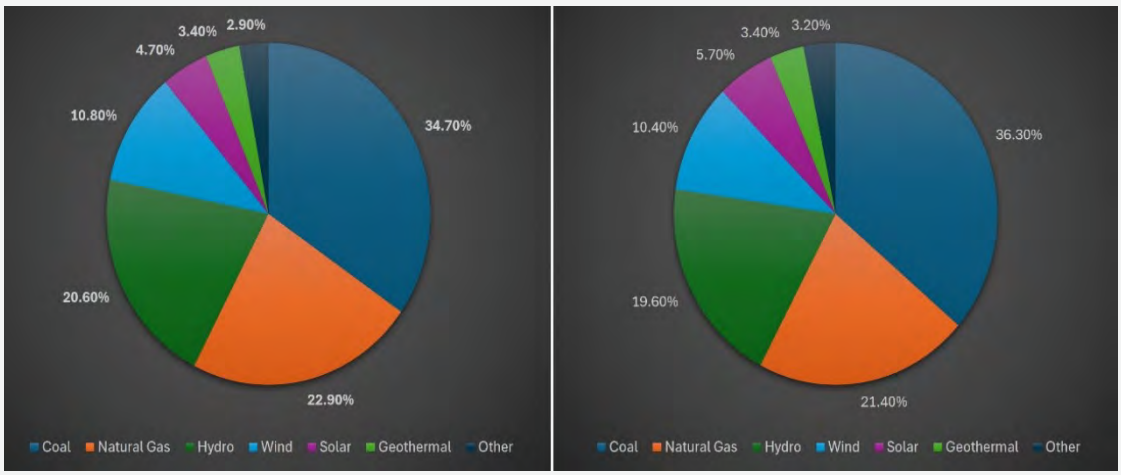
Electricity generation in Türkiye in 2023 reached 326.3 TWh. Figure 64 shows the development of electricity generation during the period 2015-2023[151]. Coal accounted for 36.3%, followed by natural gas 21.4%, hydro 19.6%, wind 10.4%, solar 5.7%, geothermal 3.4%, and other sources 3.2% (Fig. 79)[152]. RES had 42% share in electricity output in 2023[153].

Figure 79: Total Electricity Generation in Türkiye 2015-2023[151]



[151] *IEA reports, Turkey, 2022, https://www.iea.org/countries/turkiye/electricity*
[152] *Turkish Ministry of Energy and Natural Resources, https://enerji.gov.tr/infobank-energy-electricity*
[153] *Balkan Green Energy News, "Renewables had 99.5% share in new capacity in 2023 in Turkey", 23.01.2024, https://balkangreenenergynews.com/renewables-had-99-5-share-in-new-capacity-in-2023-in-turkey/*

Figure 80: Electricity generation by source in Türkiye 2022-2023[152, 153]



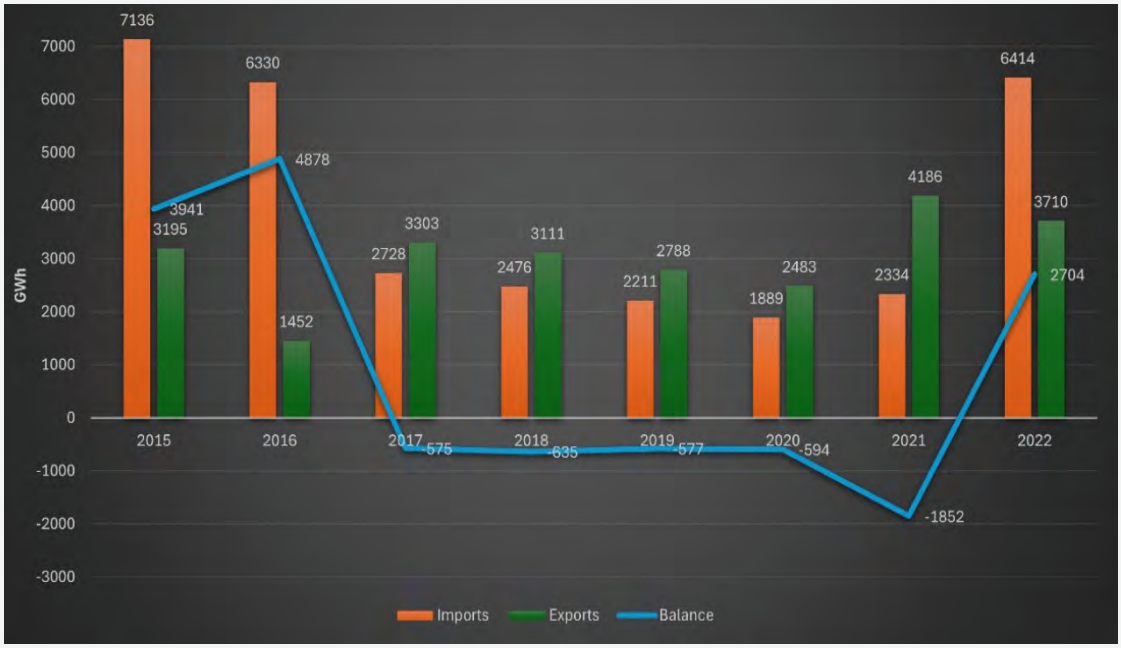
By the end of February 2024, the installed capacity of Türkiye has reached 107,594 MW[154]. The distribution of installed capacity by resources is as follows: 29.7% hydro, 23.3% natural gas, 20.3% coal, 11.1% wind, 11.5% solar, 1.6% geothermal and 2.5% other sources. RES share in installed power in 2023 was 56%[155].

Türkiye's electricity imports in 2022, amounted to 6.4 GWh significantly increased from 2021 (2.3 GWh). During 2017–2021 the country was an electricity exporter, as shown in Figure 81, however this trend changed in 2022, and Türkiye became an importer again.

Currently in Türkiye, in the southern province of Mersin, a nuclear power plant is being constructed. The 4.8 GW Akkuyu facility will be Türkiye's first nuclear power plant. Under the build-own-operate model, Rosatom is building four (4) VVER-1200 reactors. Construction of the first unit began in 2018. Following the construction of the Akkuyu nuclear power plant, Türkiye is planning to build two (2) more plants at Sinop and Thrace.

The first nuclear unit at the Akkuyu nuclear power plant should be launched by the end of 2024, while negotiations with Russia, China and South Korea on the construction of the other two nuclear power plants continue[156].

Figure 81: Electricity imports and exports in Türkiye 2015-2022



[154] *Turkish Electricity Transmission Corporation (TEIAS) official website, https://www.teias.gov.tr/en-US*
[155] *Balkan Green Energy News, "Renewables had 99.5% share in new capacity in 2023 in Turkey", January 2024, https://balkangreenenergynews.com/renewables-had-99-5-share-in-new-capacity-in-2023-in-turkey/*
[156] *Power Technology, "Turkey continues negotiations over new nuclear power plants", March 2024, https://www.power-technology.com/news/turkey-continues-negotiations-with-russia-china-and-south-korea-on-nuclear-development/*

Israel

Total electricity generation in Israel came to 76.1 TWh in 2022, according to IEA (Fig. 82). Israel's electricity generation is sourced by natural gas by over 50%[157](Fig. 83). However, as announced by the Ministry of Energy and Infrastructure, on March 12, 2024, for the first time in the country's history renewables accounted for 51% of total production[158]. Israel is a net electricity exporter. According to IEA, in 2022, 9.4% of its electricity production was exported, amounting to 6,9 TWh. Since 2000, electricity exports increased by 375% (Fig. 84).

Figure 82: Total electricity generation in Israel 2015-2022[157]

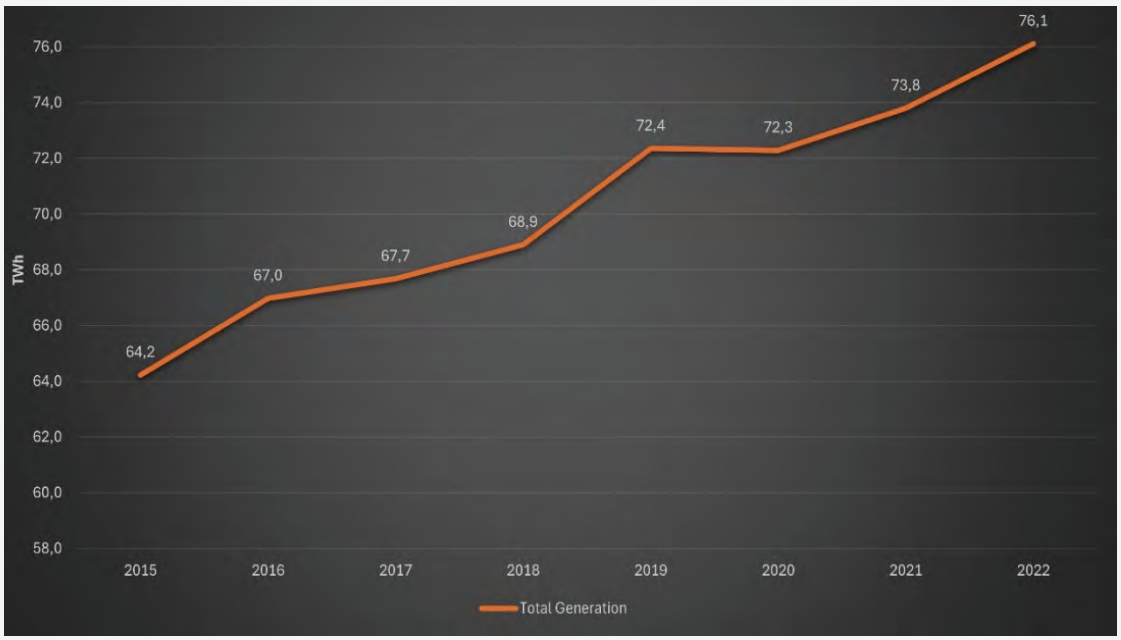
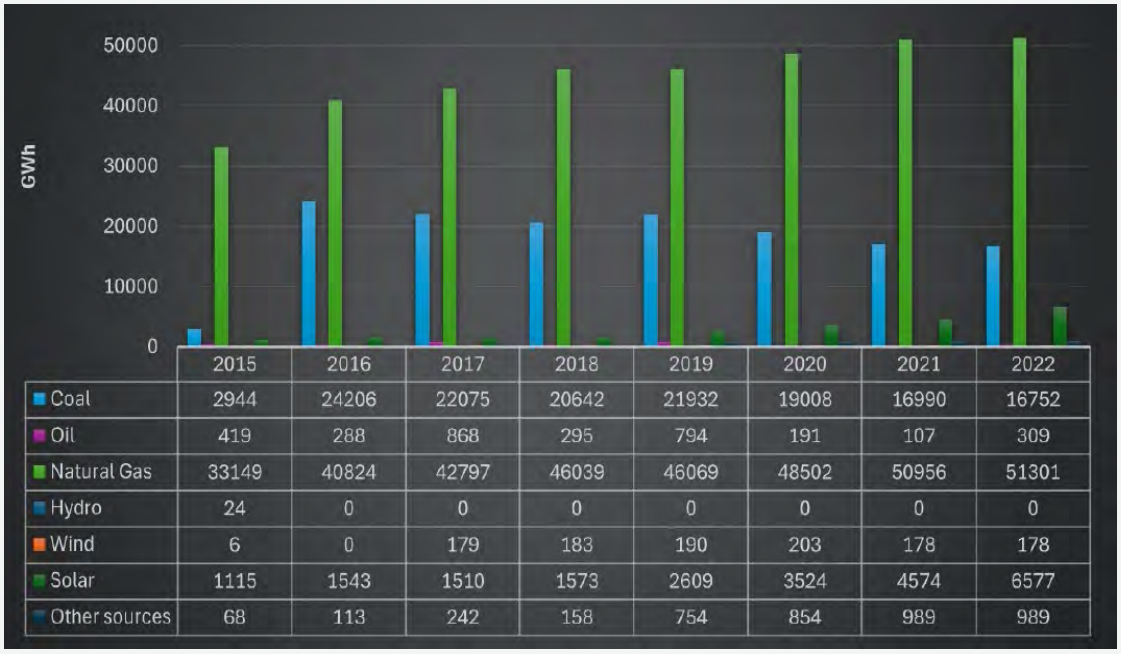


Figure 83: Electricity production by source in Israel 2015-2022[157]



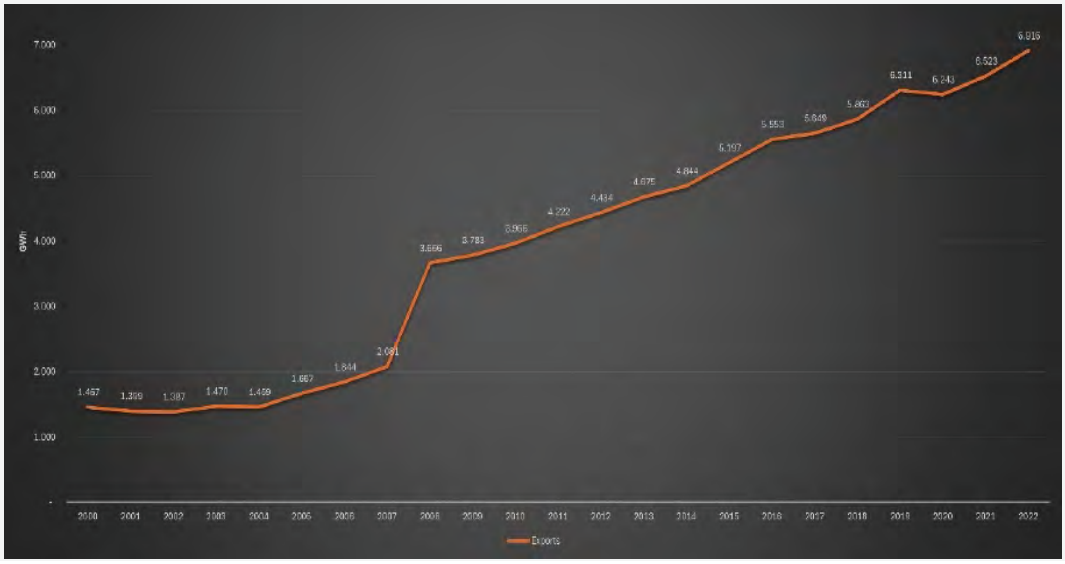
	2015	2016	2017	2018	2019	2020	2021	2022
Coal	2944	24206	22075	20642	21932	19008	16990	16752
Oil	419	288	868	295	794	191	107	309
Natural Gas	33149	40824	42797	46039	46069	48502	50956	51301
Hydro	24	0	0	0	0	0	0	0
Wind	6	0	179	183	190	203	178	178
Solar	1115	1543	1510	1573	2609	3524	4574	6577
Other sources	68	113	242	158	754	854	989	989

[157] *IEA report, Israel, 2022, https://www.iea.org/countries/israel/electricity*
[158] *PV magazine, Israel hits 51% renewable production for first time, 26.03.2024, https://www.pv-magazine.com/2024/03/26/israel-hits-51-renewable-production-for-first-time/*

The reforms have ended Israel's Electric Corporation (IEC) monopoly in the generation and supply segments. Independent Power Producers (IPP) are expected to reach 56% of installed capacity by 2025, with IEC's market share forecasted to decrease to 40%. Noga, the system management company, became independent from IEC in 2021. The supply market opened to competition in 2023, with dozens of new suppliers receiving licenses. In 2023, about 19 virtual suppliers (without production facilities) supplied about 10% of consumer consumption. As of April 2024, there are 48 licensed virtual suppliers. IEC will continue to have a monopoly in the network segments, but its role in production has significantly diminished due to the sale of power plants to private producers.

In 2025, the total generation is expected to be 81.7 TWh, with natural gas and renewable energy shares growing, and coal's share decreasing[159]. Finaly the Great Sea interconnector is set to link the power grids of Greece, Cyprus, and Israel through the longest submarine power cable in the world.

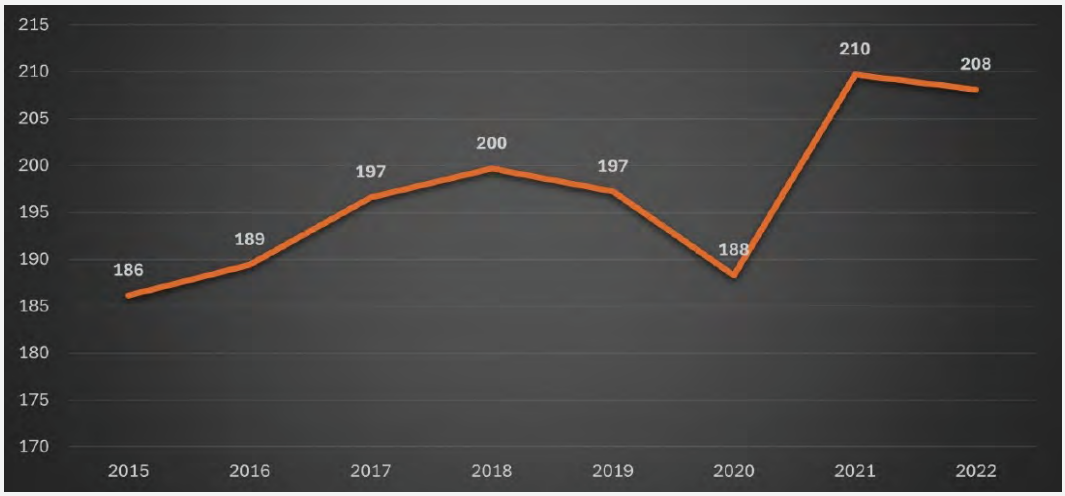
Figure 84: Electricity exports in Israel 2000-2022



Egypt

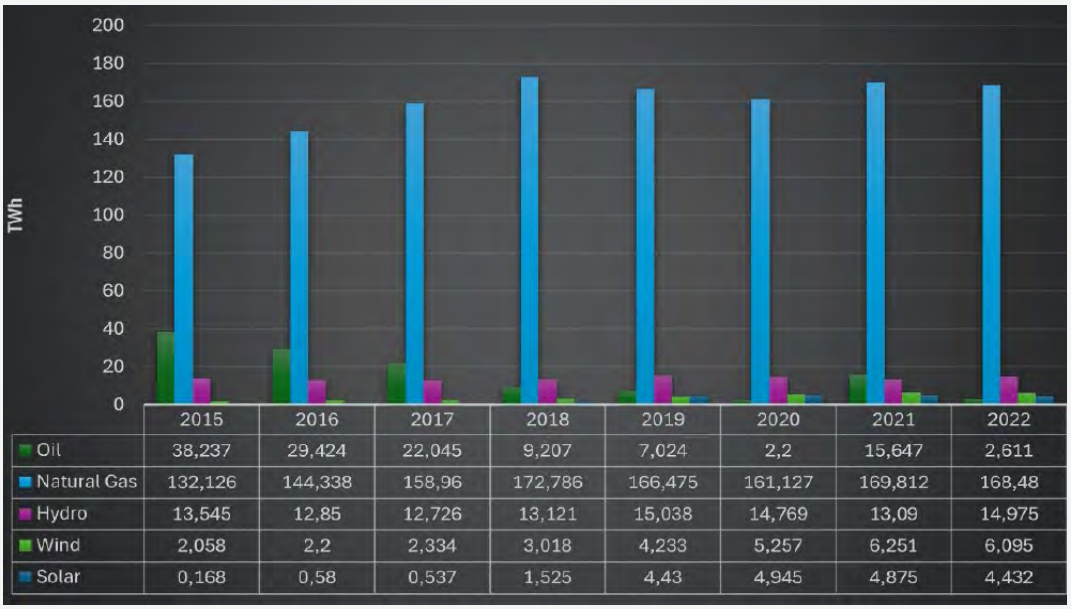
In 2022, most of Egypt's electricity, nearly 90%, was generated from gas and oil. The country's electricity output has been steadily increasing, predominantly fuelled by the expansion of fossil gas generation (Fig. 85 and 86). Renewable energy sources accounted for 11% of the energy mix, with wind and solar contributing a mere 4.5%[160].

Figure 85: Total electricity generation in Egypt 2015-2022[161,162]



[159] *IENE, SEEE Outlook 2025.*
[160] *Ember Climate, Egypt, May 2023, https://ember-climate.org/countries-and-regions/countries/egypt/*
[161] *IEA reports, Egypt, 2021, https://www.iea.org/countries/egypt/electricity*
[162] *Climatescope, Egypt, 2022, https://www.global-climatescope.org/markets/eg/*

Figure 86: Electricity Production in Egypt by source 2015-2022[161]

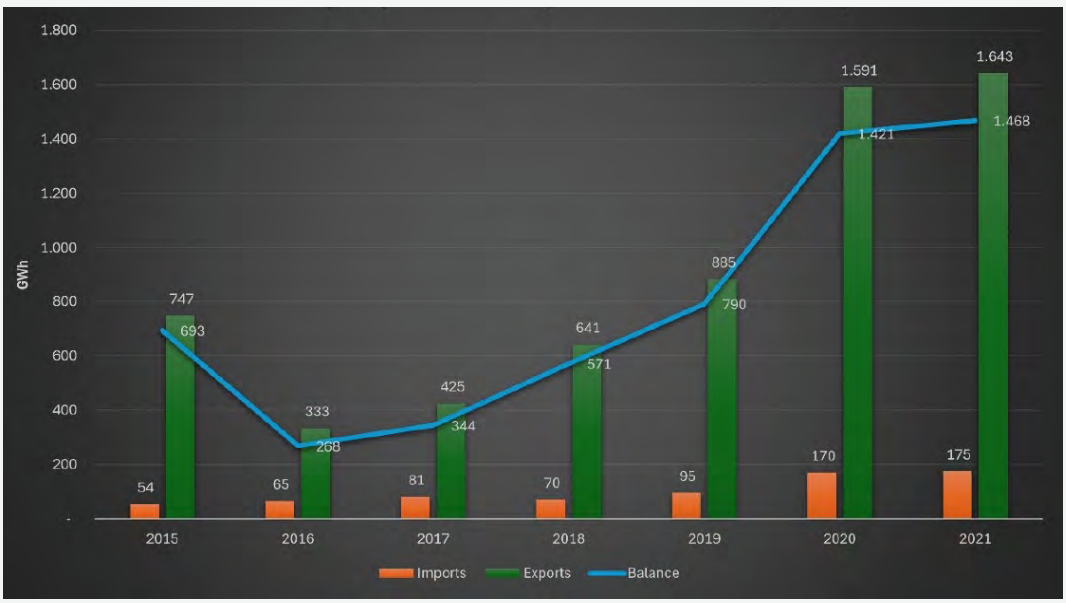


	2015	2016	2017	2018	2019	2020	2021	2022
Oil	38,237	29,424	22,045	9,207	7,024	2,2	15,647	2,611
Natural Gas	132,126	144,338	158,96	172,786	166,475	161,127	169,812	168,48
Hydro	13,545	12,85	12,726	13,121	15,038	14,769	13,09	14,975
Wind	2,058	2,2	2,334	3,018	4,233	5,257	6,251	6,095
Solar	0,168	0,58	0,537	1,525	4,43	4,945	4,875	4,432

The top amount of capacity installed in Egypt in 2022 was in Natural Gas at 86.35%, down from 86.79% in 2021. The technology with the biggest increase in capacity installed in 2022 was Solar PV at 3.8%, up from 3.39 in 2021[161].

