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Organization of Arab Petroleum Exporting Countries



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**EXCLUSIVE INTERVIEW**

**HE ENG. SUHAIL AL MAZROUEI:  
OUR ADOPTION OF CIRCULAR ECONOMY SETS A COURSE TO TAKE  
THE UAE TOWARDS SUSTAINABLE USE OF NATURAL RESOURCES**



# The Cover



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### ORGANIZATION OF ARAB PETROLEUM EXPORTING COUNTRIES (OAPEC)



The Organization of Arab Petroleum Exporting Countries (OAPEC) was founded on the basis of the agreement signed in Beirut, Lebanon on 9 January 1968 between the governments of Kingdom of Saudi Arabia, the State of Kuwait and the (then) Kingdom of Libya. The agreement stipulates that the Organization shall be domiciled in the City of Kuwait.

The principal objective of the Organization is the cooperation of the members in various forms of economic activity in the petroleum industry, the determination of ways and means of safeguarding the legitimate interests of its member countries in this industry, individually and collectively, the unification of efforts to ensure the flow of petroleum to its markets on equitable and reasonable terms, and providing appropriate environment for investment in the petroleum industry in member countries.

In 1970 the United Arab Emirates, the State of Qatar, the Kingdom of Bahrain and the Republic of Algeria joined the Organization, followed by the Syrian Arab Republic and the Republic of Iraq in 1972, Arab Republic of Egypt in 1973, then the Republic of Tunisia in 1982 (its membership was suspended in 1986). Any Arab country which derives a significant share of its national income from petroleum is eligible for membership in OAPEC upon the approval of three-quarters of the member countries, including all three founding members.



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• **OAPEC-Joint Ventures:**

OAPEC has sponsored the creation of four companies: The Arab Maritime Petroleum Transport Company (AMPTC), established in 1972 with headquarters in Kuwait City, the Arab Shipbuilding and Repair Yard Company (ASRY) established in 1973 with headquarters in Bahrain, the Arab Petroleum Investments Corporation (APICORP) established in 1974 with headquarters in Khobar, Saudi Arabia, the Arab Petroleum Services Company (APSC) established in 1975 with headquarters in Tripoli, Libya.

**OAPEC'S ORGANS**

The Organization carries out its activities through its four organs:

- **Ministerial Council:** The Ministerial Council is the supreme authority of the Organization, responsible for drawing up its general policy.
- **Executive Bureau:** The Executive Bureau is composed of one representative from each of the member countries, drawing recommendations and suggestions to the Council, reviewing the Organization's draft annual budget and submitting it to the Council, it also adopts the regulations applicable to the staff of the General Secretariat. The resolutions of the Executive Bureau are issued by the majority of two-thirds of all members.
- **General Secretariat:** The General Secretariat of OAPEC plans, administers, and executes the Organization's activities in accordance with the objectives stated in the agreement and directives of the Ministerial Council. The General Secretariat is headed by the Secretary General. The Secretary General is appointed by resolution of the Ministerial Council for a tenor of three years renewable for similar period(s). The Secretary General is the official spokesman and legal representative of the Organization and is accountable to the Council. The Secretary General directs the Secretariat and supervises all aspects of its activities, and is responsible for the tasks and duties as directed by the Ministerial Council. The Secretary General and all personnel of the Secretariat carry out their duties in full independence and in the common interests of the Organization member countries. The Secretary General and the Assistant Secretaries General possess in the territories of the Organization members all diplomatic immunities and privileges.
- **Judicial Tribunal:** The protocol of the Judicial Tribunal was signed in Kuwait on 9 May 1978 and came into effect on 20 April 1980. The Tribunal is competent to consider all disputes related to the interpretation and application of OAPEC's establishment agreement, as well as disputes arising between two or more member countries concerning petroleum operations.