The largest electricity generating technology in Egypt in 2022 was Natural Gas, generating some 85.67% of electricity, down from 87.12% in 2021. The technology with the biggest increase in electricity generation in 2022 was Large Hydro at 7.61%, up from 6.95% in 2021. Egypt's electricity imports in 2021 were 175 GWh while at the same time exports came at 1,643 GWh, making it a net exporter (Fig. 87).

Figure 87: Electricity imports and exports in Egypt 2015-2021



Lebanon

Lebanon relies heavily on imported oil to generate electricity, with renewable energy sources contributing less than 10% to the power generation mix in 2021 (Fig. 88 and 89). Imports in 2021, amounted to 797 GWh[163].

Shortages and blackouts occur frequently in the country. In October 2021, Lebanon experienced a widespread power blackout when its two largest power stations, Zahrani and Deir Ammar, were forced to shut down due to fuel shortages. This left Lebanon without centrally generated electricity and insufficient fuel for private electricity generators.

Power was restored the following day after the Lebanese army distributed fuel from its reserves[164]. The Lebanese parliament recently passed a new law permitting peer-to-peer renewable energy trading among private sector entities and officially incorporating net metering into the country's legal framework for the first time. Prior to 2020, Lebanon's solar PV capacity was less than 100 MW. Presently, the country boasts approximately 1,300 MW of PV capacity, primarily derived from small solar-plus-battery systems[165].

Figure 88: Total generation in Lebanon 2015-2021[163]

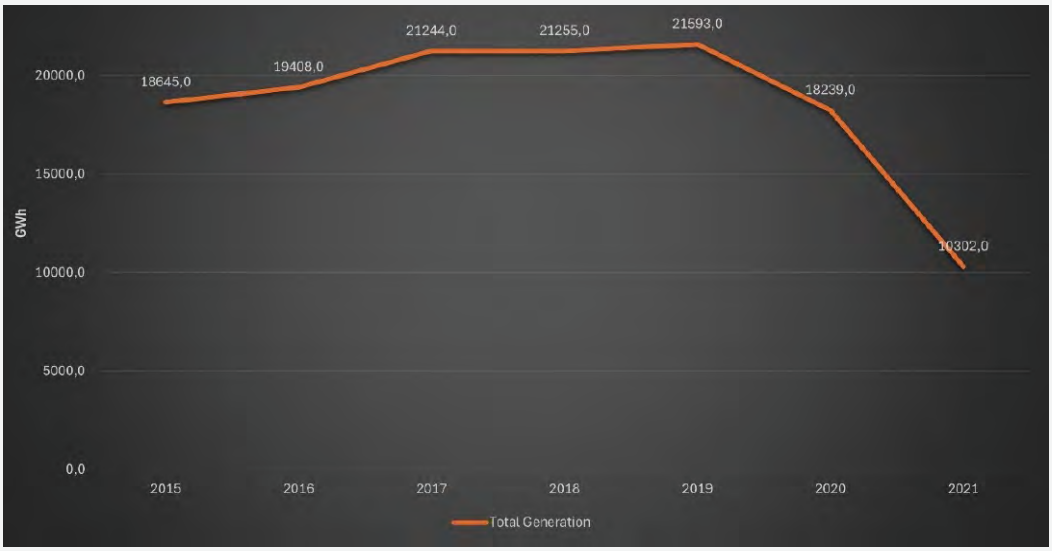


Figure 89: Electricity Production by source in Lebanon 2015-2021[163]

	2015	2016	2017	2018	2019	2020	2021
Oil	18143	18983	20768	20814	20473	17022	9384
Hydro	479	382	414	347	965	1054	611
Wind	6	6	6	0	0	0	0
Solar	17	37	55	86	121	140	306
Other sources	0	0	0	6	34	21	0

[163] *IEA report, Lebanon, 2021, https://www.iea.org/countries/lebanon/electricity*
[164] *Al Jazeera, "Lebanon electricity back online after army supplies fuel", 10.10.2021, https://www.aljazeera.com/news/2021/10/10/lebanon-electricity-back-online-after-army-supplies-fuel*
[165] *PV magazine, "Lebanon introduces peer-to-peer renewable energy trading", 02.01.2024, https://www.pv-magazine.com/2024/01/02/lebanon-introduces-peer-to-peer-renewable-energy-trading/*

Syria

Syria's conflict has wreaked havoc on its electricity system, resulting in more frequent blackouts nationwide, disruptions to economic activities of all kinds, and reports indicating a rise in electrical fires due to grid-related issues[166]. Before 2011, Syria heavily relied on foreign expertise to manage the most intricate investments in its electrical sector, such as repairing and installing generation infrastructure. However, after a decade of conflict, a combination of international sanctions and foreign exchange shortages posed significant barriers to accessing foreign expertise.

Additionally, Syria experienced a decline in its own pool of technical talent due to a persistent brain drain and severe setbacks to its education system. The installed capacity of electricity generation in Syria in 2010 amounted to about 8,500 MW.

US and EU sanctions further exacerbated the challenges facing Syria's electricity sector. These sanctions restricted foreign (European and Arab) entities from providing loans or executing infrastructure projects, while also straining Syria's capacity to import fuel and spare parts[167].

Total electricity generation in 2021 was down by 33% compared to 2000[168] (Fig. 90) with oil, natural gas and hydro being the sources for electricity production in Syria (Fig. 91).

Since 2011, electricity imports into Syria ceased with the onset of the conflict and has not yet resumed, largely due to both geopolitical factors and the impact of sanctions as previously mentioned (Fig 92).

Figure 90: Total electricity production in Syria 2000-2021[168]

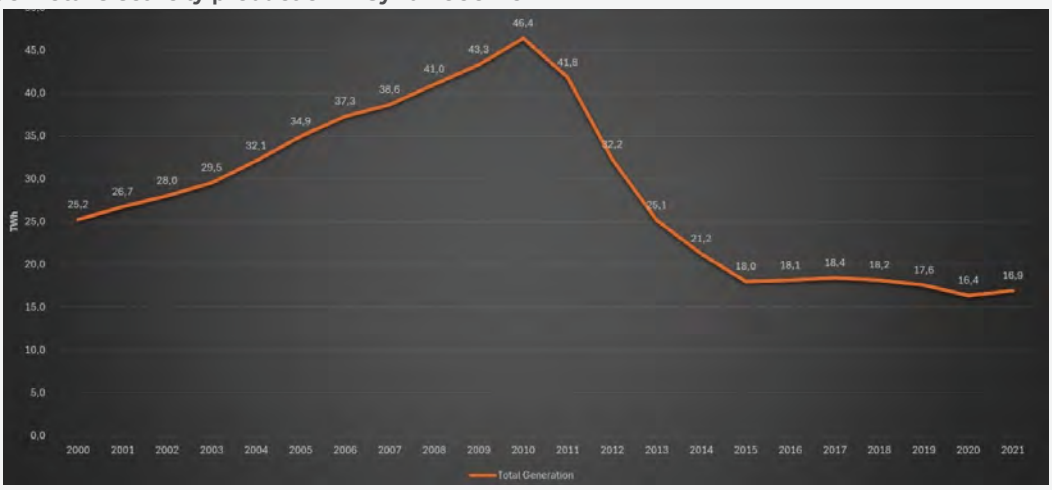


Figure 91: Electricity Production by source in Syria 2015-2021[168]

	2015	2016	2017	2018	2019	2020	2021
Oil	5298	6505	7099	6908	6740	6764	6744
Natural Gas	12271	10702	10559	10501	10073	8846	9417
Hydro	413	929	754	754	754	754	754

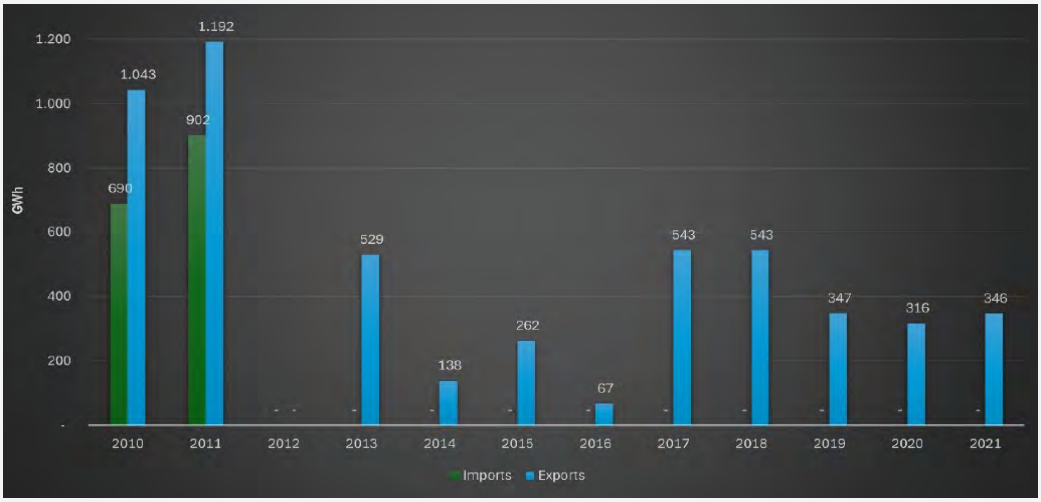
166 *France 24, "Power cuts stall industrial revival in Syria's Aleppo", 08.09.2021, https://www.france24.com/en/live-news/20210908-power-cuts-stall-industrial-revival-in-syria-s-aleppo*

167 *European Union External Action Service (EAAS), "EU response to the Syrian crisis", 26.04.2019, https://www.eeas.europa.eu/eeas/eu-response-syrian-crisis_en*

168 *IEA report, Syria, 2021, https://www.iea.org/countries/syria/electricity*

Syria's infrastructure suffered extensive damage during the years of war, with much of it rendered inoperable. Most power generation stations ceased functioning, and a significant portion of the electricity transmission networks was sabotaged. While precise estimates of the destruction in the electricity sector are unavailable, statements from the regime's Minister of Energy in mid-2020 indicated that the sector's direct losses over the past decade amounted to approximately $4 billion. The war also led to the shutdown of around 70% of transfer stations and transmission lines.

Figure 92: Imports and exports in Syria 2010-2021[168]



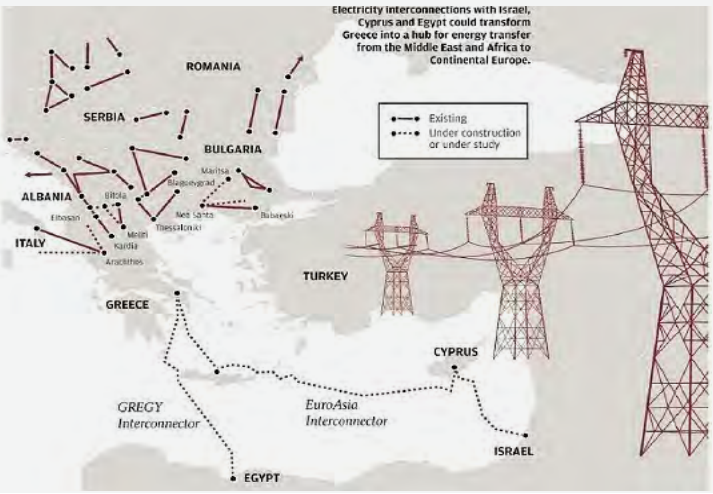
7.2. Electricity Interconnectors

Electricity interconnectors, often described as the unsung heroes of the modern energy landscape, have revolutionized the way nations share and manage their electrical power. These high-voltage links between different countries or regions enable the seamless flow of electricity across borders, promoting energy security, enhancing grid stability, and fostering economic cooperation. In this chapter, we will explore the fascinating world of electricity interconnectors, delving into their history, benefits, challenges, and the role they play in shaping a sustainable energy future.

Electricity interconnectors have come a long way since their humble beginnings. Early interconnections were limited in capacity and primarily served neighbouring regions. Over time, advancements in technology, coupled with the growing need for reliable and diversified energy sources, led to the development of high-capacity interconnectors spanning vast distances. Today, these interconnectors link continents, enabling the exchange of electricity on an unprecedented scale.

The region boasts a substantial array of electricity interconnectors, some already operational, while others are in various stages of planning or construction (Fig. 93). Among these projects, a select few stand out for their immense scale, the number of nations involved, and the complex geopolitical challenges they navigate.

Figure 93: Greece's international electricity interconnections: existing and planned [169]



[169] *Ekathimerini.com, "Greece eyes green energy corridor status", 04.11.2022, https://www.ekathimerini.com/economy/1197094/greece-eyes-green-energy-corridor-status/*

The Great Sea Interconnector

This ambitious project is geared towards knitting together the electricity grids of three nations – Israel, Cyprus, and Greece – employing cutting-edge high-voltage direct current (HVDC) submarine cables. At its core, the Great Sea Interconnector seeks to establish a seamless conduit for the exchange of electricity among these nations, heralding a new era of extensive energy cooperation and fortifying the energy security of each participating country.

The project will have a capacity of 1,000 MW and at its full deployment will have a total length of 1,208 km (310 km between Cyprus and Israel, 898 km between Cyprus and Crete) and allow for bidirectional transmission of electricity. The maximum laying depth of the cable in some areas is expected to reach 3,000 m (Fig. 94)[170].

The significance of the Great Sea Interconnector amplifies when considering its broader implications. By interlinking the energy infrastructures of Israel, Cyprus, and Greece, this project not only fosters regional synergy but also lays the foundation for a resilient energy network spanning the Eastern Mediterranean.

Through this collaboration, these nations can optimise their energy resources, balancing supply and demand effectively, and ensuring a stable, uninterrupted energy supply for their citizens and industries.

However, the Great Sea Interconnector's impact extends far beyond the regional realm. A fundamental aspect of this initiative lies in its strategic alignment with the wider European energy landscape.

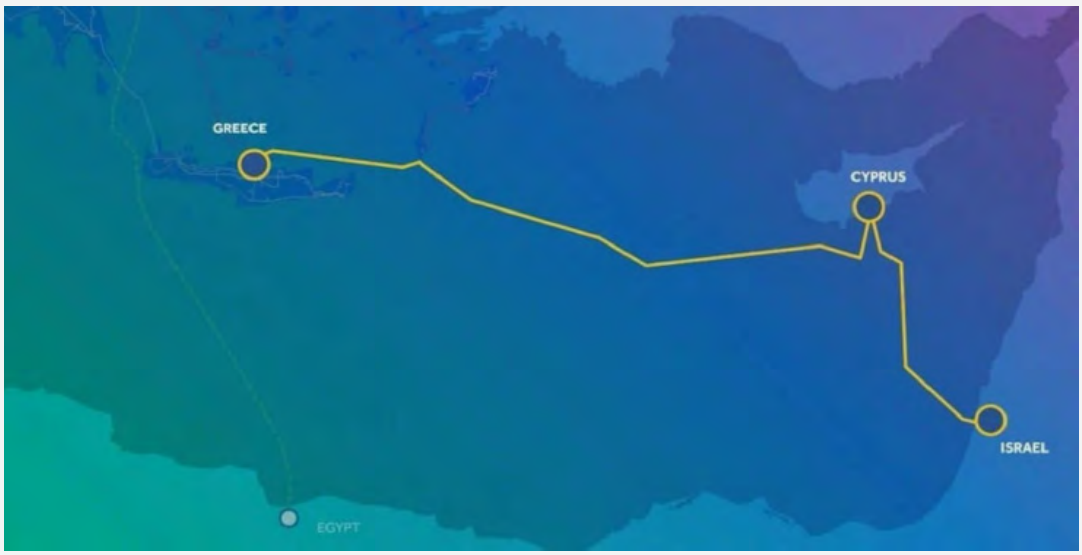
By integrating with the European electricity grid, the project creates pivotal interconnections between the East Mediterranean and continental Europe. This interconnectedness holds immense promise, enabling the smooth, cross-border flow of electricity. This integration not only enhances the energy security of the participating nations but also reinforces the collective resilience of the European energy grid. It strengthens the foundation for a collaborative, pan-European energy market, fostering stability and sustainability in the face of evolving energy demands.

Cyprus, being at the centre of the Great Sea Interconnector, benefits enormously, since by linking with Crete's electricity grid it gains access to the European grid, thus enabling itself to end its energy-island status.

Additionally, the Great Sea Interconnector fosters economic growth and stability in the host countries – Israel, Cyprus, and Greece. The construction and operational phases of the project will attract substantial investments, stimulating local economies, creating job opportunities, and encouraging technological advancements.

In essence, the Great Sea Interconnector transcends its role as a mere infrastructure project. It symbolizes a transformative force, shaping the energy landscape of the nations involved, fostering regional collaboration.

Figure 94: The Great Sea Interconnector route from Greece to Cyprus and Israel



[170] *Great Sea Interconnector official website, https://www.great-sea-interconnector.com/en*

The EuroAfrica Interconnector

The EuroAfrica Interconnector (Fig. 95) stands as a pioneering venture, interlinking the electricity grids of Egypt, Cyprus, and Greece in Europe. This integration is made possible through an extensive subsea DC cable and onshore converter stations, boasting a substantial total capacity of 2000 MW, and spanning an impressive distance of 1,396 km. Serving as a robust energy conduit, this project serves as a dependable alternative for the transfer of electric energy to and from Europe.

The EuroAfrica Interconnector, serving as the official promoter and developer, will finance the construction of the electricity link connecting Egypt, Cyprus, Crete, and Attica. This first stage of the project will have an initial transmission capacity of 1,000 MW, with a projected cost of €2.5 billion. Stage 1 of the interconnection is expected to be commissioned between December 2028 and 2029 both for the Cyprus–Egypt and Cyprus–Greece (Crete) segments[171].

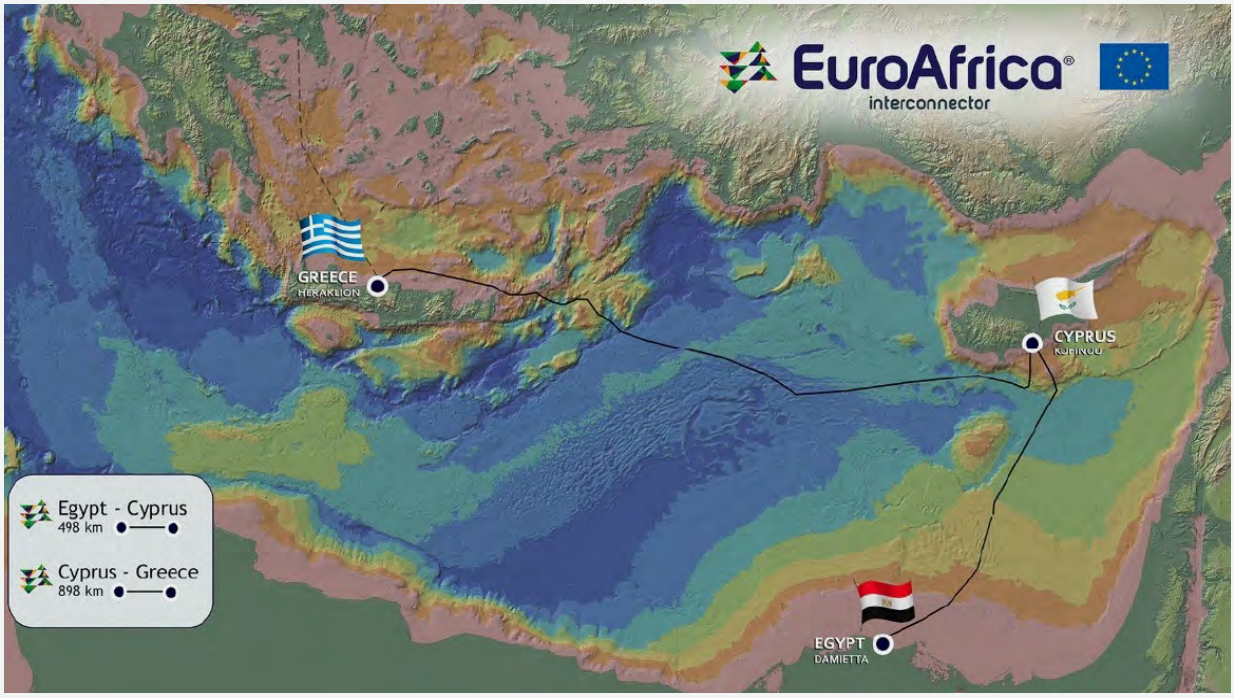
Endorsed by the European Union, the EuroAfrica Interconnector embodies a multitude of strategic goals. Firstly, it marks a significant milestone in eradicating Cyprus' energy isolation, eliminating its status as the last EU member state devoid of any electricity or gas interconnections.

Moreover, the project ensures the secure supply of electricity to the European Union. By creating a dedicated electricity route from Egypt to Cyprus and Greece, this initiative guarantees a stable supply sourced from the gas reserves of Cyprus and Egypt, alongside renewable energy sources, thus advancing the completion of the European Internal Market.

Additionally, the EuroAfrica Interconnector strengthens energy security for Cyprus, Crete, and the entire EU system. Through the seamless integration of Cyprus and Crete's isolated energy systems with Egyptian and European networks, it facilitates an uninterrupted, multidirectional flow of energy, fortifying energy supply chains.

In alignment with the EU's overarching goal, the EuroAfrica Interconnector contributes significantly to achieving the target of 10% electricity interconnection between member states. Moreover, its socio-economic impact extends to the local level, generating employment opportunities and supporting communities, thereby enriching the social fabric of the regions involved. The EuroAfrica Interconnector, thus, stands not only as an energy infrastructure project but as a transformative force, shaping the energy landscape and fostering collaboration, growth, and sustainability [172].

Figure 95: The EuroAfrica Interconnector route form Egypt to Cyprus and Greece



[171] *Smart Energy International, "Greece and Saudi Arabia form power interconnection joint venture", 29.09.2023, https://www.smart-energy.com/industry-sectors/energy-grid-management/greece-and-saudi-arabia-form-power-interconnection-joint-venture/*

[172] *EuroAfrica Interconnector official website https://www.euroafrica-interconnector.com/at-glance/the-big-picture/*

The GREGY project

Elica S.A, a member of the Copelouzos Group, a major Greek energy group, is spearheading this project for the electrical interconnection between Egypt and Attica, Greece (Fig. 96). This initiative, endorsed by both Greece and Egypt, as well as the European Commission, stands as a significant step towards enhancing energy connectivity. The project, known as "GREGY project", is a contender for inclusion in the 6th PCI/PMI project list. It proposes a direct link between Egypt and mainland Greece, eliminating the need for intermediate supply points.

At the heart of GREGY is a state-of-the-art submarine electricity cable with bi-directional power transmission capabilities, boasting a substantial budget of €4.2 billion. This high-tech cable will harness electricity from Egypt's renewable energy sources, benefiting residential consumers and businesses not only in Greece but also in neighbouring European countries[173].

GREGY aims to transmit 3,000 MW of electricity, over a distance of 954 km, facilitating the replacement of 4.5 Bcm of natural gas annually. This transition will result in a significant reduction of CO_2 emissions, slashing 10 mmt/year.

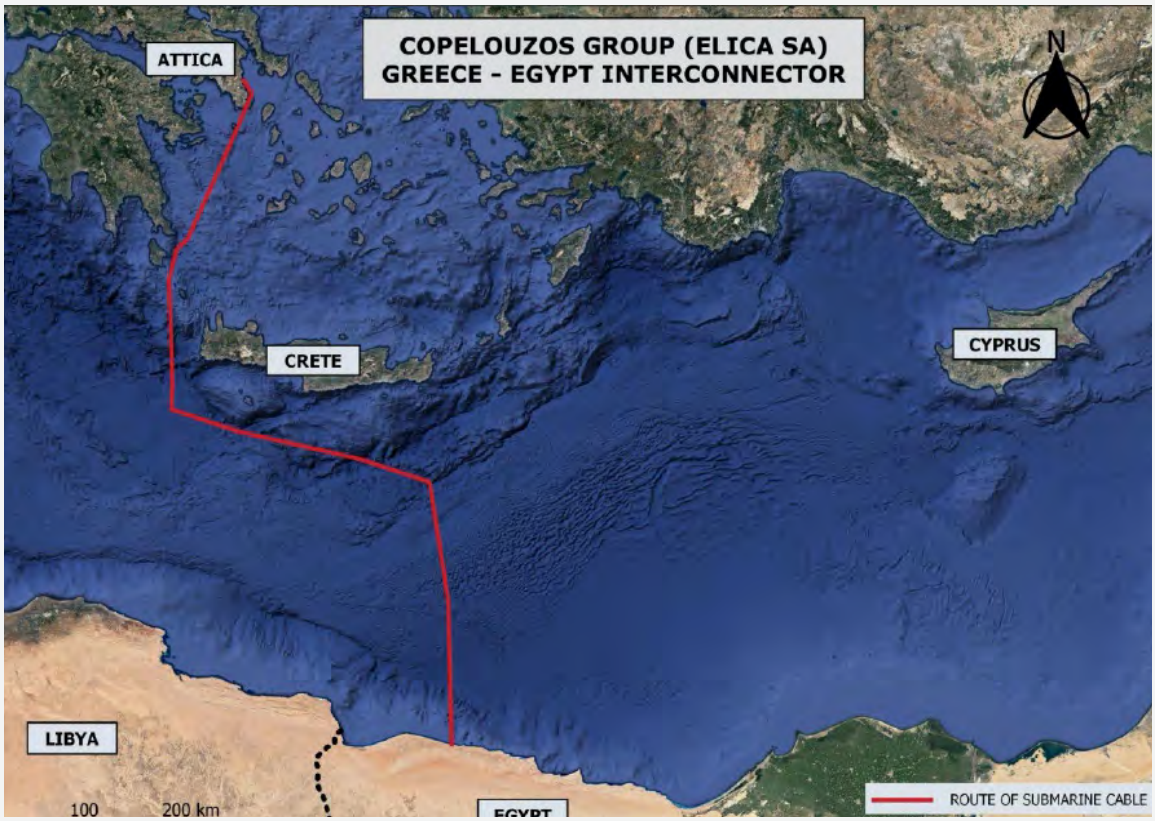
Copelouzos Group plans to establish renewable electricity plants generating 9.5 GW in Egypt, making a substantial impact on the region's energy landscape[174].

Embracing the EU's vision of green energy corridors from south to north, GREGY serves as a pivotal component of the EU's Global Gateway infrastructure development initiative. Valued at over €3.5 billion, this project not only fosters energy diversification but also aligns with the European Union's commitment to sustainable, environmentally friendly energy solutions.

The project's progress was a key topic during a trilateral summit held in Cairo in January 2025, involving the leaders of Greece, Egypt, and Cyprus. This meeting allowed Greek officials to assess developments on two significant issues agreed upon during an earlier discussion between Greece's Energy Minister and Egypt's Minister of Electricity and Renewable Energy.

At that time, the two ministers concurred that Egypt's transmission operator, EETC, would become a stakeholder in the GREGY project. They also agreed that the energy transmitted through the interconnector would comprise a mix of 75% wind and 25% solar power.

Figure 96: The GREGY project's route from Egypt to Greece



[173] *EKathimerini.com, "Copelouzos, InfinityPower sign GREGY MoU", 18.05.2023, https://www.ekathimerini.com/economy/1211175/copelouzos-infinitypower-sign-gregy-mou/*

[174] *Balkan Green Energy News, "EU adds Greece-Egypt power interconnection project to PCI/PMI list proposal", 26.10.2023, https://balkangreenenergynews.com/eu-adds-greece-egypt-power-interconnection-project-to-pci-pmi-list-proposal/*

The Greece-Saudi Arabia interconnector

One of the significant breakthroughs in the realm of regional energy cooperation is the recent agreement between Greece and Saudi Arabia to establish a vital interconnector. This monumental step has been marked by the mutual consent of the two governments. On September 27, the Kingdom of Saudi Arabia and Greece inked a historic deal, culminating in the creation of a jointly-owned company. This venture is set to bridge the power grids of the two nations, paving the way for an interconnected energy network.

The primary objective behind this pioneering initiative is to facilitate the supply of clean energy from the Middle East to Europe. By forging this collaboration, both countries are poised to play a pivotal role in bolstering the global clean energy transition. The establishment of this interconnector not only signifies a remarkable leap in diplomatic relations but also underscores the shared commitment of Greece and Saudi Arabia towards sustainable energy solutions.

The proposal for a Greece-Saudi Arabia interconnector, follows an agreement between Saudi Arabia and Egypt for the construction of an electricity interconnector between the two countries (Fig. 97).

The Saudi-Egypt initiative marks the inaugural large-scale HVDC interconnection within the Middle East and North Africa region and it is estimated at $1.8 billion. The endeavour involves the establishment of two high-voltage substations in Saudi Arabia's Medina and Tabuk regions, as well as the «Badr» station located on the outskirts of Cairo, the capital of Egypt. To ensure seamless connectivity, a network of 1,350 km-long overhead power transmission lines and 22 km of undersea cables spanning the Gulf of Aqaba will link the three substations.

The contract for this undertaking was granted to a consortium comprising Hitachi ABB Power Grids from Japan and Saudi Services for Electro Mechanic Works (SSEM) in 2021. The contractual scope encompasses the implementation of three transformer stations in both Saudi Arabia and Egypt.

The project is set to unfold in two distinct phases. The initial phase, with a capacity of 1,500 MW, was scheduled to commence in June 2025 and subsequently, the second phase would kick off in November 2025, also boasting a capacity of 1,500 MW[175].

Figure 97: The Saudi-Egypt interconnector

[175] *Transformers magazine, "Egypt–Saudi Arabia electrical interconnection project", 08.06.2023, https://transformers-magazine.com/tm-news/egypt-saudi-arabia-electrical-interconnection-project/*

The EuroGulf Interconnector

The EuroGulf Interconnector (Fig. 98) is yet another regional electricity project which aspires to connect the Gulf Countries through Egypt and Cyprus with the European network of electricity grids which they are interconnected via bi-directional subsea DC cable and with HVDC onshore converter stations at each connection point, with a total capacity of 2,000 MW, to provide stable and sufficient electricity.

This electricity highway can supply the European markets with electricity produced by gas reserves, as well as from the available renewable energy sources and creates a reliable alternative route for the transfer of electricity between the Arabian Gulf countries and to/ from Europe[176].

The EuroGulf Interconnector is set to commence its journey from the vicinity of NEOM in Saudi Arabia. It will traverse the sub-sea path through the Red Sea and the Mediterranean, ultimately reaching Cyprus to establish a connection at the Kofinou station. Proceeding westward, it will follow a sub-sea route through mainland Greece, extending into Continental Europe.

Spanning a total length of 747 km, the EuroGulf Interconnector will dip to its lowest sub-sea point, positioned at a depth of 3,000 m below sea level.

Figure 98: The EuroGulf interconnector's route and its connections through Egypt, Cyprus and Greece to the European Network

[176] *Eurogulf Interconnector official website, https://www.eurogulf-interconnector.com/at-glance/the-big-picture/*

Renewable Energy in the East Mediterranean

8

8. Renewable Energy in the East Mediterranean

Renewable energy sources in the East Mediterranean region encompass a diverse array of options that hold substantial promise for sustainable power generation. Chief among these is solar energy, capitalising on the region's ample sunlight and favourable climatic conditions. The East Mediterranean region experiences high levels of solar irradiance, making it particularly conducive to the deployment of solar photovoltaic (PV) and concentrated solar power (CSP) technologies. These solar technologies have the potential to provide a significant portion of the region's electricity needs while reducing reliance on fossil fuels and mitigating greenhouse gas emissions (Fig. 99)[177].

Furthermore, wind power represents another significant renewable energy resource in the East Mediterranean. Coastal areas, in particular, benefit from consistent wind patterns, offering favourable conditions for the development of onshore and offshore wind farms. Harnessing the power of the wind not only diversifies the region's energy mix but also contributes to energy security and local economic development.

In addition to solar and wind energy, biomass, geothermal, and hydroelectric resources contribute to the renewable energy landscape in the East Mediterranean. Biomass energy can be derived from agricultural residues, organic waste, and dedicated energy crops, providing a renewable alternative to conventional fuels. Geothermal energy, stemming from the Earth's heat, offers a reliable and constant source of power, particularly in areas with geothermal activity. Moreover, hydroelectric power generated from rivers and water reservoirs contributes to the renewable energy portfolio of certain East Mediterranean countries and can provide for much need peak load needs.

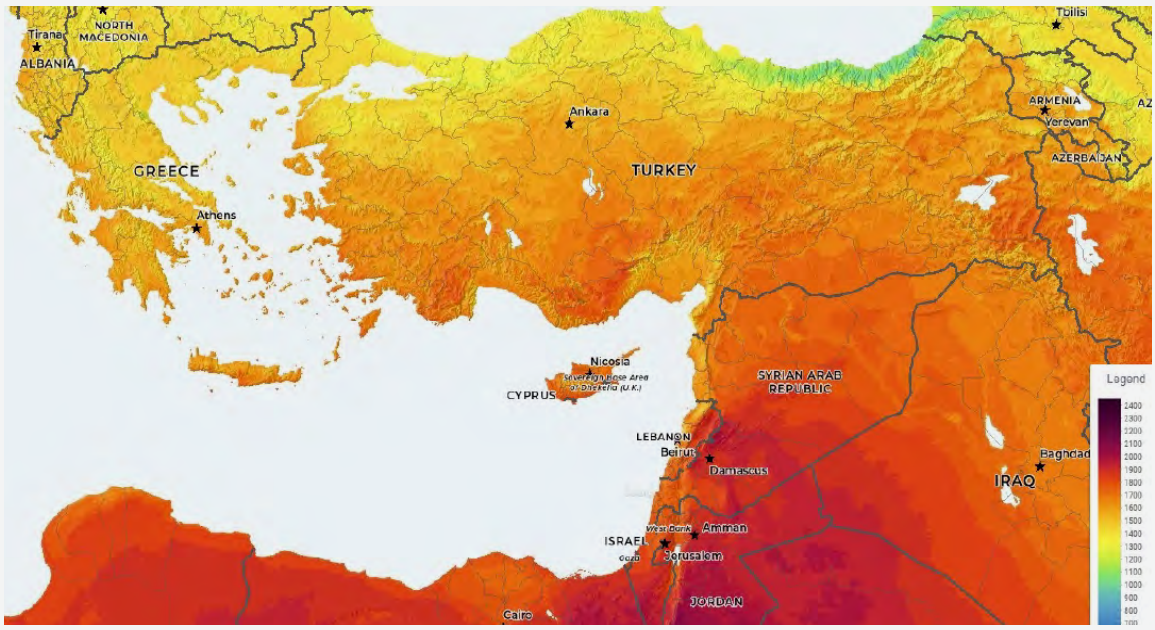
The development and expansion of renewable energy sources in the East Mediterranean region is crucial for advancing energy sustainability, reducing greenhouse gas emissions, and enhancing energy security. By capitalizing on the region's abundant renewable resources, countries in the East Mediterranean can foster economic growth, mitigate environmental impact, and contribute to global efforts to combat climate change.

8.1. Country overview

Greece

Although a small part of the country's electricity needs is already covered by several wind farms, the country has a potential for the further utilisation of wind energy. The Aegean Sea in Greece boasts one of the most promising wind potentials in the region, presenting an ideal environment for harnessing offshore wind energy. The consistent and robust winds that sweep across this vast expanse offer an unparalleled opportunity for the generation of renewable energy. With its expansive coastline and strategic location, the Aegean Sea stands as a prime location for the establishment of wind farms, capable of contributing significantly to the sustainable energy goals of the region (Fig.100). According to the Hellenic Wind Energy Association (HWEA), at the end of 2024 in Greece the total installed capacity to the grid was 5,355 MW, distributed across the country (Fig. 101)[178].

Figure 99: Photovoltaic Power Output map, covering the East Mediterranean region



[177] *Glovar Solar Atlas, https://globalsolaratlas.info/map?c=36.182225,27.026367,6*
[178] *HWEA official website, January 2024, https://eletaen.gr/wp-content/uploads/2024/01/2024-01-18-2023-HWEA_Statistics-Greece.pdf*

Penetration of renewable energy sources in Greece is described in the National Energy and Climate Plan (NECP) which was submitted to the European Commission in October 2023. This is a draft version of the plan, which will be finalised and presented in July 2024[180].

The NECP anticipates the widespread adoption of RES across all sectors to serve as the primary driver of the green transition. This involves utilising RES directly for energy production and indirectly for generating green hydrogen and climate-neutral fuels.

Setting an ambitious target, RES is projected to constitute 44% of total gross energy consumption by 2030, a substantial increase from the previous target of 35% (NECP 2019). Emphasising energy transformation, the focus lies on the electricity generation sector. The aim is for RES to account for 80% of gross electricity consumption by 2030, escalating to nearly 95% by 2035. In 2030, RES is targeted to contribute 82% of domestic electricity generation, marking a significant rise from the previous goal of 67%.

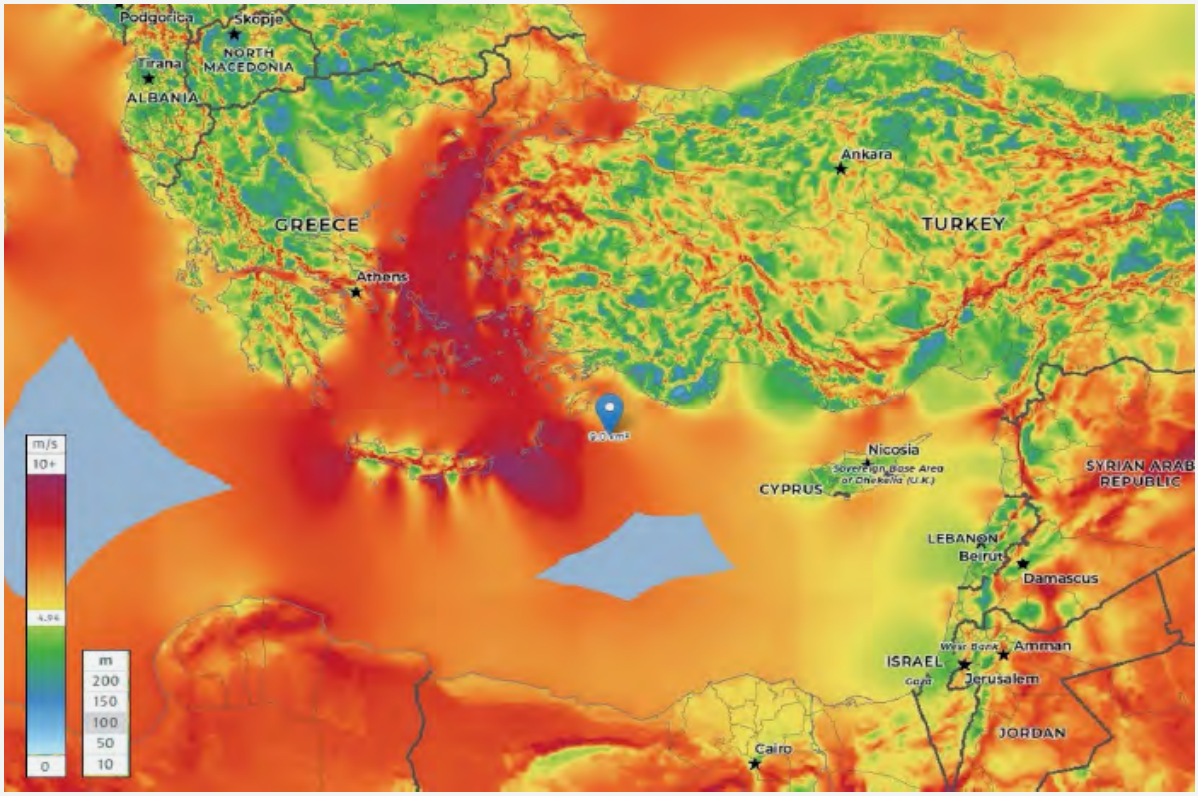
This trajectory towards RES dominance is propelled by the rapid rise in the installation of RES plants from 2019 to 2023, coupled with recent investments in RES. Furthermore, the imperative to meet escalating electricity demand, attributed to factors such as the promotion of electromobility, island interconnection, and the electrification of thermal uses, drives the heightened targets.

In the transport sector, the binding RES participation target for 2030 stands at 29%, a notable increase from the previous 19%. Achieving this involves leveraging e-mobility, biofuels, and non-recyclable fuels of non-biological origin, with a specific target of 1% for the latter category. Advanced biofuels, particularly derived from ligno-cellulosic biomass, are envisioned as pivotal contributors in the long term.

For heating and cooling, the binding RES development target for 2030 is set at 46%, surpassing the previous goal of 43%. This objective will largely rely on the widespread adoption of heat pumps and solar thermal systems, with no provision for expanding biomass combustion in urban areas to mitigate air pollution.

Prioritising the development of the bio-economy, the NECP aims to «green» distributed gas by integrating renewable gases, such as biomethane, with natural gas, thereby reducing the carbon footprint of gaseous fuels. Ultimately, the long-term strategy involves transitioning to climate-neutral gases and maximising the utilisation of livestock, arable, and forest residues, along with waste, for biogas production. The objective is to inject around 250 Mcm of biogas into the gas grid, with a target of 1 Bcm by 2040.