## CCUS IN OAPEC MEMBER COUNTRIES: CHALLENGES & OPPORTUNITIES

Achieving Net-Zero is a big challenge worldwide. It calls for more creative efforts. Carbon capture technologies have drawn growing international interest as a promising solution to contribute to cutting carbon emissions between 15% and 55% by the year 2100. These technologies would- to a great extent- help countries with huge coal reserves to use these reserves in a safe and clean way, especially following the amendment of the past concept of “Carbon Capture and Storage (CCS)” to the new concept of “Carbon Capture, Usage and Storage (CCUS)” as leading global companies started seizing such opportunities to use in Enhanced Oil Recovery (EOR) operations, or as a primary raw material to enhance the production of some chemicals like ammonia and urea, as well as, methanol, synthetic fuel, or polycarbonate alcohol.

CCUS projects can play a significant role in diversifying the economies of Arab oil and gas producing countries if they succeeded in drawing up appropriate plans and policies, especially that these projects have become closely linked to the production of low-carbon blue

hydrogen. Moreover, the endorsement of legislations, incentives, and carbon tax in a number of countries had have a substantial role in the establishment of CCUS projects, which helped these countries in delivering on part of their NDCs and obligations to cut their emissions in line with the Paris Agreement.

In spite of the challenges facing such projects, like high investment costs and difficulties in securing the required funding on time, Arab countries (especially OAPEC members) have completed a number of projects in some countries like: the UAE, Bahrain, Algeria, Saudi Arabia, and Qatar.

Algeria took the lead in launching CCS projects in the Arab World through its “Ayn Saleh” project, one of the world’s largest research model projects on a commercial scale. The project’s execution formed a basis for evaluating the CO<sub>2</sub> geological storage technology and inspecting its safety; while underscoring that expanding CO<sub>2</sub> storage in the industrial sector is an important option to enhance

productivity and profitability, and help countries in cutting their environment-pollutant gas emissions. Also, Bahrain has been among the leading Middle East countries that started working early on using CO<sub>2</sub> emissions in enhancing urea and methanol production. Henceforth, Arab projects followed with the most recent success of Saudi Arabia, through SABIC research and development efforts in 2020, in collaboration with The Institute of Energy Economics, Japan – IEEJ, to execute an experimental project to produce the world’s first shipment of blue ammonia (40 tons) to be exported to Japan based on the circular carbon economy concept. This is in addition to the UAE’s plans to execute a number of Phase-II projects and programmes (until 2025) to capture additional quantities of CO<sub>2</sub> up to 2.3 million tons, resulting from natural gas processing, to be used to enhance oil production. The UAE also has a blue ammonia production project in Al Ruwais. Furthermore, there are announced initiatives and development plans in Qatar, Kuwait, and Egypt.

In recognition of the importance of CO<sub>2</sub> capture technologies and their

contribution to the development of clean and environment-friendly downstream industries, OAPEC Secretariat General has released a new study titled “CO<sub>2</sub> Capture & Usage in the Petrochemicals Industry: Potentials & Challenges.”