Figure 100: Average wind speeds (m/sec) at 100 m altitude[179]



[179] *Global wind atlas, https://globalwindatlas.info/en*
[180] *Greece draft updated National Energy and Climate Plan (NECP) 2021-2030, 06.11.2023, https://commission.europa.eu/document/download/83ffdc95-2d22-4c67-8d4c-a3e59f752921_en?filename=GREECE%20-%20DRAFT%20UPDATED%20NECP%202021-2030%20EN.pdf*

Figure 101: Spatial distribution of wind capacity in Greece (MW), by the end of 2024[178]

Table 12: Summary of RES target indicators, as calculated by EUROSTAT

NECP (Apr 2023)	2021 (estimate)	NECP 2019 for 2030	2025	2030	2035	2040	2045	2050
RES-Electroproduction Indicator								
Total RES switchgear (TWh)	22.6	40.7	35.3	52.7	76.1	110.8	147.7	172.3
Total generation (TWh)	53.9	60.5	58.7	64.6	78.7	112.1	149.4	175.2
RES-heating/cooling Indicator								
Index RES-Heating/Cooling	436.7	470.0	668.4	931.3	1,014.6	1,047.1	1,035.0	1,058.0
RFNBO (ktoe)	0	0	0	79.8	200.1	605.6	1,204.8	1,190.1
Solar thermal (ktoe)	308.2	500	574.8	599.6	630.7	632.8	602.3	582.3
Biomass (ktoe)	1,702.8	900	893.6	748.8	563.2	600.3	547.7	521
Total RES in Heating/Cooling (ktoe)	2,447.7	1870	2,136.8	2,359.6	2,408.6	2,885.8	3,389.8	3,351.3
RES-Transportation Indicator								
Electricity from RES (ktoe)	5.7	86.0	19.4	158.2	378.6	597.5	832.7	973.2
RFNBO (ktoe)	0	0	0.2	23.8	694.9	1,360.7	1,801.5	2,737.9
Biofuels (ktoe)	179.1	380	443.6	524.9	780.7	1,063.6	1,469.9	1,701.2
Total RES in transportation (ktoe)	184.9	466	463.2	706.9	1,854.2	3,021.8	4,104.1	5,412.4

Greece has unveiled an ambitious offshore wind development plan to harness its vast, untapped wind energy potential, enhancing the nation's energy security and positioning it as a leading power exporter in the region. The eligible areas for the medium-term development phase are located in the following areas:

- Eastern Crete, where it is estimated that projects with a total capacity of 800 MW will be developed
- Southern Rhodes, with a maximum installed capacity of between 300 MW and 550 MW
- In the central Aegean, with a maximum installed capacity of between 200 MW and 450 MW
- In the Evia-Chios axis, with a maximum installed capacity of 300 MW
- In the Ionian Sea, with a maximum installed capacity of 450 MW

Over recent years, Greece has significantly increased its renewable energy production, which now accounts for over 50% of the country's electricity generation. This has enabled Greece to export electricity to neighbouring countries in Southeast Europe and as a growing energy hub.To sum up, on renewable energy, Greece's plan projects renewable electricity generation to reach 82% in 2030 in gross electricity consumption, with solar power becoming the main source of renewable electricity, and the share of wind power and installed capacity projected to double in 2030 compared to 2023.

Regarding the installed capacity for different types of RES, according to the NECP:

- The installed capacity of onshore wind and photovoltaic parks is projected to increase by 12 GW by 2030 (from 11.5 GW end of 2023 to 23.5 GW in 2030).
- The installed capacity of offshore wind farms is expected to reach 1.9 GW by 2030.
- The total installed capacity of hydropower projects (hydropower projects) is expected to reach 3.800 MW by 2030, from 3.100 MW installed so far.

As latest figures reveal, licensing, construction, and implementation of RES projects are advancing at a fast pace, surpassing current energy demand in Greece. Consequently, surplus production cannot be effectively stored and is often exported at prices approaching or below zero. This market imbalance has not deterred investors, although their profit margins are shrinking, primarily due to electricity offloading[181].

Cyprus

The Transmission System Operator of Cyprus (TSOC) emphasised the necessity of curtailing renewable energy production on the island to ensure the stability of its electricity grid.

This measure becomes imperative due to the significant adoption of solar energy, the limited capacity for energy storage installations, and the absence of electrical interconnections with neighbouring nations.

TSOC forecasts that annual curtailments of green electricity generation could soar to 28% in 2024. Specifically, curtailment rates for March, April, and May might escalate to 59%, 79%, and 51%, respectively. Conversely, during the peak tourist season from July to September, when air-conditioning demand spikes, curtailments are anticipated to range from 0% to 5%.These forecasts pertain exclusively to renewable energy facilities monitored by Cyprus' transmission and distribution networks through SCADA systems, encompassing wind farms and approximately 47% of the island's photovoltaic (PV) capacity. However, TSOC suggests that factoring in all solar power generation, including unmonitored sources, could potentially reduce curtailments in 2024 to around 13%[182].

According to Cyprus' draft NECP, submitted to the European Commission in July 2023, the following targets are to be achieved[183]:

- The share of RES in total gross energy consumption in 2030 increases to 26.5% in the AFM scenario (Scenario with Additional Measures), while in the SMM scenario (Scenario with Existing Measures) the share of RES reaches 24.3%. This will be the national contribution to the European target of 42.5% in 2030.
- The RES share in the electricity sector in 2030 increases to 31.5% in the AFM, while in the SMM the RES share reaches 28.2%.
- The RES-CHP share in 2030 rises to 48.2 % in the AFM and reaches 45.2% in the SMM. The mandatory target set in the revision of Directive (EU) 2018/2001 for this RES share, which is an annual increase of at least 0.8 % in the period from 2021 to 2025 and 1.1% in the period from 2026 to 2030 in the proportion of RES-CHP, is achieved in the AFM and is not met in the SMM for the second five-year period.
- In transportation, the share of RES-M in 2030 reached 14.6% in the AFM, while in the MB it reached 11.9%.
- The RES energy use rate in the buildings sector is estimated to reach around 48% in 2030 in the LPIS. That percentage shall constitute the indicative national share of renewable energy use in buildings to achieve the overall EU level target of at least 49% renewable energy use in buildings by 2030.
- In industry it is estimated that in the five years from 2021 to 2025, the RES share will increase annually by an average of 1.71% and in the five years from 2026 to 2030 the RES rate will increase by 5.34%. It is therefore expected that the indicative target set in the revision of the RES Directive will be achieved.

[181] *IENE Conference, "Effectiveness of «Green» Targets in Renewable Energy and Energy Efficiency in Greece", April 2024.*
[182] *PV Magazine, "Cyprus set to curtail 28% of renewable electricity in 2024", 05.02.2024, https://www.pv-magazine.com/2024/02/05/cyprus-set-to-curtail-28-of-renewable-electricity-in-2024/*
[183] *Cyprus draft updated National Energy and Climate Plan (NECP) 2021-2030, 27.07.2023, https://commission.europa.eu/document/download/c33b83eb-9ed5-4162-a23c-24900408f152_en?filename=Cyprus%20Draft%20Updated%20NECP%202021%202030%20%282%29.pdf*

Türkiye

In recent years, wind and solar energy have become the main drivers of electricity generation from domestic sources in Türkiye. In 2024, for the second consecutive year, their combined annual output exceeded that of domestic coal, marking a permanent shift away from coal as the leading source of domestically generated electricity. Electricity generation from wind and solar reached 62 TWh, surpassing domestic coal (47 TWh). For the first time, it also exceeded the historical peak of domestic coal generation, which was 53 TWh in 2019.

Solar power in 2024, increased by a record 39% year-on-year. This pushed solar's share of electricity to 7.5%, up from 5.7% in 2023. The additional 7.3 TWh in 2024 alone almost matched Türkiye's total level of solar power in 2018 (7.8 TWh).

However, wind power growth has decelerated since 2022. Between 2022 and 2024, wind generation increased by just 5%, reflecting a modest 13% rise in installed capacity. As new wind power plant installations slowed and electricity demand continued to rise, wind's share in total electricity generation saw only a slight uptick in 2024—reaching 10.7%, up from 10.6% in 2023. As a result, the total share of wind and solar in electricity generation in 2024, surpassed 18%[184].

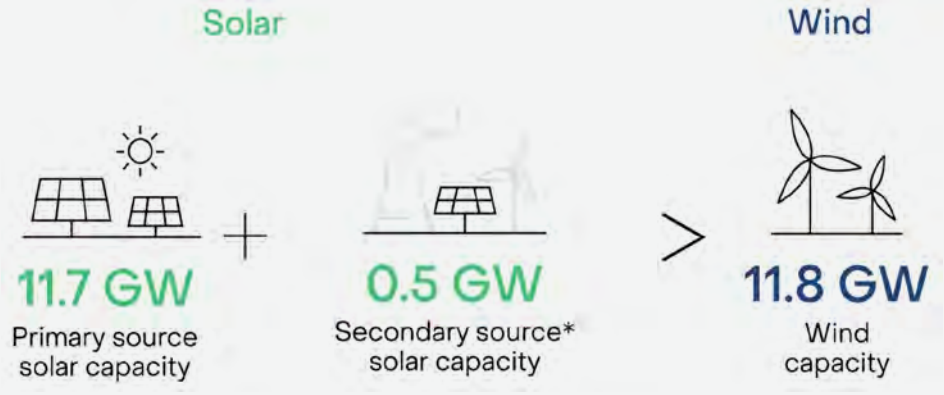
Türkiye's solar energy capacity stood at 19.8 GW, nearly doubling from 10.9 GW in 2022, while wind energy capacity reached 11.8 GW by the end of 2024. Notably, these statistics do not encompass secondary solar capacity integrated into hybrid power facilities. According to data from the Energy Market Regulatory Authority (EMRA), Türkiye has incorporated an additional 510 MW of secondary solar capacity as of 2024. Consequently, the cumulative solar capacity has now exceeded that of wind, totalling 12.2 GW (Fig. 102)[185].

In the realm of geothermal energy, Türkiye emerges as a rising star, owing to its abundant underground resources and a consistent tariff framework. In comparison to other countries in the region, Türkiye stands out for the substantial investments made in this sector, hosting some of the globe's largest geothermal power facilities. With power plants located in six provinces in the Aegean Sea region, the geothermal installed power in Türkiye reached 1,734 MW in 2024, and accounted for 3.2% of electricity output, providing 11.2 TWh[186]. Türkiye, in 2024, ranked 4th in the top 10 countries with the highest installed geothermal power generation capacity, behind USA (3,937 MW), Indonesia (2,653 MW) and the Philippines (1,984 MW)[187].

As Türkiye endeavours to harness its renewable energy potential to meet its rising energy demands and support its economic expansion while striving for net-zero emissions, it is embarking on the implementation of offshore wind energy auctions within Renewable Energy Resources Areas (YEKA). This initiative aims to bolster the nation's installed capacity in offshore wind energy. The Ministry of Energy and Natural Resources has unveiled the National Energy Plan, outlining ambitious targets until 2035, with a primary focus on achieving net-zero emissions by 2053. The recently announced targets aim for a quadrupling of wind and solar energy capacity, from 32 GW in 2024 to 120 GW in 2035.

As part of this plan, Türkiye has set a target of reaching a total installed wind power capacity of 29.6 GW by 2035, comprising 5 GW of offshore and 24.6 GW of onshore wind installed capacity[188]. Regarding other renewable sources, Türkiye's installed electric power will increase to 52,900 MW in solar energy, 35,100 MW in hydroelectric, and 5,100 MW in geothermal and biomass.

Figure 102: Türkiye's solar capacity surpassed wind with hybrid installations in 2023[185]



[184] *EMBER, "Hybrid plants push solar capacity past wind in Türkiye", 22.02.2024, https://ember-climate.org/insights/in-brief/hybrid-plants-push-solar-capacity-past-wind-in-turkiye/*
[185] *Ember, "Hybrid plants push solar capacity past wind in Türkiye", 22.02.2024, https://ember-climate.org/insights/in-brief/hybrid-plants-push-solar-capacity-past-wind-in-turkiye/*
[186] *Balkan Green Energy News, "Turkey reaches 55% rate of domestic geothermal power equipment", 19.02.2025, https://balkangreenenergynews.com/turkey-reaches-55-rate-of-domestic-geothermal-power-equipment/*
[187] *Think Geoenergy, "Geothermal power capacity in Türkiye reaches 1691.4 MW", 20.06.2023, https://www.thinkgeoenergy.com/geothermal-power-capacity-in-turkiye-reaches-1691-4-mw/*
[188] *SHURA Energy Transition Center, "Offshore Wind Energy Tenders: Global Trends & Recommendations for Türkiye", February 2023, https://shura.org.tr/wp-content/uploads/2024/02/SHURA-2024-12-Rapor-Offshore_ENG.pdf*

Israel

During the 1950s, Israel emerged as one of the pioneering nations in utilising solar energy for water heating through the use of solar panels (flat plate collectors), predominantly for residential needs. Presently, the installation of thermo-solar collectors remains mandatory for all residential properties across the country.

Since 2009, the government has spearheaded various initiatives aimed at advancing renewable energy, particularly solar, wind, and biomass, through the issuance of tenders and the implementation of appealing feed-in tariffs. Israel is now actively promoting a transition to renewable energy sources, including solar energy, wind power, biomass, and other non-fossil energy options. This shift is driven by the recognition that renewables offer sustainable, environmentally friendly power generation over the long term. Key targets for renewable energy sources in the Israeli market include solar, wind, and waste/refuse-based generation[189].

In 2021-2022, the Ministry of Environment unveiled a roadmap for renewable energy, with a target of integrating 40% renewables into the nation's energy mix by 2030. Achieving this goal would require the installation of approximately 18 GW to 23 GW of solar projects, coupled with 5.5 GW/33 GWh of storage capacity. The solar PV potential is estimated at 26 GW, with 24 GW allocated for building rooftops, facades, parking lots, industrial zones, and water surfaces, and 2 GW designated for agricultural land. Additionally, the roadmap proposes the establishment of a regulatory framework to oversee distributed renewable energy and storage systems, as well as virtual power plants (VPPs) to manage 100 MW of renewable energy and 50 MW of storage[190].

Renewable energy capacity in Israel has grown significantly, from 4.8 GW (21%) in 2022 to 5.9 GW (24%) in 2023, with 35% of annual growth between 2018-2023. In 2023, 1.1 GW of new capacity was added, mostly dual-use facilities. By 2025, renewable capacity is expected to reach 7.8 GW (30% of total). Solar dominates at 96% of renewable capacity, with 57% dual-use PV, 32% ground PV, and 4% Thermosolar. Electricity generation from renewables increased from 7.5 TWh (10%) in 2022 to 9.1 TWh (12%) in 2023[191].

Egypt

Over the past few years, Egypt has witnessed significant developments, events, and political shifts, all of which have influenced the trajectory of renewable energy projects in the country. These factors have prompted a re-evaluation and modification of the renewable energy strategy to ensure alignment with evolving circumstances.

As Egypt's strategies demonstrate a notable level of adaptability to accommodate changing dynamics, the target for renewable energy was revised upwards, aiming to contribute 20% to the total energy production by the year 2022 (Fig. 103). This strategic adjustment underscored the nation's commitment to leveraging renewable resources as a substantial component of its energy portfolio, while also reflecting its responsiveness to prevailing conditions and imperatives.

The Energy Sector in Egypt, encompassing electricity, renewable energy, and hydrocarbons, collaborated with the European Union under the Technical Support Program for the Restructuring of the Energy Sector in Egypt (TARES) to develop a comprehensive strategy on the optimal blend of technical and economic energy production up to the year 2035. This collaborative effort aimed to bolster Egypt's sustainable and integrated energy strategy over the long term. Central to the project was the examination of various scenarios for the energy mix, incorporating different assumptions regarding the integration of renewable energies into the electricity generation landscape. The objective was to assess the technical and economic implications of these scenarios, ultimately identifying the most favourable option.

In October 2016, the Egyptian Supreme Council of Energy endorsed the Egyptian Energy Strategy until 2035, with Scenario 4-B selected as the reference framework for energy planning going forward. This scenario sets a target for renewable energy to contribute 37.2% to the overall energy mix by 2035, outlining a roadmap for Egypt's energy transition (Fig. 104)[192].

In 2023, Egypt's installed renewable capacity was 6,709 MW, increased by 6.12% since 2022. In fact, installed capacity in the country, has been continuously increasing from 3,457 MW in 2014[193].

Figure 103: Electricity production in Egypt in 2022[192]

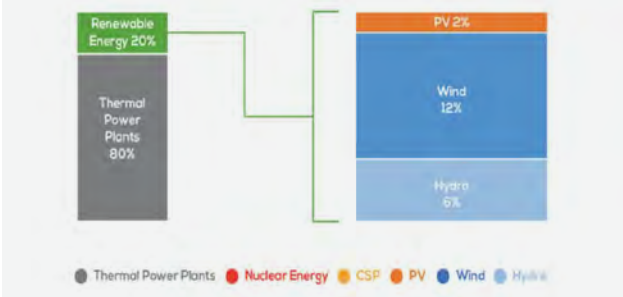
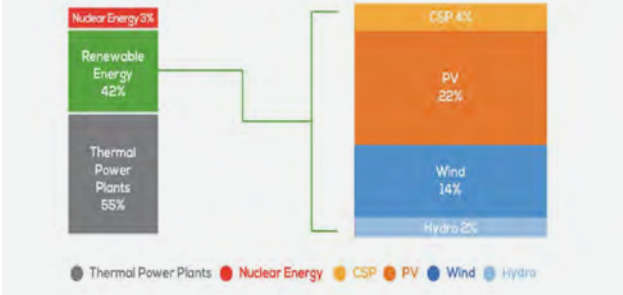


Figure 104: Egypt's electricity production target for 2035[192]



[192] *Ministry of Electricity and Renewable Authority, New and Renewable Energy Authority, Renewable Energy Targets, http://nrea.gov.eg/test/en/About/Strategy*
[193] *IRENA, Renewable Capacity Statistics 2024, https://mc-cd8320d4-36a1-40ac-83cc-3389-cdn-endpoint.azureedge.net/-/media/Files/IRENA/Agency/Publication/2024/Mar/IRENA_RE_Capacity_Statistics_2024.pdf?rev=a587503ac9a2435c8d13e40081d2ec34*

8.2. Sustainability and Environmental Benefits

The East Mediterranean region stands at a critical juncture, grappling with the dual challenges of meeting its energy needs while safeguarding its environment. In this context, the adoption of renewable energy emerges as a transformative solution offering myriad benefits that extend far beyond mere energy generation. In addition, the East Mediterranean has significant potential of exporting the surplus of green electricity to energy-hungry Europe. In this sense, a series of major cross-border electricity interconnection projects undertaken by the region's Electricity Transmission Operators are of high importance (see Chapter 7).

One of the foremost advantages of transitioning to renewable energy sources such as solar, wind, and hydroelectric power lies in its ability to significantly reduce carbon emissions. Unlike fossil fuels, which release greenhouse gases upon combustion, renewable energy technologies produce electricity without contributing to atmospheric pollution. By curbing carbon emissions, countries in the East Mediterranean can play a pivotal role in mitigating climate change and its attendant impacts, safeguarding both local ecosystems and the global climate system.

Furthermore, the embrace of renewable energy promises tangible improvements in public health and environmental quality. The combustion of fossil fuels not only exacerbates air pollution but also poses grave risks to human health, particularly in densely populated urban centres. In contrast, renewable energy systems produce clean electricity, thereby mitigating the health risks associated with air pollution and respiratory illnesses. Moreover, hydropower projects, when managed sustainably, offer an environmentally benign source of electricity, promoting water conservation and bolstering efforts towards sustainable water management.

Economic considerations further underscore the attractiveness of renewable energy adoption in the East Mediterranean. By investing in renewable energy infrastructure, countries can catalyse job creation and stimulate economic growth across a spectrum of industries, from manufacturing and construction to installation and maintenance. Moreover, the development of a vibrant domestic renewable energy sector fosters innovation and technological advancement, driving down costs and enhancing the competitiveness of renewable energy vis-à-vis conventional energy sources.

In addition to its economic and environmental dividends, renewable energy holds the key to bolstering energy security and enhancing resilience in the face of climate change. By harnessing indigenous renewable resources, countries can reduce their reliance on imported fossil fuels, insulating themselves against volatile global energy markets and geopolitical uncertainties. Moreover, decentralized renewable energy systems offer inherent advantages in terms of resilience, providing communities with reliable power sources and substantial economic benefits.

Crucially, the transition to renewable energy not only fosters local sustainability and resilience in the face of pressing environmental challenges but also confers global leadership and collaboration opportunities. Through ambitious renewable energy targets, supportive policies, and cross-border partnerships, countries in the East Mediterranean can position themselves as vanguards of the global clean energy transition, contributing to collective efforts to address climate change and promote sustainable development worldwide. Moreover, collaboration on renewable energy projects serves as a catalyst for diplomatic engagement, fostering regional cooperation and stability in an increasingly interconnected world.

In conclusion, the adoption of renewable energy represents a paradigm shift with far-reaching implications for the East Mediterranean region. Beyond its immediate benefits in terms of carbon emissions reduction, public health improvement, and economic development, renewable energy holds the potential to reshape the region's energy landscape. As countries in the East Mediterranean chart their course towards a sustainable future, the imperative to embrace renewable energy looms large as a beacon of hope and progress in an uncertain world.

Undoubtedly, renewable energy in all its forms, emerges as a viable energy option in the East Mediterranean region. An option which, when fully developed, will not only impact the region's energy balance, but which can contribute to the generation of sizeable amount of green electricity to be transmitted to the European continent.

8.3. Can RES from the East Med region be exported to the EU?

The East Mediterranean region possesses substantial potential for renewable energy development, particularly in solar and wind power, due to its favourable climatic conditions and geographic features. Solar energy stands out as a primary renewable resource, with high levels of solar irradiance across much of the region making it highly suitable for both photovoltaic (PV) and concentrated solar power (CSP) technologies. These systems could play a major role in meeting the region's electricity needs while reducing dependence on fossil fuels and lowering greenhouse gas emissions. Wind energy also holds promise, especially in coastal and island areas where wind patterns are consistent, enabling the development of both onshore and offshore wind farms. Other renewable sources such as biomass, geothermal, and hydroelectric power also contribute to the region's renewable mix, offering further diversification and sustainability.

Greece exemplifies the growing momentum in the region. It has already achieved significant integration of renewable energy into its electricity mix, with more than 50% of electricity generation now coming from renewables. The country aims for renewable energy to contribute 82% of its electricity production by 2030 and 95% by 2035. Offshore wind development is a key area of focus, with specific zones identified for medium-term expansion. The National Energy and Climate Plan (NECP) outlines ambitious targets, including the installation of 23.5 GW of onshore wind and PV capacity, 1.9 GW of offshore wind, and an expansion of hydropower capacity. As Greece's RES output increasingly exceeds domestic demand, electricity exports to Southeast Europe have become more common, although surplus generation has occasionally led to electricity being exported at very low or even negative prices due to storage limitations.

Cyprus faces a different challenge. Despite substantial solar potential, the lack of interconnection with other grids and limited storage capacity has forced the country to curtail renewable electricity production to maintain grid stability. Curtailments are projected to reach 28% annually in 2024, with certain months potentially seeing even higher rates. The country's NECP aims to increase the share of renewables in total gross energy consumption to 26.5% by 2030 under its more ambitious scenario, although progress depends heavily on addressing structural and infrastructural constraints.

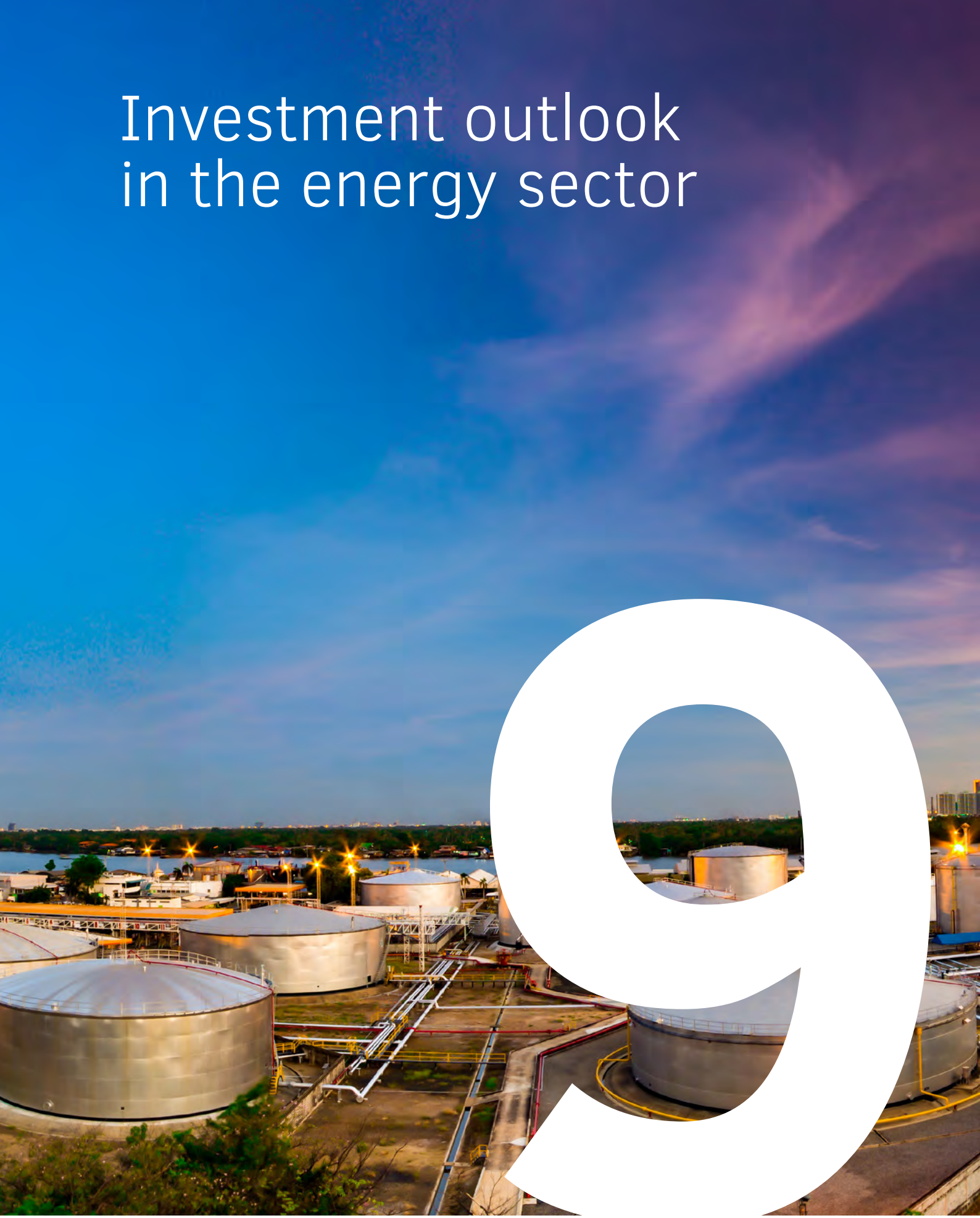
Türkiye has made considerable advances in renewable energy deployment and now ranks sixth in Europe in terms of installed capacity. The country is leveraging its solar and wind resources while also being a global leader in geothermal power. Plans are underway to further expand offshore wind capacity and increase solar and hydro capacity as part of its 2035 energy strategy. Türkiye's installed wind and solar capacities are both above 11 GW and are expected to grow significantly, while geothermal energy capacity has reached over 1.6 GW, placing it among the top countries worldwide.

Israel has embraced solar power as the dominant renewable source, driven largely by policy measures and the need to diversify energy sources. The government aims to reach 40% renewable electricity by 2030, focusing almost entirely on solar PV and associated storage solutions. Distributed solar systems and virtual power plants are seen as key mechanisms for managing increasing renewable penetration.

Egypt has also revised its energy strategy to increase the share of renewables, targeting 37.2% by 2035. The country has seen a steady increase in installed capacity, reaching over 6.7 GW by 2023. Strategic collaboration with the EU has helped develop a long-term energy mix that aligns with both economic and environmental goals.

Despite differences in scale and approach, the East Mediterranean countries are collectively making meaningful progress toward renewable energy integration. Surplus green electricity production, particularly in Greece and potentially Türkiye and Egypt, positions the region to become a strategic supplier to the EU. Major cross-border interconnection projects will be critical to realizing this potential and enabling the export of renewable electricity to energy-hungry European markets.

Investment outlook in the energy sector



9

9. Investment outlook in the energy sector[194]

The coronavirus pandemic fundamentally reshaped the policy landscape for governments and societies worldwide. During the height of the crisis, there was an urgent and necessary pivot towards bolstering public expenditures on health care and social protection schemes. This shift in priorities led to the temporary sidelining of other critical policy areas, particularly those related to energy transition and efficiency.

As the world has emerged from the shadow of COVID-19, the focus is once again turning towards the energy sector. The pandemic's grip on global priorities is now loose, allowing for renewed and invigorated investment in energy infrastructure and innovation. Policymakers and investors alike are now placing a heightened emphasis on energy policy, recognising its central role in driving sustainable growth and addressing climate change.

With the pandemic receding into the past, there is a burgeoning optimism about the future of energy investment. The drive to transition to cleaner, more efficient energy systems is regaining momentum, supported by a growing consensus on the necessity of mitigating environmental impacts. As a result, energy policy is poised to reclaim its position at the forefront of governmental and financial agendas, promising advancements that align with long-term sustainability goals and economic resilience.

Greece

Over the last decade, Greece has undergone a profound transformation in its energy sector, marking the most significant shift since the country's post-World War II electrification. Extensive reforms have restructured the energy market, fostering increased competition. Meanwhile, major infrastructure projects are underway to enhance grid connectivity with Europe and link the mainland to the islands. Coupled with substantial investments in natural gas and other supply infrastructures, Greece's evolving energy sector is poised to become a crucial supplier for Southeastern Europe.

The strategy also prioritises substantial upgrades in energy efficiency within the building sector and promotes the use of renewable energy sources (RES) for heating and cooling. A very small percent of the Greek homes meet the EU's highest energy efficiency standards, with the highest household energy consumption dedicated to heating. Improving energy efficiency will not only reduce overall energy consumption but also stimulate growth in the construction and building materials sectors.

The Greek government has set ambitious targets to significantly expand its renewable energy capacity by 2030, aiming for renewables to make up more than 70% of electricity generation. This objective is driving investments in utility-scale solar parks, onshore and offshore wind farms, and battery energy storage systems. Greece's sunny climate and expansive coastlines provide ideal conditions for renewable energy development, further enhancing investor confidence. In tandem with the renewable push, there is growing interest in energy infrastructure modernization. Investments are targeting grid enhancements to support decentralized power generation and interconnections with neighbouring countries. Projects like the Crete-Attica power interconnection and upgrades to the national transmission network are pivotal in reducing energy losses and integrating renewable sources more effectively.

Greece has increasingly attracted attention in the oil and gas sector due to its strategic location in the Eastern Mediterranean and the potential for untapped hydrocarbon resources. In recent years, international energy companies have shown interest in offshore exploration, particularly in areas such as the Ionian Sea and south of Crete. Seismic surveys and initial exploratory drilling have suggested the possibility of significant reserves, prompting collaboration between the Greek government and major global energy firms. This interest is also aligned with Greece's ambitions to become a key energy transit hub in the region, connecting supply routes between Europe, the Middle East, and North Africa.

Foreign direct investment (FDI) in Greece's energy sector has been on the rise, led by European utility companies, international funds, and development banks. These entities are attracted by Greece's strategic location, improving regulatory framework, and commitment to energy transition. The country's economic recovery and political stability are also reinforcing investor sentiment in the sector. However, we observe long waiting times from the time FDI is taken to project realization. Despite progress, Greece faces several challenges. Bureaucratic delays, permitting obstacles, and concerns about land use and local community opposition can slow project implementation. Addressing these issues is crucial for unlocking the full potential of the energy sector. The government has introduced reforms to simplify licensing procedures, but further streamlining and transparency are needed to maintain investment momentum.

In addition to the above, hydrogen and energy storage are emerging as strategic areas of focus for future investments. Greece is exploring its potential as a green hydrogen hub in SE Europe, supported by EU initiatives and regional cooperation. Similarly, investments in energy storage technologies are vital to ensure grid reliability and enhance the flexibility of renewable energy integration.

Overall, the energy investment outlook in Greece is promising, marked by a clear policy direction, strong investor interest, and significant natural potential. Continued reforms, infrastructure upgrades, and regional collaboration will be essential in sustaining this

[194] *This chapter is based on the information and data presented in IENE's "SEEE Outlook 2021/2022", https://www.iene.eu/media/iene-SEEE-outlook-2021-22-3rd-edition.pdf*

momentum and positioning Greece as a leader in the clean energy transition in the Mediterranean region.

Cyprus

Due to its limited indigenous energy resources, Cyprus is highly dependent on energy imports, far exceeding the European Union average. The country's energy mix is predominantly composed of oil and petroleum products. However, RES use is increasing steadily.

This landscape is expected to shift significantly in the near future. As RES penetration continues to grow and natural gas from LNG imports becomes available in the local market, fuel oil used for power generation and industrial purposes will be largely replaced, and eventually, the household sector will also transition. Although oil products will continue to dominate the transport sector, the overall share of oil in the energy mix is anticipated to decrease substantially.

Achieving the climate and environmental targets in Cyprus necessitates a radical transformation of the energy system over the next decade, involving substantial investments in energy infrastructure and efficiency. The National Climate and Energy Plan (NECP) outlines specific national targets up to 2030, providing a mid-term framework for an ambitious long-term strategy aimed at reducing greenhouse gas (GHG) emissions by 2050. Decarbonisation is the cornerstone of the NECP, emphasising the need for substantial policy and infrastructural changes.

A binding decision mandates the decommissioning of the existing oil products storage terminal and the relocation of current storage facilities for local petroleum and LPG trading companies. The Cyprus Organisation for the Storage & Management of Oil Stocks (KODAP) will establish and operate a strategic oil stocks depot to ensure energy security.

Investment opportunities in Cyprus are extensive and diverse. They include the development of renewable energy sources, the transformation and modernisation of energy networks, the introduction of smart meters for electricity distribution, and enhancements to power transmission networks. Other promising areas include the importation and distribution of natural gas, the development of a gas grid across the island, and efforts to increase energy efficiency in power generation and consumption by households, businesses, and the public sector. Additional opportunities lie in the water sector, transport infrastructures, sustainable mobility, and technological research.

One of the most notable developments is the active participation of major international energy companies in Cyprus's offshore hydrocarbon exploration. These activities underscore the robust interest in Cyprus's Exclusive Economic Zone (EEZ) and its potential to contribute to Europe's energy diversification efforts.

Infrastructure projects are also central to Cyprus's energy strategy.

The EuroAfrica Interconnector, a high-voltage direct current (HVDC) submarine power cable, aims to link the electricity grids of Egypt, Cyprus, and Greece, enhancing energy security and enabling the export of surplus renewable energy. Similarly, the Great Sea Interconnector (formerly EuroAsia Interconnector) plans to connect Cyprus with Israel and Greece, further integrating the island into the regional energy network.

Despite these ambitious projects, Cyprus has faced setbacks, notably the stalled Vasilikos LNG terminal project. The project's suspension, due to contractual disputes and delays, has raised concerns about the country's ability to manage large-scale infrastructure developments and has impacted investor confidence.

Looking ahead, Cyprus's energy investment outlook remains cautiously optimistic. While challenges persist, particularly in infrastructure development and renewable energy integration, the government's proactive policies, coupled with international interest in the region's energy potential, position Cyprus to play a key role in Eastern Mediterranean's evolving energy landscape. Continued focus on regulatory reforms, infrastructure upgrades, and strategic partnerships will be crucial in realizing this potential.

Türkiye

Türkiye has the highest rate of energy demand increase among OECD countries. In recent years, Türkiye has been second only to China in the growth of electricity and natural gas demand, positioning it to become the largest natural gas and electricity market in the region. However, Türkiye is heavily reliant on energy imports, with an import dependency of nearly 75%.

One of the primary objectives of Türkiye's energy strategy is to diversify supply routes and sources to enhance energy security. Additionally, Türkiye aims to contribute to regional and global energy security and establish itself as a regional energy trading hub. The key elements of Türkiye's international energy strategy include:

- Diversifying routes and resources for oil and natural gas supply to address increasing demand and import dependency.
- Contributing to regional and global energy security.
- Becoming a regional energy trading centre.
- Considering social and environmental impacts in the context of sustainable development throughout the energy supply chain.
- Increasing the share of domestic and renewable energy in electricity production.
- Incorporating nuclear power into the energy mix.

The main operational objective of Türkiye's energy policy is to maximise national welfare by providing uninterrupted, sustainable, high-quality, reliable, and cost-effective energy from diverse sources in an efficient and environmentally conscious manner. Key priorities include:

- Maximising the use of renewable and indigenous sources.
- Diversifying energy-supplying countries and supply routes.
- Reducing energy intensity.
- Introducing nuclear energy into the energy mix.
- Minimising environmental impact within the energy system.
- Developing a competitive internal energy market (oil, gas, electricity).

Türkiye's energy production strategy is increasingly focused on hydrogen as a primary energy source for various economic activities. The development of indigenous hydrogen production is becoming central to its energy policy, with efforts to attract foreign investment and stakeholders in hydrogen production. The government's Energy Transition Strategy 2035 outlines a plan to quadruple the country's wind and solar capacity to 120 GW by 2035, requiring an estimated $100 billion in investments. This initiative is part of a broader goal to achieve net-zero carbon emissions by 2053 and to become a net energy exporter within the next three decades.

In addition to renewables, Türkiye is investing in energy infrastructure to support the anticipated increase in electricity demand, projected to reach 510.5 TWh by 2035. Approximately $28 billion is earmarked for enhancing transmission networks, including interconnections with Europe, to ensure grid stability and facilitate the integration of renewable energy sources. The government's commitment to renewable energy is further evidenced by its support for domestic manufacturing of renewable energy equipment. Incentives include tax exemptions, land allocation, and favourable leasing terms for renewable energy projects. These measures aim to reduce initial investment costs and improve financial returns, making the sector more attractive to investors.

Türkiye has significantly intensified its efforts in the oil and gas sector, focusing on reducing its heavy reliance on energy imports. A pivotal development in this endeavour is the Sakarya gas field, located in the Black Sea, which stands as the country's largest natural gas discovery to date. Discovered in August 2020, the field is estimated to hold approximately 540 billion cubic meters of natural gas. Production commenced in April 2023, marking Türkiye's first foray into deepwater gas extraction. The initial phase of development includes ten wells, aiming to produce up to 10 million cubic meters of gas per day, with plans to increase this to 40 million cubic meters per day by 2028.

Moreover, the latest discovery of a new 75 bcm natural gas reserve in the Black Sea's Goktepe-3 field (May 2025) underscores Türkiye's efforts to bolster domestic energy production. Valued at around $30 billion, this reserve is expected to supply household gas needs for 3.5 years, contributing to the country's goal of reducing its reliance on energy imports.

Overall, Türkiye's energy investment outlook is marked by a proactive approach to renewable energy expansion, infrastructure development, and strategic partnerships. The combination of ambitious targets, supportive policies, and significant investments positions Türkiye as a key player in the regional energy landscape, with the potential to achieve greater energy independence and to contribute to global efforts in combating climate change.

Israel

Israel's energy investment outlook is characterized by a dynamic shift towards renewable energy, bolstered by strategic natural gas developments and regional infrastructure projects. The country is actively pursuing a diversified energy portfolio to enhance energy security, meet climate commitments, and position itself as a regional energy hub.

A cornerstone of Israel's energy strategy is the expansion of solar power. By the end of 2023, renewable energy accounted for approximately 12.5% of the country's electricity consumption, with over 90% derived from solar PV systems. The government has set ambitious targets to increase this share to 30% by 2030, necessitating significant investments in solar infrastructure and energy storage solutions. Innovative approaches, such as agro-voltaic installations and rooftop solar mandates for new buildings, are being implemented to overcome land scarcity and integrate solar energy into various sectors.

Israel has emerged as a significant player in the Eastern Mediterranean's natural gas sector, primarily due to the development of the Tamar and Leviathan gas fields. The Tamar field, discovered in 2009 and operational since 2013, is located approximately 90 km west of Haifa and supplies around 70% of Israel's electricity needs. With an estimated 389 bcm of recoverable gas, Tamar has been instrumental in reducing Israel's reliance on coal and oil, leading to improved air quality and energy security.

The Leviathan field, discovered in 2010 and commencing production in 2019, is Israel's largest natural gas reservoir, containing approximately 605 bcm of recoverable gas. Situated about 130 km off the coast of Haifa, Leviathan has significantly bolstered Israel's energy exports, particularly to Egypt and Jordan. Plans are underway to expand Leviathan's production capacity from 12 bcm to 21 bcm annually, with an estimated investment of $2.4 billion. This expansion aims to meet rising domestic demand and strengthen Israel's position as a key energy provider in the region. In parallel, Israel continues to develop its natural gas resources. In March 2025, the country awarded exploration licenses to BP, SOCAR, and NewMed Energy for offshore blocks near the Leviathan field. This move aims to boost domestic gas reserves and expand exports, particularly to Europe, which is seeking alternatives to Russian gas. The strategic importance of natural gas is underscored by its role in strengthening Israel's economic and diplomatic standing in the Middle East. To address the intermittency of renewable energy sources, Israel is investing heavily in energy storage systems. Projections indicate that new energy storage installations will reach 1.1 GW/3.4 GWh in 2024, marking a significant year-on-year growth. Utility-scale energy storage is expected to play a dominant role, enhancing grid stability and facilitating the integration of renewable energy into the national grid.

Regional cooperation is also a key component of Israel's energy strategy. The Great Sea Interconnector, a high-voltage direct current submarine power cable, will link Israel's electricity grid with those of Cyprus and Greece. This project will have an initial capacity of 1,000 MW, with plans to double it in a second phase. The interconnector aims to enhance energy security, enable electricity exports, and integrate Israel into the European energy market. Domestically, the Israeli energy sector is undergoing significant reforms to increase competition and efficiency. The establishment of Noga, the independent system operator, is facilitating the decentralization of the grid and promoting digitalization. Additionally, the Israel Electric Corporation is divesting a substantial portion of its power generation assets, encouraging private sector participation and fostering a more dynamic energy ecosystem.

Israel's commitment to innovation is evident in its robust climate tech ecosystem. As of 2025, the country hosts 946 startups focused on climate solutions, with significant investments in clean energy systems, sustainable mobility, and eco-efficient water infrastructure. Public investment has been instrumental, with the Israel Innovation Authority granting $257 million over the past three years to support the development of breakthrough technologies. Currently, Israel's energy investment landscape is marked by a concerted effort to diversify energy sources, modernize infrastructure, and foster innovation. Through strategic investments in solar energy, natural gas exploration, energy storage, and regional interconnectivity, Israel is positioning itself to meet future energy demands, while contributing to global sustainability goals.

Egypt

Egypt's energy sector presents a wealth of investment opportunities, particularly in hydrocarbons. The country has made significant strides in natural gas exploration and production, notably with the Zohr gas field in the Mediterranean, one of the largest gas discoveries in recent years. The government continues to offer new concessions for oil and gas exploration, creating a conducive environment for foreign investments. Additionally, there is substantial potential in upgrading existing refineries and developing new petrochemical plants, which promise to enhance the sector's output and efficiency.

Renewable energy is another burgeoning area for investment in Egypt. The country's solar energy potential is immense, exemplified by the Benban Solar Park, one of the largest in the world with a total capacity of 1,650 MW. With attractive feed-in tariffs and government incentives, solar power projects are particularly appealing. Wind energy also offers substantial opportunities, especially in the Gulf of Suez area, known for its high wind speeds. The government's support for public-private partnerships in renewable energy projects further boosts the sector's investment attractiveness. To support the integration of renewable energy, Egypt is investing in energy storage solutions. The European Bank for Reconstruction and Development (EBRD) is backing Egypt's first solar and battery storage project, which aims to reduce CO_2 emissions by 1.357 million tonnes per year. Additionally, Scatec ASA has commenced construction of a 1.1 GW solar and 100 MW/200 MWh battery storage project, with a 25-year power purchase agreement.

Hydrogen production represents a forward-looking investment opportunity in Egypt's energy landscape. The country is strategically positioned to develop a green hydrogen industry, leveraging its abundant renewable energy resources to produce hydrogen sustainably. Green hydrogen can play a crucial role in decarbonizing various sectors, including industry and transportation, and Egypt's potential to become a major hydrogen exporter adds another layer of investment appeal. The government's interest in fostering a hydrogen economy is reflected in its plans to develop infrastructure and partnerships to support this emerging sector. Furthermore, Egypt is advancing its nuclear energy capabilities with the construction of the El Dabaa Nuclear Power Plant. The plant will have four VVER-1200 reactors, making Egypt the only country in the region to have a Generation III+ reactor. The project, expected to be commissioned in 2026, aims to diversify Egypt's energy mix and enhance energy security.

Electricity interconnections are critical to enhancing Egypt's energy security and integration with regional markets. Investment in expanding and modernizing the electricity transmission and distribution network is essential to meet growing domestic demand and facilitate cross-border electricity trade. Projects like the Egypt-Saudi Arabia interconnection and potential links with European and African grids present significant opportunities. These interconnections will not only improve the reliability of Egypt's power supply but also position the country as a regional energy hub, capable of exporting surplus electricity generated from its diverse energy mix. Overall, Egypt's energy investment outlook reflects a comprehensive approach to addressing current challenges and future demands. By investing in renewable energy, energy storage, LNG imports, regional integration, and nuclear power, Egypt is working towards a more sustainable and secure energy future.

Based on the available data, the following comparative table has been created outlining the projected energy investments of €579 billion by 2030 for Greece, Cyprus, Türkiye, Israel and Egypt, while the figures encompass various sectors, including oil, gas, coal, electricity, renewables, nuclear and energy efficiency.

Table 13: Total Anticipated Energy Investment for 2025-2030 in Greece, Cyprus, Türkiye, Israel, and Egypt

Countries	Investment estimates (€ billion)
Greece	96
Cyprus	12
Türkiye	220
Israel	30
Egypt	221
Total	579

Note: Investment figures are based on available data and may be subject to change as countries update their energy strategies and plans.
Sources: 2024 NECPs for Greece and Cyprus, various sources for the remaining countries, including latest estimates from energy experts and recent national energy strategies

Energy Security in the Eastern Mediterranean

10

10. Energy Security in the Eastern Mediterranean

10.1. Introduction

Despite a long history of animosity between states and societies in the Eastern Mediterranean, at present the main threats to energy security in the East Med originate from outside the region. They concern fallout from tensions in the Gulf, the deteriorating situation in the Red Sea and the Horn of Africa and the consequences of Russia's all-out invasion of Ukraine.

Regional tensions should not be ignored, but it is striking that even though one of the most long-lasting regional conflicts, the Israeli-Palestinian dispute, has once again erupted into war in Gaza, the direct fallout in terms of physical energy security issues in the immediate environs of the war has been minimal. Likewise, underlying issues such as the complex Türkiye-Greece imbroglio and the question of whether there will be a settlement to the Cyprus issue have not really impeded the development of energy in the region.

Such comments are not absolute. Increased tensions in the Gulf and the Red Sea are directly connected to the Gaza crisis and these have had a major impact on oil prices and, indeed, on the routes taken by tankers to deliver oil and LNG from the Middle East to markets in Europe and North America. Likewise, the Gaza crisis has contributed both to difficulties stemming from the Cyprus problem concerning the potential for building a pipeline to carry gas from Israel to Türkiye and to the complexities involved in efforts to develop a much longer pipeline to carry gas from Israel to Greece and then on to other European markets.

10.2. Hard-core energy security issues

In general, however, the hard core energy security aspect of current Middle East tensions relate primarily to the Gulf, the Horn of Africa and the Red Sea while the energy security fallout from Russia's invasion of Ukraine is currently felt primarily in terms of the cutoff of Russian oil and gas deliveries by pipeline though Ukraine and Central Europe to customers further afield and, to a lesser extent tensions in the Black Sea. In addition, of course, both conflicts have had a major impact on global oil and gas markets and, in particular, on the delivery of supplies to customers in Europe and, indeed, throughout the Eastern Mediterranean itself.

As of mid-2024, the main impact on energy of broader tensions in the Middle East is the re-routing of tankers, and particularly LNG tankers, around the Cape of Good Hope instead of transiting the Red Sea and the Suez Canal. These are estimated to add around $930,000 to each voyage, mainly in fuel costs, while increasing transit time from around 16 to 32 days. They also increase carbon emissions, not least because the re-routed tankers are under pressure to reduce the time spent on the voyage by sailing faster.

The continuing war in Ukraine is currently only having a limited impact on deliveries of fossil fuels to Europe from non-Russian suppliers, but there are reasons to suppose that there may soon be significant further impact on deliveries from Russia itself. The ongoing impact of the Ukraine War on non-Russian supplies is essentially confined to the delivery of Kazakh oil to global markets via the Caspian Pipeline Consortium system, the Russian Black Sea port of Novorossiysk and then the Black Sea and the Turkish Straits. Since Russia launched its all-out invasion of Ukraine on 24 February 2022, Kazakh oil shipments, part of a blend with Russian crude known as CPC Blend, have been halted on various occasions. These are officially attributed by CPC's operator, the Russian pipeline monopoly Transneft, to natural causes, notably storms at Novorossiysk or maintenance activities. However, the sometimes prolonged delays have prompted the Kazakh authorities to study alternative export routes, such as increased tanker deliveries across the Caspian into the Baku-Tbilisi-Ceyhan pipeline or increased deliveries to China. But there is really no substitute for CPC and Novorossiysk, and this becomes increasingly problematic since the CPC loading terminal is located just 15 kms from the main Russian port, which appears to be gradually taken over from Sevastopol as the principal operations centre for Russia's Black Sea Fleet. These have come under attack from Ukrainian drones and such attacks can be expected to intensify, with the potential of making it increasingly dangerous for tanker traffic in the vicinity.

Continued warfare in the Black Sea also has the potential to threaten development of such projects as a deep-sea cable between Georgia and Romania, which would carry electricity from Azerbaijan and Georgia, and perhaps from Kazakhstan and Uzbekistan as well, to European markets. But it should be noted that by and large marine traffic in the Black Sea has continued despite the war, with agreements such as the Black Sea Grain Initiative of July 2022 helping to ease tensions.

As for supplies from Russia itself, as of mid-2024 the crucial issue is whether the industrialised nations of Europe and North America will place sanctions on Russian exports of LNG. These rose steadily in 2022 as pipeline exports collapsed, with deliveries to the EU rising from 13.3 Bcm in 2021 to 18.56 Bcm in 2022. They did fall back a little in 2023 to 17.6 Bcm but, with exports to the EU totalling 5.4 Bcm in the first quarter of 2024, they could reach around 22 Bcm by end-2024 if they are not checked. The EU's total LNG imports in these years were 78.6 Bcm in 2021, 129.7 Bcm in 2022 and 134 Bcm in 2023. Most of the Russian LNG is landed in western Europe, at regas facilities in Spain, France and Belgium.

Elimination of Russian LNG from European markets – including the UK as well as the EU as a whole – would prompt increasing demand in the Eastern Mediterranean for alternative supplies. Some would still come from Qatar, but at a cost given the need to traverse the Cape of Good Hope. So, most would undoubtedly have to come from the United States. In such circumstances, the most important factor would not be any direct threat to shipping but the question of whether President Biden will end his pause on the granting of licences for new LNG projects in the United

States. This is a particularly acute issue for the newly installed FSRU at Alexandroupolis in northern Greece. It is probably of lesser concern for the region's other impending regas facility, the FSRU at Vassilikos in Cyprus which is expected to start operations in the third quarter of 2024. This is because Vassilikos is clearly focussed on deliveries from Egypt, fuelled, directly or indirectly, by output from Cyprus's own gas fields. Whether it will impact on Türkiye's two fixed LNG regas terminals or its three FSRU units will depend on the balance between the long-term contracts which underpin many of Türkiye's LNG import agreements and prevailing commercial conditions for spot LNG, which will necessarily be impacted by the amount of US LNG available for delivery to the region.

10.3. The lack of impact on EU gas supply MoUs

One question that also needs to be addressed is whether the current state of the conflicts in Gaza and Ukraine are having significant impact on two key agreements that the European Union signed in the summer of 2022 to secure alternative gas supplies that would help it to compensate for the near termination of pipeline supplies from Russia. The first was a memorandum of understanding (MoU) signed with Israel and Egypt on 15 June 2022 intended to secure "a stable delivery of natural gas to the EU," notably through the promotion of Israeli gas supplies to gas liquefaction facilities in Egypt. But while it also allowed for the inclusion of gas from "any other source in the East Mediterranean region, including EU Member States" – a clear reference to Cyprus – the MoU did not specify any volumes from prospective suppliers. The agreement also called for European investment in Israeli and Egyptian gas development. But it made no mention of the proposed Eastern Mediterranean Pipeline (EMP).

The second agreement was an MoU signed with Azerbaijan in Baku on 18 July 2022, which did envisage a specific increase in gas supplies when it spoke of doubling "the capacity of the Southern Gas Corridor to deliver at least 20 Bcm to the EU annually by 2027" but without specifying the source of the gas that would ensure such an increase.

The Gaza War may yet impact directly on the EU's aspirations for increased supplies from the Eastern Mediterranean, but – as of mid-May 2024 – the issue of Egypt's subsidy driven appetite for gas for use at home seems likely to play a much more important role in determining the volumes of East Med gas available for export via Egypt. As for the EU's MoU with Azerbaijan, while it is clear that both sides were – and still are – looking to Azerbaijan itself to provide all or at least the vast bulk of the gas that would go into an enlarged SGC, the pace of actual field development in Azerbaijan makes it unlikely that any doubling will be achieved by 2027. Azerbaijan has managed to increase its exports to the EU so that it is currently supplying around 12 Bcm a year. In September 2023, France's Total announced its agreement to implement a second phase of development at its Absheron field, which would add four Bcm a year of export-oriented output by around 2027. But that will probably take Azerbaijan to its near-term production limit, since the giant projects that could enable it eventually to produce much more, a third phase for its Shah Deniz field and the development of the deep gas reservoir under the existing Azeri-Chirag-Guneshli oilfield, will almost certainly take five or six years to implement.

In sum, the wars in Gaza and Ukraine do not constitute the principal factors that need to be considered when assessing prospects for realising the potential that the two MoUs were intended to unlock.

10.4. Two key issues

This chapter will therefore focus primarily on two key issues: the tensions prevailing through the Middle East and the energy security consequences of the war in Ukraine. It is these events that are shaping so much of the global energy environment, notably by causing spikes in oil prices and longer journeys around the Cape of Good Hope for cargo vessels in general and oil and LNG tankers in particular. It will then address the relative quiet concerning historic tensions in the Eastern Mediterranean itself and the issue of whether the conflicts in Gaza and Ukraine might prompt a resurgence of old animosities.

It is, however, worth starting with a paradox. Israel is at war with Hamas in Gaza. There is broad-based international concern that the Israeli assault in Gaza may yet result in the flight or forcible expulsion of hundreds of thousands of Gazans – possibly the majority of the two million inhabitants of the entire Gaza Strip – to Egypt. And yet the core factor impacting the always delicate gas relationship between Israel and Egypt is something completely different: the symbiotic relationship of the two countries as Egypt's increasingly relies on Israeli gas to meet domestic demand and as Israel finds itself increasingly dependent on Egypt as its principal export market.

The Egypt-Israel gas relationship is the core driver of the Eastern Mediterranean's energy geopolitics. The two countries are the biggest producers in the region, while Egypt is the biggest consumer. Moreover, the absence of export pipelines from the region means that Egypt, with its LNG liquefaction plants at Idku and Damietta, possesses the physical ability to export gas from the region.

However, there are increasing constraints concerning such exports. These reflect the relatively poor performance of Egypt's own fields in the Eastern Mediterranean, notably the giant Zohr field, and the inability or unwillingness of the Egyptian government to ease the subsidy regime which is fuelling a constant increase in domestic gas demand. The result is that Egypt itself possesses only a strictly limited ability to export its own gas and therefore has to rely on imported Israeli gas – and possibly future imports from Cyprus – to enable it to meet domestic demand and maintain at least a modest flow of LNG exports.

As for Israel, while its major fields, notably Tamar, are flourishing, it remains constrained by export limitations. In practice these are confined to Egypt, Jordan and the Palestinian territories. The Gaza War has had an impact, notably concerning a limited re-routing of Israeli gas

supplies to Egypt, the stalling of an energy and water agreement between Israel and Jordan, and perhaps a rethinking by Israel of its own energy security policies. But it has not fundamentally impacted on the actual supply of Israeli gas to either Jordan or Egypt. Indeed, the only loss of supply concerns Gaza itself, both in terms of immediate deliveries of gas and electricity from Israel to the Gaza Strip and in terms of pushing still further into the future any prospect for development of the Gaza Strip's own offshore Gaza Marine gas field.

There were some immediate impacts in the wake of the Hamas massacre of more than 1,300 Israelis on 7 October 2023 and the subsequent Israeli onslaught on Gaza. Israel ordered Chevron to close production at its Tamar field, concerned that onshore processing facilities at Ashdod might become a target for rockets fired from Gaza. It also closed down exports to Egypt via the East Mediterranean Gas Pipeline (EMGP) but was able to maintain deliveries by increasing the flow to Jordan and then shipping gas onwards using the Arab Gas Pipeline (AGP) between Jordan and Egypt. Moreover, a month later, both the closure order and the re-rerouting instruction were reversed and, indeed, in February 2024 Tamar's operator Chevron and its partners approved further investments to increase production.

As for Leviathan, it not only continued to produce gas for export to Egypt but, in early March 2024, also began supplying condensate to Israel's refinery at Ashdod. In other words, business as usual. Likewise, development at Israel's Karish North field is proceeding on track, despite its proximity to Lebanon and the possibility of missile or drone attacks by Hezbollah. The field's smooth development was epitomised by the announcement by the field's operator, Greece's Energean, that first gas had been delivered to a floating production and storage and offloading vessel on 22 February 2024. This would appear to indicate that the October 2022, US-brokered maritime boundary agreement between Israel and Lebanon, which could not have been achieved without the acquiescence of Hezbollah, has so far proved to be a more important factor in field development than the Gaza war.

10.5. Consequences of a lasting ceasefire or a prolonged war

Should a ceasefire take hold in the Gaza war, then issues concerning Israeli and Cypriot gas exports to Egypt will be overwhelmingly determined by commercial factors, notably rising Egyptian domestic gas demand and the frailty of relying on gas deliveries to Egypt in order to secure export revenues from liquefaction at Idku or Damietta.

Should the war persist, however, it would most likely start to strain Israeli-Egyptian political relations and this could well spill over into a rethink by either – or both – sides concerning their current symbiotic gas relationship. The logic underpinning such an argument is that the longer the war continues, the more intractable Israel is seen by both Arab governments and Arab populations. Under such circumstances, business as usual may no longer be an option. For Jordan, the issue is particularly acute. From an Israeli perspective, its gas deliveries to Jordan may be modest, but politically and strategically they are extremely important. Precise volumes remain a state secret – indeed, the original 2014 agreement with Israel has yet to be made public – but the capacity of the pipeline to Jordan is around 3 Bcm/year while total Jordanian consumption amounted to around 3.4 Bcm in 2020, accounting for 38 % of Jordan's energy demand.

Moreover, Jordanian dependence on Israel, not just for gas but for water, is a highly charged issue in Jordan, where roughly half the population is either Palestinian or has strong Palestinian connections. The clauses concerning energy and water in the Israel-Jordan peace treaty of 1994 are constantly criticised by opposition members of the Jordanian parliament and have led to multiple demonstrations, including protests in March and April in which calls for the Jordanian government to support Palestinians in Gaza were coupled with demands for the severance of all relations with Israel, including the 1994 peace treaty. And while there is no likelihood of such demonstrations leading to significant changes in Jordanian policy in the event of a ceasefire taking hold in Gaza, should the war become prolonged, the Jordanian Government might well need to rethink its reliance on energy supplies from Israel. In the past, it has been reluctant to turn to Saudi Arabia, with which it has had long standing dynastically related disputes. But it would scarcely be surprising if a prolonged war were not only to result in at least a pause in the pre-crisis Israeli-Saudi contacts but in a rapprochement between Riyadh and Amman that could lead to Saudi Arabia and perhaps other Gulf states replacing Israel in Jordan's energy mix, not least by increasing LNG supplies to Jordan's existing regasification facility at Aqaba.

In the Eastern Mediterranean itself, the most obvious repercussion would be an end to any discussion of an Israeli gas export pipeline to Türkiye. On 3 May 2024, Türkiye ordered the suspension of all trade with Israel until a permanent ceasefire was established, citing the worsening humanitarian tragedy in the Strip. In view of Türkiye's strong support for the Palestinians, it might actually require an actual peace agreement to get Israeli-Turkish relations sufficiently back on track for Ankara to endorse such a pipeline.

10.6. Gaza Marine

If – and at the time of writing this seems to be a very long shot indeed – there were to be a ceasefire that holds and if that were to be followed by a full peace settlement, then there is one small energy development that could have profound consequences for the region: the development of the Gaza Strip's own Gaza Marine gas field. The field was discovered in 2000 by BG (the former British gas) in 2000, and has a reserve estimated at 1 Tcf, equivalent to around 28.3 Bcm. On 18 June 2023, three months before the Hamas massacre triggered the Gaza War, Israel finally gave its approval for field development. The field

is currently owned by a 50-50 partnership between the Palestinian Investment Fund and CC Oil & Gas (sometimes called CC Energy), part of the giant Consolidated Contractors Company.

Development of Gaza Marine would have negligible impact in terms of actual production, since its output would scarcely be sufficient to meet even the requirements of reconstruction in the shattered morass of the Gaza Strip. But its development would serve as a striking demonstration of how the geopolitics of the region had changed in order to accommodate such development.

10.7. Underlying Issues

If this paper were being written a few years ago, the topics that would have headed any list of regional energy security issues would have included rival Greek, Turkish and Cypriot claims to potential offshore drilling waters; the Cyprus issue itself and boundary issues such as the question of whether the exclusive economic zones (EEZs) of Türkiye and Libya share a common boundary, or whether those of Greece and Cyprus do. But as of mid-2024, such issues are no longer prominent. They are, perhaps, best regarded as underlying issues that might yet need to be addressed in order to ensure regional energy security.

The fact that these issues are currently in the shadows and not the limelight may, in fact, be due to a common understanding by the governments in Ankara, Athens and Nicosia that Russia's all-out invasion of Ukraine in February 2022 radically changed the regional security situation. Türkiye found itself poised between instinctive support for Ukraine, bolstered by Russian ill-treatment of the Crimean Tartars after its seizure of the peninsula in 2014, and continued reliance on Russian gas as a major component of its energy supply and on Russian assistance and technology in construction of its first nuclear power station.

Greece, despite long-standing efforts to ensure a good relationship with Russia, has for many years supported Ukraine, vehemently opposing Russia's self-declared annexation of Crimea and its subsequent all-out invasion of Ukraine. Greece has not only pushed for Ukrainian entry into both the European Union and NATO, but has actually supplied advanced equipment, notably F-16 aircraft, to help Ukraine fight Russia.

The core underlying issues largely concern Cypriot attitudes to hydrocarbon developments offshore from Cyprus and various maritime boundary issues.

10.8. Cyprus and regional hydrocarbons development

The generally accepted international position is that the Government of Cyprus, which controls the southern areas primarily populated by Greek Cypriots, remains the internationally recognised Government, with full authority to initiate and approve hydrocarbon exploration and development as it sees fit. The Cypriot fields that have been found to date – Aphrodite, Glaucus, Calypso, Zeus and Cronos – are all in waters that lie off the island's southern coast and which therefore constitute not only part of the island's natural EEZ and, in de jure terms to the rest of the world and in de facto terms to the Turkish Cypriots, are controlled by the Government of Cyprus.

However, the Turkish Cypriots consider that they have a right to be part to major decisions concerning the island's future including both energy development and the settling of maritime boundaries. At the heart of this issue is Türkiye's non-recognition of the Government of Cyprus and its unilateral recognition of Northern Cyprus, which it terms the Turkish Republic of Northern Cyprus (TRNC), as an independent state. The Turkish Cypriot argument essentially concerns the sharing of sovereignty, rather than the sharing of resources, and that therefore no hydrocarbons activities should take place without their express approval. This reflects their view that when the Republic of Cyprus was established in 1960 it was on the basis of joint sovereignty between the island's Greek and Turkish communities. They do not consider that this approach was invalidated either by the partition of the island in 1974, or their own unilateral proclamation of independence in 1983, or the failure of various UN-sponsored negotiations to settle the dispute. This approach is backed by Türkiye.

It would require a full peace settlement to resolve the underlying theories behind the dispute, but in practice the Government of Cyprus has been able to conclude a series of agreements with international companies for development of the island's offshore resources. At present, the communal and international aspects of offshore development are far less important than finding an answer to the key problem of whether the best way to monetise its offshore resources is to ship them to Egypt for liquefaction (and then bring some back to Cyprus for domestic use); to pipe the gas back to Cyprus itself, primarily for liquefaction and export; or to pipe at least some of it back to the island for domestic use. While a settlement to the Cyprus question would make it easier to resolve this dilemma, it is not essential. Right now, commercial considerations remain dominant.

10.9. Boundary Issues

There are two major sets of unresolved boundary issues that have historically created tensions in the Eastern Mediterranean: Turkish claims to waters to the west of Cyprus and off the coast of Crete and the Aegean dispute between Greece and Türkiye.

Turkish claims to waters to the west of Cyprus and off the coast of Crete.

Türkiye has made major claims concerning the extent of its exclusive economic zone in the Eastern Mediterranean. It argues that these entitle it to share common maritime boundaries with both Libya and Egypt, thus ensuring there can be no point at which the EEZ of Greece can meet the EEZ of either Cyprus or Egypt. Nor does it recognise the validity of the boundary delimitation agreement signed by Egypt and the Republic of Cyprus in 2003.

The area claimed by Türkiye is enormous and stems from its stated belief that EEZs should essentially be determined by the coastlines of mainland territories and not by islands. Such a position runs completely counter to the views held by an archipelagic nation, such as Greece.

The issue is complicated by the fact that Türkiye is not a signatory to the United Nations Convention on the Law of the Sea (UNCLOS), which sets out the most generally accepted international standards for defining national EEZs. Adherence to UNCLOS principles would probably help Türkiye with regard to establishment of an EEZ off its southern coast that would extend as far south as Egypt's EEZ, but it would not enable it to secure a common maritime boundary with Libya. It would also undermine Türkiye's stance in the Aegean, where the principal problem is not a question of the extent of EEZs but of coastal territorial waters and the importance of islands in establishing maritime boundaries.

The core question has two parts. The first is whether it is Greece whose EEZ shares a common boundary with Egypt's EEZ or whether it is the EEZs of Türkiye and Cyprus that share a common boundary[195]. The second is whether a solution to this issue really matters in terms of development of regional resources and the transport of exports through such contested waters. In August 2020, when Turkish survey vessels were active in disputed waters, a Greek warship scraped the stern of a Turkish warship that was escorting one of the survey vessels. But while this inflamed tensions for several months, fears that the zero-sum approach that both Ankara and Athens appeared to be pursuing at the time would ensure a state of perpetual conflict in the Eastern Mediterranean proved unfounded. In part, of course, this was because Russia's all-out invasion of Ukraine in February 2022 prompted both Ankara and Athens to face more serious security challenges. But it also reflects Türkiye's first major discovery in its own waters, the Sakarya field in the Black Sea. The dispute does have implications for one project, the East Med Pipeline (see below). But in terms of current developments offshore from Cyprus, the EEZ issue has receded. The two operators most exposed to potential risk from theoretical Turkish claims are both operating normally. They are Eni, which operates Block 6, including the Calypso, Cronos and Zeus discoveries; and Exxon, which operates Block 10, including the Glaucus discovery.

Another underlying boundary dispute that also effectively seems to be in abeyance is the question of whether Greece's EEZ shares a common boundary with Egypt's EEZ or whether Türkiye has an EEZ which shares a common boundary with that of Libya. On 19 November 2019, Türkiye and the Government of National Accord in the Libyan capital of Tripoli – which was at the time receiving military support from Türkiye in what continues to be a vicious civil war – signed an agreement which proclaimed they had a common boundary between their respective EEZs and identifying the coordinates of this line. The agreement was swiftly ratified by parliaments in both capitals and, at least from the viewpoint of the contracting parties, entered into force on 8 December 2019. This agreement, which was immediately condemned by the European Union for failing to conform to the Law of the Sea and for infringing the sovereign rights of third states – a reference to Greece and Egypt – was particularly remarkable because, in effect, it entirely ignored the existence of Crete. One reaction was that on 6 August 2020, Greece and Egypt signed their own agreement which partially delimited their common EEZ boundary and which established a mechanism for resolving the remainder of the line. Since the Egypt-Greece boundary is a far less contentious issue than the question of whether Greece shares a common EEZ boundary with Cyprus, it makes it possible for planners of the proposed East Med Pipeline to consider running their line through Egyptian waters to Greece, rather than through waters that might be more actively contested by Türkiye.

The Aegean dispute between Greece and Türkiye

Türkiye has long had a major dispute with Greece concerning both territorial waters and EEZs in the Aegean. In 1987, this nearly resulted in a military clash between the two countries and tensions have flared up on many occasions. Because Türkiye has not signed up to UNCLOS, there is no generally accepted mechanism to resolve the dispute apart from direct bilateral negotiations or mutually agreed mediation. Although organisations such as NATO, to which both belong, have acted as facilitators for discussions between the two sides there has been no comprehensive effort to resolve the dispute. The dispute blows hot and cold, but has twice, in in the wake of severe earthquakes in Türkiye in1999 and 2023, seen periods of tension followed by calmer periods as a result of so-called

[195] *The question of what respect – or 'effect', in geo-legal parlance - islands should have when considering territorial waters and EEZs is crucial to any resolution of this issue. Assertions that Greece's EEZ meets that of Cyprus depend not only on giving full effect to the small island of Kastellorizo, located just two kilometres off Türkiye's southern coast, but to the associated islet of Strongyli, which lies eight kms to the southeast of Kastellorizo. This is a highly complex issue which, at least for the time being, appears to be in abeyance.*

earthquake diplomacy. The dispute blew hot in September 2022, when President Erdogan threatened to seize Greek islands in the Aegean by force, but matters eased considerably in the wake of the devastating earthquake in February 2023 which destroyed much of the city of Hatay, the ancient Antioch, in southeastern Türkiye. Greece responded by providing immediate earthquake relief teams and aid, which contributed significantly to an improvement in bilateral relations that culminated in President Erdogan visiting Athens in December 2023. There is no particular reason to suppose that the issue will blow hot again in the immediate future, but it does remain a serious obstacle to deeper cooperation between the two countries across a whole range of issues, including energy security.

10.10. The East Med Pipeline

Where these issues may yet have an impact is in consideration of the long-proposed deep-sea pipeline that would connect the fields off Israel and Cyprus – and possibly those of Egypt – to Cyprus and Greece and then onwards to Italy. This 1,900-km project, known as the Eastern Mediterranean Pipeline or East Med Pipeline, was the subject of what the governments of Israel, Cyprus and Greece termed a final agreement in January 2020, but so far the project has failed to secure the all-important FID. The project is highly complex with questions concerning whether it can truly be delivered for its initially estimated cost of $5.1 billion. As and when commercial discussions on an FID appear to be reaching a positive conclusion, it is quite likely that Türkiye, which argues that it makes more sense to deliver Eastern Mediterranean gas first to Türkiye and then on to Greece and the European Union, will once again raise the issue of laying a pipeline in waters that it claims. While UNCLOS makes it clear that possession of an EEZ cannot prevent others from laying pipelines through that EEZ, the need to satisfy the EEZ's owner that the project is environmentally sound can ensure considerable delays, sufficient, perhaps, to prevent the project from going ahead.

However, it should be noted that even the most complex boundary problems in the region can sometimes be resolved. US mediation successfully delivered an agreement between Lebanon and Israel on 27 October 2022 on their common maritime boundary, enabling Israel to proceed with the development of its Karish North field and Lebanon to start development of its Qana field and to hold further bidding rounds for other prospective offshore oil and gas fields. Since such discussions had to involve – de facto, if not de jure – Lebanon's Hezbollah movement as well as the governments in Beirut and Tel Aviv, this was no mean feat.

Conclusion

Overall, in energy terms, the real curiosity about the wars in both Gaza and Ukraine is how well the global energy system has compensated by switching suppliers and supply routes in Europe and by reducing oil and gas tanker traffic around the Cape of Good Hope – albeit at some additional cost. But in the Eastern Mediterranean itself, the most curious factor is that regional energy security remains largely defined by the fundamentals of supply and demand, rather than the exigencies of emergencies and interruptions. Such underlying issues as the Cyprus question or various disputes concerning maritime boundaries currently appear to be much less important than the specifics of how to monetise resources that have either been developed already or are in the process of being developed. This could – and probably would – change, if either the Ukraine or Gaza conflicts were to escalate, but for the moment the leading energy security question in the Eastern Mediterranean is simply this: will Egypt ever get a hand on its subsidy-driven domestic demand for natural gas?

There is, however, one crisis-related issue which does have significant potential implications for near-term energy security in the region: the strained relationship between the Biden Administration in Washington and Israeli Prime Minister Binyamin Netanyahu. At the time of writing, it is far from clear just how this will play out. For the first time in decades the US Government has, in withholding immediate delivery of heavy weaponry to Israel, taken action against Israel, even if the word 'actions' still remains more relevant than the word 'sanctions'. Should the US-Israeli relationship deteriorate still further, it would make it harder for Egypt to maintain a business-as-usual approach with Israel. Under such circumstances the flow of Israeli gas to Egypt would almost certainly dry up, prompting further cutbacks to exports from Egypt's LNG facilities. This would prompt increased demand for US LNG throughout the Mediterranean. And that in turn would increase the pressure on President Biden, who is already facing Congressional demands to promote further US LNG development to counter Russian LNG sales in Europe, to end the pause in federal approval of new LNG projects.

Between them, the wars in Gaza and Ukraine could yet lead to a significant change in US energy policy with significant implications for LNG trade in the Eastern Mediterranean.

Iran’s aspirations and the dormant geopolitical rift

11. Iran's aspirations and the dormant geopolitical rift

Iran's geopolitical aspirations and its expanding influence in the Middle East have profound implications for regional stability and global politics. Recent developments in the Middle East may have created a setback, but Iran continues to seek new avenues to assert its present.

Iran's Role in the Region

Iran has historically leveraged alliances and proxies to enhance its regional influence. However, the recent overthrow of the Assad regime in Syria has disrupted Iran's strategic corridor to Hezbollah in Lebanon, challenging its ability to project power across the Levant. Despite this setback, Iran continues to maintain and adapt its network of influence, seeking new avenues to assert its presence.

Axis of Resistance: Current Dynamics

The «axis of resistance» has faced significant challenges:

- Hezbollah: The group has suffered considerable losses, including the assassination of key leaders such as Hassan Nasrallah, impacting its operational capabilities.
- Houthis in Yemen: Israeli airstrikes have targeted Houthi positions, resulting in casualties and infrastructure damage.
- Iraqi Militias: The U.S. has pressured the Iraqi government to dismantle Iran-aligned armed groups, threatening military action if Baghdad does not comply.

These developments indicate a period of transformation and potential fragmentation within the axis, compelling Iran to recalibrate its regional strategy.

Impact of the Gaza Conflict

The recent conflict in Gaza has had profound implications for Iran's regional posture. The fall of the Assad regime has severed critical supply lines to Hezbollah, diminishing Iran's ability to support its proxies effectively. This has necessitated a strategic reassessment, with Iran potentially seeking alternative methods to exert influence and support allied groups.

Broader Middle East Hostilities

The interconnectedness of Middle Eastern conflicts means that escalations can have widespread repercussions. For instance, Israeli airstrikes in Beirut targeting Hezbollah and Quds Force officials have heightened tensions, underscoring the fragile nature of regional stability.

Geopolitical Impacts

Iran's activities continue to have significant geopolitical ramifications:

- Maritime Security: Houthi actions in the Red Sea have disrupted vital shipping lanes, affecting global commerce and energy markets.
- Regional Influence: Despite setbacks, Iran's enduring relationships with groups in Iraq and Yemen demonstrate its persistent influence and ability to adapt to changing dynamics.

Containing the Situation

Addressing Iran's influence requires a nuanced approach. Recent reports suggest that the U.S. and Israel are contemplating military options to curtail Iran's nuclear ambitions, highlighting the complexities of containment strategies.

Energy Resources

Undoubtedly Iran is one of the key energy suppliers of the broader region. With abundant oil and natural gas reserves (oil and gas) it can play a much bigger role than it does today as its exports are restricted due to western sanctions related to its nuclear programme and financial and military backing to the Axis of Resistance. Should Iran's relations with the west get normalised it could realise its long-held plans for a gas export link through the East Mediterranean and also develop a critical LNG production and export facility. In this context Iran has to be factored in when studying the East Mediterranean energy calculus.

Nuclear Program

Iran's nuclear program remains a focal point of international concern. Discussions between Iranian and Russian officials and likely between Iranian and USA officials (April-May25) have underscored the urgency of addressing Tehran's nuclear ambitions, with potential military actions deemed illegal and unacceptable by involved parties. The potential for Iran to achieve nuclear capability poses a significant threat to regional and global security, potentially sparking a nuclear arms race in the Middle East.

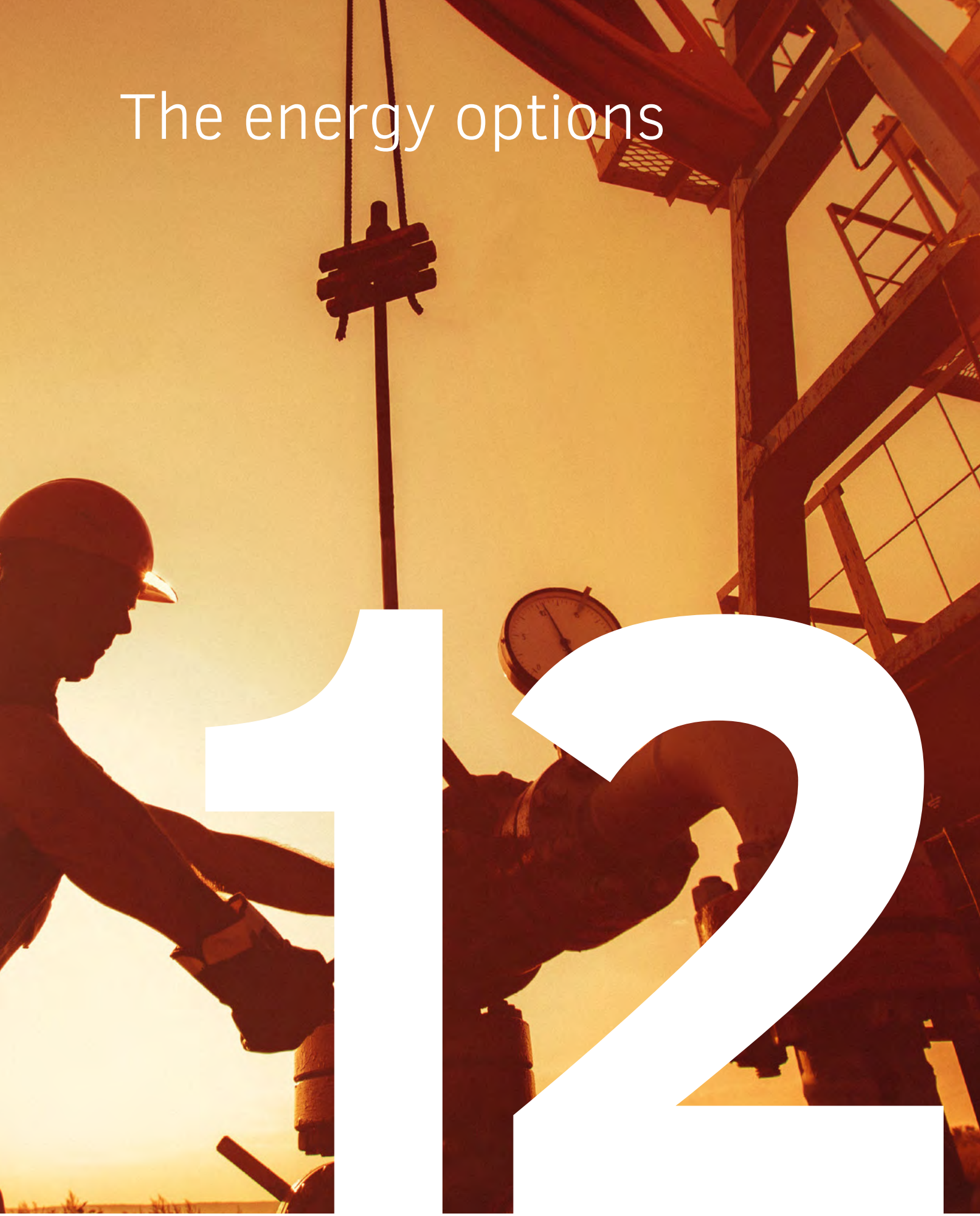
In summary, Iran's role in the Middle East is at a crossroads, with recent developments necessitating strategic adjustments. The evolving dynamics within the «axis of resistance,» ongoing conflicts, and nuclear ambitions collectively contribute to a complex and volatile regional landscape.

Conclusion

Iran's geopolitical trajectory remains dynamic, shaped by shifting alliances, military confrontations, and evolving strategic calculations. While the «axis of resistance» faces setbacks, such as the loss of key leaders and disruptions to supply lines, Iran continues to adapt, leveraging its remaining proxies and influence to maintain a foothold in the region. The recent escalations, including Israeli airstrikes on Hezbollah and Houthi maritime disruptions, illustrate the fragile balance of power and the potential for broader conflicts.

Looking ahead, Iran's nuclear ambitions and regional manoeuvres will be decisive factors in shaping Middle Eastern stability. Diplomatic efforts to curb its influence face significant obstacles, while military options carry the risk of escalating tensions into full-scale confrontation. The situation remains fluid, and the ability of regional and global powers to manage these complexities will determine whether Iran's influence expands further or encounters serious limitations in the years to come.

The energy options



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12. The energy options

Having in the previous chapters reviewed, the entire energy and geopolitical landscape of the East Mediterranean, it is only fair to return to the title of the present study and discuss the actual energy options which are now available and will guide developments over the coming years. These options cover the various facets of the energy sector and as such have been examined extensively in the relevant chapters. However, we feel it is necessary even in a concise form to sum up the findings under each option and also add our assessment on their prospects.

The Oil & Gas option is by far the most relevant in view of the huge progress achieved in both exploration and production in several countries including Egypt, Israel, and Türkiye. All of these countries have carried out extensive exploration work and are producing sizeable volumes of oil and gas. Cyprus has carried out extensive exploration work with promising finds and the prospect of starting gas production before 2030. Greece is the laggard in this field since exploration work has proceeded no further than seismic surveys. As exploratory drilling in the deep sea of the Ionian and South of Crete is yet to take place, production prospects cannot yet be realistically determined.

With Syria slated to return to global markets following the lifting of economic sanctions in May/June 2025, we have additional prospects for new hydrocarbon exploration, development of new fields and restoration to capacity of existing ones. By 2030 Syria could become once again an important producer and exporter of crude oil with a promising future in gas production.

In short, the region as a whole, has real potential for producing high volumes of gas with good export potential as is it is discussed in some detail further below.

Renewable Energy Sources (RES) are being developed in a truly big scale in Türkiye, Greece, Israel and Cyprus. With Egypt, which has a huge potential, following closely behind. Already Greece is covering more than 50% of its electricity needs from RES while in Türkiye RES contribute to almost 30% of electricity demand. Over the coming years RES will be developed further primarily in order to cover the domestic electricity needs in the countries themselves. However, excess electricity will result in the process -as it is already happening in certain countries- and hence the opportunity will arise for exporting this electricity to other countries (e.g. See the Green Aegean Interconnector project which is developed by IPTO in Greece for electricity exports to northern Europe) Because of the nature of electricity flows and the organisation of the markets themselves, it is difficult to make predictions of RES export capacity from the East Mediterranean. The potential will be there, but it will be up to market operators and the companies involved to develop large capacity (above 3 GW) electricity Interconnectors which will enable export-oriented electricity flows to take place.

Hydrogen production and export from East Mediterranean countries to Europe and worldwide, is a distant option as current plans aim exclusively in addressing needs of the domestic markets. As the first volumes of green hydrogen are expected to start flowing by 2028, and the fuel is slowly introduced in the energy mix of the different countries then it will take generations before we begin to have a better perspective on local use and export possibilities.

Likewise, is the situation in the Carbon Capture Utilisation and Storage (CCUS) field where we have a number of projects under development in Greece while a facility for the permanent storage of CO2 is being developed in the depleted oil fields of Prinos in the North Aegean. As demand for the storage of liquefied CO2 will grow and the capacity of Prinos will be unable to store all industrial emissions the need for storing CO2 in another location in the East Mediterranean will soon emerge. Egypt, which will soon have some sizeable, depleted oil and gas fields, could provide a promising location for developed the required CCUS facilities.

Can the East Mediterranean become a key energy supplier to Europe?

According to Dr. C. Ellinas, during his presentation at FLAME 2024 in Amsterdam (May 12th 2024), the likelihood of increased gas exports from the East Mediterranean to Europe is low, in the near future at least, despite the region's prolific gas reserves. In fact, it is quite the opposite, as Egypt has stopped its LNG exports to Europe.

More specifically, Egypt is currently facing a dire energy situation. The country is struggling to meet its domestic gas consumption needs, and recent developments have not been promising. Eni's Orion project has been a failure, and the Zohr gas field, which has only about 5 Tcf (142 Bcm) of gas left, is producing at about half its design capacity. While Chevron is attempting to fast-track Narges (a 2-year $3 billion investment), this effort will not resolve Egypt's energy problems, as mentioned earlier in Chapter 3, gas in place is now estimated to be less than 2.8 Tcf (80 Bcm) in comparison to the initial estimates of approximately 3.5 Tcf (100 Bcm), and in addition it is experiencing delays. In an attempt to mitigate blackouts, Egypt is bringing in FSRUs to import LNG this summer.

The last time Egypt transitioned from being an LNG exporter to an importer was between 2015 and 2017. However, the discovery of the Zohr gas field in 2015 reversed this trend, leading to a rise in exports to 9 Bcm/year by 2019, which generated $8 billion in revenue for the country. However, (see Chapter 4), Zohr's downward-revised remaining gas reserves are limiting production to the mid-2030s, posing a significant challenge for Egypt.

Therefore, given Egypt's current trajectory, it seems unlikely that the MoU signed with the EU in June 2022 will be fulfilled in the near future for quickly replacing Russian

gas. It is worth noting that in the Joint Declaration on the Strategic and Comprehensive Partnership between the Arab Republic of Egypt and the EU (March 2024), there is no reference to gas or the 2022 MoU. However, the declaration does specifically mention the GREGY electricity interconnector [196].

Israel is providing some support to Egypt, but within limits. In 2023, Israel exported 8.6 Bcm of gas to Egypt and plans to increase this to 21 Bcm by 2028. However, it is unlikely that Israel will further increase its gas exports to Egypt. Chevron is also preoccupied with expanding its Tamar and Leviathan gas fields. Although the ongoing Gaza conflict is not directly impacting gas developments in Israel or the region, oil and gas companies are becoming more cautious and assessing the risks.

Cyprus presents a mixed picture. Although it made early headlines with the discovery of the Aphrodite gas field in 2011, commercial progress has been slow. The Cypriot government recently rejected Chevron's revised development plan for Aphrodite and insisted on adherence to the original 2019 plan, demanding a final investment decision within six months. Meanwhile, Eni is now emerging as the likely lead for monetizing the Cronos field in Block 6, potentially through tie-ins to Egypt's Zohr infrastructure and onward to the Damietta LNG terminal. Yet, even this route faces complications. Given Egypt's domestic gas deficit and the fact that the state-owned EGAS has first rights to domestic supply, it is possible that gas from Cronos may end up serving Egypt's internal market rather than being exported.

An alternative path—once considered and now being quietly re-discussed in certain circles—is the revival of plans to build a liquefaction facility in Cyprus. Such a facility could process gas from both Cypriot and Israeli fields, offering a more direct route to European markets. However, this is still an early-stage concept with no formal commitments. Political sensitivities, investment costs, and market uncertainty continue to deter rapid progress.

All these complications highlight a central truth: while the East Mediterranean holds promise as a gas exporter, particularly to Europe, its short-term capacity is constrained by a mix of geology, geopolitics, and investment hesitation. Even where reserves exist, turning them into deliverable supply within competitive timelines and at reasonable costs remains difficult.

In contrast, the region is beginning to emerge as a strong potential supplier of renewable electricity, and in this context, prospects for contributing to Europe's energy security are more immediate and scalable. Countries like Greece are already leading the charge. With over 50% of its electricity generated from renewables in 2023, and plans to push this figure above 80% by 2030, Greece is beginning to face issues of excess electricity supply. As storage and grid flexibility remain limited, this surplus is increasingly exported to neighbouring Balkan countries. However, with appropriate investments in interconnectors—such as the GREGY (Greece-Egypt) and the Great Sea Interconnector (Israel-Cyprus-Greece) projects—Greece could serve as a conduit for East Mediterranean renewable electricity into the European grid.

Cyprus, too, is positioning itself for a renewables pivot. Although the island has been forced to curtail solar electricity production due to grid constraints, projects are underway to strengthen storage and facilitate cross-border connections. The Great Sea Interconnector, which is expected to come online by 2028, will be a game-changer. Once operational, it will enable the transfer of electricity between Israel, Cyprus, and mainland Europe, allowing excess solar energy to flow westward and enhancing grid stability.

Israel is also leaning heavily into solar power. The government's target of achieving 40% renewable electricity by 2030 is based almost entirely on solar PV and battery storage. With limited land area and growing electricity demand, Israel is focusing on distributed generation and virtual power plants to manage intermittency and integrate renewables into its grid.

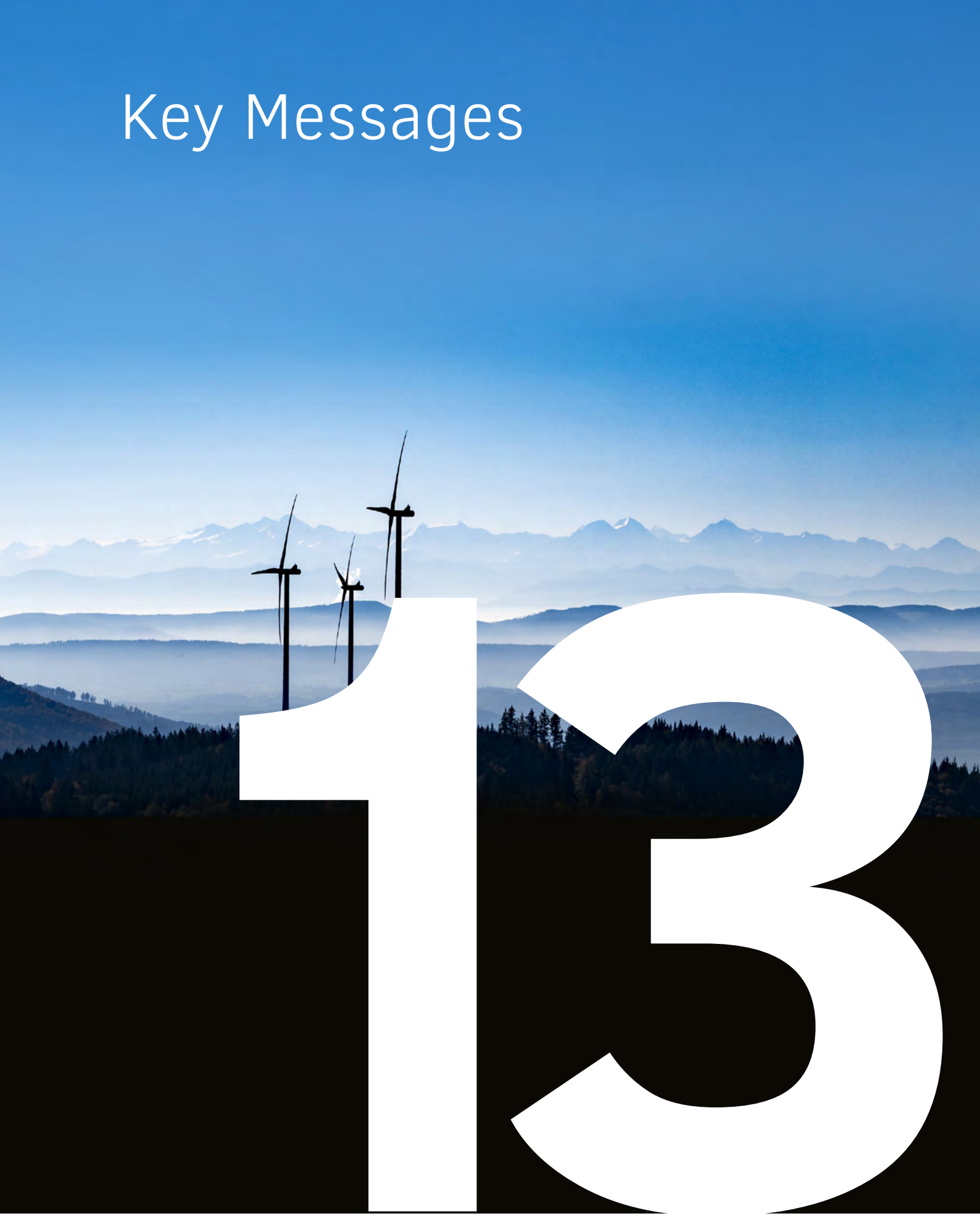
Türkiye, meanwhile, has emerged as a regional renewables powerhouse. With over 11 GW each of installed wind and solar capacity and ambitious targets to triple solar capacity by 2035, the country is rapidly decarbonizing its electricity mix. Its geothermal capacity is among the highest in the world, and new offshore wind projects are in the pipeline. Türkiye's location and infrastructure allow it to serve both as a generator and a transit country for green electricity to Europe, particularly via the Balkan interconnectors.

Egypt's renewable ambitions are similarly growing. Despite its current gas shortages, Egypt is actively pursuing solar and wind energy projects in its vast desert regions. The country has already installed more than 6.7 GW of renewable capacity, and new partnerships with the EU and international investors suggest further momentum. If grid infrastructure and interconnectors such as GREGY are completed, Egypt could eventually become a major exporter of green electricity to Europe.

In conclusion, while the East Mediterranean's potential as a gas supplier to Europe faces significant near-term limitations, its role as a key energy provider could still materialize through renewable electricity exports. The narrative is shifting from fossil fuels to clean energy, and this transition may offer the region a more sustainable and geopolitically viable path to contributing to Europe's energy future. With strategic infrastructure investments, policy coordination, and private sector engagement, the East Mediterranean could indeed emerge as a vital energy bridge to Europe — not through gas, as once assumed, but through electrons flowing from sun and wind.

[195] *European Commission, "Joint Declaration on the Strategic and Comprehensive Partnership between The Arab Republic Of Egypt and the European Union", 17.03.2024, https://ec.europa.eu/commission/presscorner/detail/en/statement_24_1513*

Key Messages



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13. Key Messages

1. Importance of Regional Geography

The proximity of the East Mediterranean to the Middle East and its surrounding regions is pivotal to understanding its energy dynamics and regional geopolitics. The broader geographical area is home to some of the world's most significant energy producers, each playing a crucial role in the global energy market.

Saudi Arabia: As a leading global oil producer, Saudi Arabia's vast reserves and production capacity make it a key player in energy geopolitics. The country's influence extends beyond oil, with substantial investments in renewable energy projects aiming to diversify its energy portfolio.

Iran: Iran holds some of the world's largest oil and gas reserves. Despite facing international sanctions, its potential for energy production and export remains significant.

Iraq: Iraq is another major oil producer, with its economy heavily reliant on oil exports. The country's energy sector has faced challenges due to political instability, but it remains a critical supplier.

Gulf of Suez and Suez Canal: This region is strategically important and it is a crucial chokepoint and gateway point for global oil and gas transportation.

Caspian Sea: The Caspian region is rich in hydrocarbons, with countries like Azerbaijan and Kazakhstan contributing significantly to the European energy market.

Black Sea: Its link with the East Mediterranean, through the Dardaneles, is of vital importance in understanding energy flows through the region. It is also an emerging notable player in energy exploration. Therefore the Black Sea region offers potential for new energy resources.

European Union: As a significant energy consumer, the EU's policies and demand influence the region's energy dynamics, particularly its efforts to diversify energy sources and reduce dependency on Russian gas.

2. Potential for Energy Export to Europe

The East Mediterranean and its adjacent areas possess prolific hydrocarbon resources and a high RES potential. However, several factors need to be considered to determine whether this region can become a significant energy exporter to Europe.

Hydrocarbon Resources: The abundance of oil and natural gas in the region positions it well for exporting energy. However, the ability to cover regional demand while exporting surplus is a critical question.

Renewable Energy Potential: The region has high potential for solar and wind energy. Investing in renewable energy could potentially enable it to meet domestic needs and export the surplus.

Domestic Demand: Can the region's energy production sufficiently cover its own demand? For example, Egypt has seen a reduction in gas production and has stopped LNG exports due to rising domestic consumption.

Export Feasibility: The ability to export surplus energy depends on infrastructure, supply and of course geopolitical stability and regional cooperation.

Regional Supply/Demand Dynamics: How will changes in production and consumption affect the overall energy dynamics? Egypt's halt in LNG exports impacts regional supply, while Greece's delays in E&P highlight the challenges in maintaining a steady supply.

3. Electrification and Grid Capacity

Electrification is a critical aspect of the global energy transition. The region's ability to support this transition hinges on the capacity and resilience of its electrical grids.

Grid Support for Energy Transition: The current state of electrical grids in the region varies. While some countries have modern infrastructure, others need significant upgrades to handle increased loads from renewable sources.

Cross-Border Interconnectors: Enhancing cross-border electricity interconnectors can accelerate the energy transition. These interconnectors enable the sharing of surplus renewable energy, balancing supply and demand across borders and enhancing energy security.

In this context, implementation of the Great Sea Interconnector (GSI), the GREGY project and the upgrade of the Greece-Italy initiatives for the development of the Green Aegean Interconnector are critical for enhancing electricity flows in the region.

4.Saudi Arabia's Role in Energy Export

Saudi Arabia's strategic position and energy resources allow it to play a significant role in regional and global energy markets.

Electricity Export via Egypt: Saudi Arabia's ambitious renewable energy projects, particularly solar, position it to export electricity. One potential route is through Egypt, utilising existing and future infrastructure.

Export via Jordan: Another viable route is through Jordan, which could facilitate energy flows to neighbouring countries and beyond. These routes underscore Saudi Arabia's potential as a pivotal energy hub in the region.

5. Impact of Iran and Iraq

Iran and Iraq's energy policies and production capabilities significantly influence regional energy dynamics.

Regional Balance: Iran's vast energy reserves and its geopolitical stance impact regional energy politics. Similarly, Iraq's energy sector, despite its challenges, contributes to the regional balance.

Geopolitical Tensions: The political relationships and tensions involving these countries affect their energy export capabilities and the stability of the region. Both countries' ability to engage in the energy market without hindrance is crucial for maintaining regional balance.

6. Diverse Cultures, Economies, and Persistent Hostilities

The East Mediterranean and surrounding regions are characterised by diverse cultures, economies, and longstanding hostilities. Overcoming these challenges is essential for successful cooperation and energy development.

Cooperation Amidst Diversity: Achieving cooperation among countries with varied cultural and economic backgrounds requires diplomatic efforts, trust-building, and mutual interests. Energy cooperation can serve as a platform for broader regional collaboration.

Hostilities and Conflicts: Persistent hostilities pose significant obstacles to cooperation. Addressing these issues through dialogue and conflict resolution mechanisms is vital for regional stability and cooperation.

7. Türkiye's Position and Relations

Türkiye's geopolitical stance and relationships with neighbouring countries influence regional energy dynamics.

Drifting from the West: Türkiye's recent political and economic shifts indicate a drift away from traditional Western alliances. This realignment affects its energy policies and cooperation with other countries.

Potential for Return: Whether Türkiye can re-align with the West depends on political and economic developments at home. Improved relations could enhance regional cooperation and energy projects.

Türkiye-Iran Relations: The evolving relationship between Türkiye and Iran has implications for US-Turkish relations. Balancing these relationships is critical for regional stability.

Cyprus-Türkiye and Greece-Türkiye Relations: Tensions between Türkiye and Cyprus, as well as Greece, complicate regional cooperation. Resolving these disputes is essential for collaborative energy initiatives.

UNCLOS Compliance: Türkiye's reluctance to follow the United Nations Convention on the Law of the Sea (UNCLOS) affects maritime boundary disputes and energy exploration rights. Finding common ground on UNCLOS compliance is crucial for regional cooperation.

Necessity for Regional Cooperation: Türkiye's role is indispensable for any comprehensive regional energy strategy. Without Türkiye's participation, achieving cohesive regional energy cooperation becomes challenging.

8. Energy Options

The Eastern Mediterranean region is emerging as a key energy hub, offering a diverse mix of resources and infrastructure potential. Natural gas remains the cornerstone of regional energy prospects, with substantial offshore reserves discovered in Israel, Egypt, and Cyprus. These finds have driven regional cooperation and export plans via LNG terminals and potential pipeline connections to Europe.

At the same time, the East Med holds considerable renewable energy potential, particularly solar and wind, given the region's abundant sunshine and favourable coastal conditions. Several countries, including Türkiye, Egypt and Greece, are actively expanding renewable capacity as part of broader decarbonisation goals. This renewable push is also feeding into early-stage hydrogen strategies, for future export to European markets. Though dedicated hydrogen export infrastructure is still under development, blending hydrogen into existing gas pipelines may provide a transitional pathway. Electricity interconnections are also gaining momentum, with projects like GSI and GREGY, aiming to link the region's power grids to Europe and Africa. These initiatives could facilitate renewable energy trade and enhance regional energy security.

Together, hydrocarbons, renewables, hydrogen, and interconnectors form a complementary energy portfolio, positioning the East Mediterranean as a critical bridge between energy producers and European markets.

9. Conclusions

The East Mediterranean and its surrounding regions hold immense potential for contributing to the European energy markets. However, realising this potential requires addressing several key challenges. Understanding the geographical and geopolitical landscape is crucial for assessing the region's capacity to become a significant energy exporter to Europe. The region's energy infrastructure, particularly its electrical grids, needs substantial improvements to support the energy transition.

Saudi Arabia, Egypt, Iran, and Iraq play pivotal roles in the regional energy dynamics, and their policies and production capabilities as well as the energy demand significantly influence the market. Overcoming cultural, economic, and political differences is essential for fostering cooperation and stability. Türkiye's geopolitical stance and relationships with its neighbours further complicate the regional energy landscape.

Despite these challenges, the region's abundant resources and renewable energy potential offer a pathway for becoming a significant energy exporter. Strategic investments in infrastructure, diplomatic efforts to resolve conflicts, and enhancing regional cooperation are key to unlocking this potential.

By addressing these issues, the region can play a vital role in meeting global energy demands and contributing to a sustainable energy future.

Utilising East Mediterranean's huge energy potential both for covering the bulk of indigenous needs and for export is not self-evident. To realize this, it will require consistent and long-term cooperation between the various countries leading to well-planned and robust cross border projects such as electricity Interconnectors, gas and hydrogen pipelines and CCUS facilities.

Also, and most importantly, a major effort needs to be undertaken to expand and upgrade the various national electricity grids as the penetration of renewables in the grid is accelerated. This is a condition sina non quo if we are serious in promoting regional energy cooperation.

In short, the East Mediterranean region has a significant and a well-explored but untapped energy potential, which when fully utilised can benefit its people and at the same time provide an important source of supply to European needs.

However, for this to happen regional cooperation along diplomatic, political and economic lines needs to be stepped up. Such cooperation is already happening though various bilateral, trilateral and incomplete regional agreements*.

But a more comprehensive framework to include all countries in the region is vital and needs to be worked out as a matter of priority. This is key in exploiting East Mediterranean's high energy potential.

*We refer here to the East Mediterranean Gas Forum (EMGF) in which until now Syria and Türkiye abstain.

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Study Contributors

Mr. **Costis Stambolis** | Energy Analyst - Executive Director, IENE

Mr. Costis Stambolis who is the Executive Director of IENE, has a background in Physics and Architecture having studied at the University of London, the North East London Polytechnic (NELP) and the Architectural Association in London from where he holds a Graduate Diploma in Architecture and Energy Studies (AA Dip. Grad). He also holds a professional practice license from the Technical Chamber of Greece (TEE), and a Masters Degree from the Said Business School, University of Oxford, where he studied «Strategy and Innovation". Costis has carried out numerous studies and projects on Renewable Energy Sources in developing countries. He has consulted widely on solar building applications for both private and institutional clients in various European countries. He has worked as a consultant and strategy advisor on natural gas, oil markets and energy security issues for large multinational companies, international organizations and governments. Costis has lectured widely on energy issues and has organised several national, regional and international conferences, seminars and workshops. He has published several books, conference proceedings, research papers and studies on energy policy, solar energy, RES and energy markets. Among others he is the editor of the «S.E. Europe Energy Outlook (2011,2017, 2022)", which considered a basic reference on energy for SE Europe. Since 2001 he supervises and edits daily Greece's foremost energy site www.energia.gr. He is a founding member of the Institute of Energy for South East Europe (IENE), which he currently chairs. He is a member of the Energy Institute (UK), the International Passive House Association (IPHA), The Technical Chamber of Greece (TEE). Since 2018 he also serves as a full member of the Greek government's standing committee on Energy and Climate Change (NECP).

Mr. **Kostis Oikonomopoulos** | Petroleum Geoscientist – Research Fellow, IENE

Before joining IENE as a Research Fellow in September 2023, Kostis Oikonomopoulos spent over six years at HEREMA SA, Greece, where he served as the primary seismic interpreter and petroleum geoscientist, specialising in prospectivity analyses and regional understanding. In this capacity, he also coordinated two important oil and gas Lease Agreements («West of Crete» and «Southwest of Crete»), offering technical subsurface expertise on licensing matters, stewardship and monitoring of licence work programmes and activities. Also, he assisted in compiling and reviewing contracts regarding seismic acquisition and processing projects and at the same time supervised and managed HEREMA's data repositoty as well as its digitization and restructuring. Prior to his tenure at HEREMA SA, Kostis worked as a Business Development geoscientist in the UK, for Spectrum Geo Ltd (now TGS) from 2012. In this role, he managed, initiated, and evaluated seismic acquisition and processing projects while liaising and engaging in negotiations with government authorities and National Oil Companies in the Mediterranean Sea, Black Sea and sub-Saharan Africa. Kostis holds a Bachelor's degree in Geology from the University of Athens and pursued further education with two Master's degrees—one in hydrocarbons management from the University of Aberdeen and another in petroleum geoscience from the Royal Holloway, University of London. His career began in 2007 as a Petroleum Geologist with Hellenic Petroleum SA (HelleniQ), where he was involved in hydrocarbon exploration work (geological and geophysical) in Egypt.

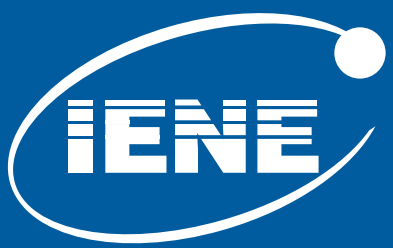
Mr. **Dimitrios Mezartasoglou** | Economist - Research Fellow, IENE

Dimitrios Mezartasoglou commenced his cooperation with IENE in 2015 as an inhouse researcher and he is currently Research Fellow. He has studied Economics and he holds two Master's degrees from the University of Strathclyde on Global Energy Management and from the University of Exeter on Money and Banking.

Whilst at IENE, Dimitrios has contributed to a number of research projects, and major studies including «SE Europe Energy Outlook 2016/2017", «SE Europe Energy Outlook 2021/2022", the Greek Energy Sector Annual Reports (2019, 2020, 2023, 2024), "Prospects for the Establishment of Gas Trading Hubs in SE Europe", while he is Assistant Editor of «Market Fundamentals and Prices", «Monthly Analysis" and several other IENE's newsletters. In addition, since 2016, he is a contributing editor of energia.gr where he regularly contributes articles and analyses on energy market, the economy and banking.

Mr. **John Robers** | Energy Security Specialist - Visiting Research Fellow, IENE

John M. Roberts is a senior partner with Methinks Ltd, a consultancy specialising in the inter-relationship between energy, economic development, and politics. He is also a non-resident Senior Fellow at the Global Energy Centre, Atlantic Council, Washington DC. He is currently researching European energy security issues, including the role of Turkey in European energy security, Russian gas deliveries to Europe, the development of new supply pipelines and interconnectors within Europe, and the energy security implications of gas discoveries in the Eastern Mediterranean. Roberts is a respected energy analyst who has testified to UK parliamentary committees on Middle Eastern, Russian, Caspian, Turkish and Kurdish energy security issues. He has lectured widely on a variety of subjects, including the development of Arctic oil and gas, the impact of social and political unrest in the Middle East and boundary disputes in the Caspian Sea. His recent papers include Democracy in Turkey: Implications for Regional Energy Security (JNU, Delhi, March 2017); Olive trees hold up Southern Gas Corridor (Platts Energy Economist, April 2017); and Iranian Gas Export Prospects and Energy Security (FLAME, Amsterdam, May 2017). Roberts has recently completed studies for the Atlantic Council on oil and gas in the Kurdistan Region of Iraq, on gas interconnectors in Europe, and on the development of Russia's Turkish Stream pipeline and its impact on the development of the Southern Gas Corridor to connect the Caspian to Europe. Private consultancy work has included investigation of investment conditions in Abu Dhabi and Saudi Arabia's Vision 2030 programme. He is currently preparing a study on the Russia-China-Turkmenistan gas triangle. His books include Caspian Pipelines (1996) and Visions & Mirages: The Middle East in a New Era (1995).



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