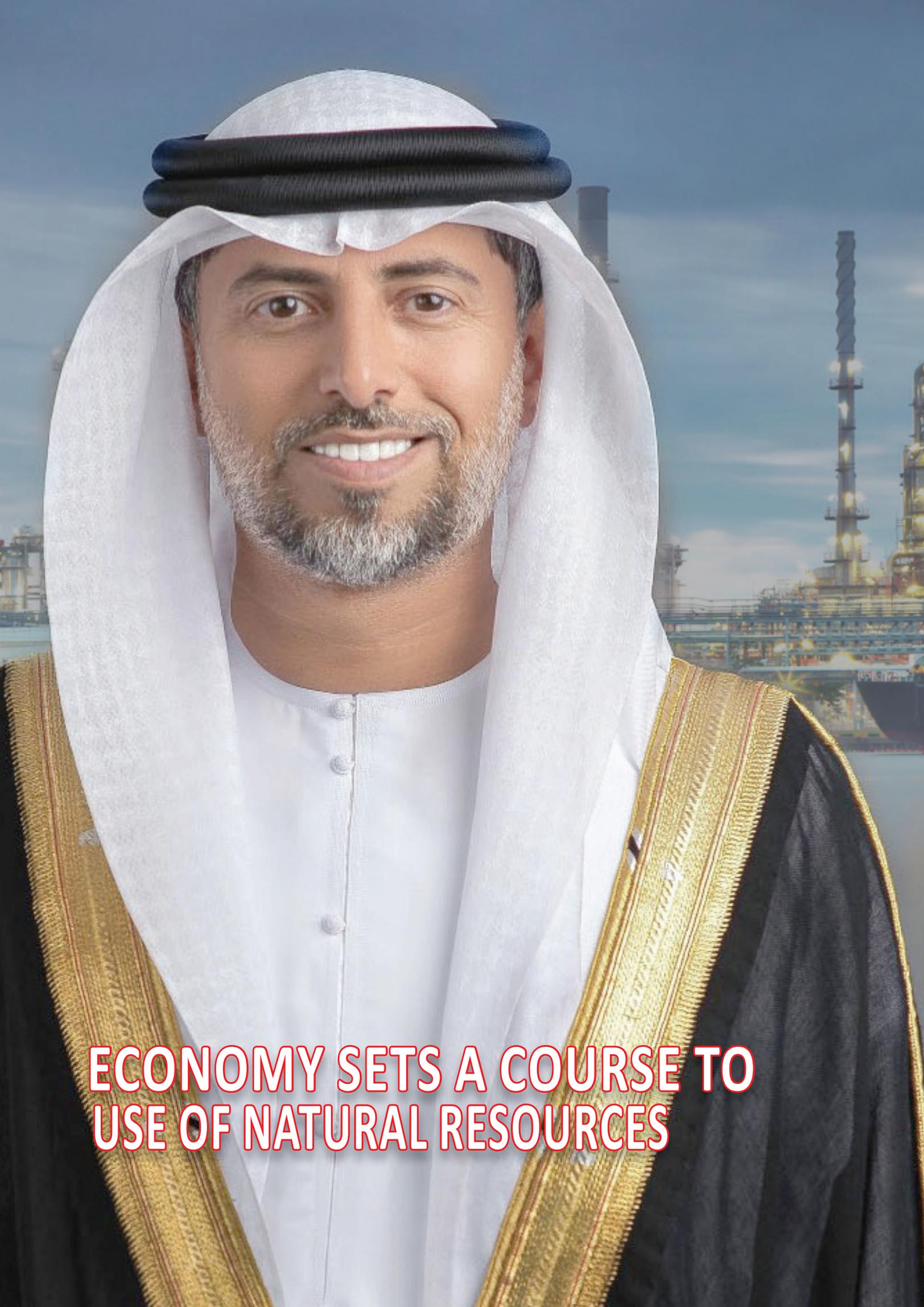
OAPEC Secretariat General believes that it is possible to expand the execution of CCUS projects in a number of Arab countries within a regional scope, especially with the availability of wide appropriate geological formations which are eligible to be used for safe and sustainable storage for decades; like depleted and abandoned oil and gas fields. This is along with the availability of financial investments required for the execution of such projects and the presence of a delivering political will, which also requires the endorsement, designing, and execution of appropriate policies, organisational frameworks, and benefitting from international expertise in executing such joint ventures on a regional scale. These elements qualify Arab Countries, especially GCC countries, to become global hubs for carbon capture, storage, and handling.

The image features a large, semi-transparent UAE flag (red, green, and white) in the foreground. In the background, an industrial facility, likely an oil refinery or power plant, is visible at dusk or dawn, with lights and structures illuminated against a cloudy sky. A dark, textured object, possibly a jacket, is partially visible in the bottom right corner.

**EXCLUSIVE INTERVIEW**

**HE ENG. SUHAIL AL MAZROUEI:**

**OUR ADOPTION OF CIRCULAR  
TAKE THE UAE TOWARDS SUSTAINABLE**



**ECONOMY SETS A COURSE TO  
USE OF NATURAL RESOURCES**



**Interview conducted by:  
Nasser Bakheet and Ala'a Al Omran  
Designer: Salem Ahmed**

**HE Eng. Suhail Al Mazrouei, the UAE's Minister of Energy and Infrastructure, speaks exclusively to OAPEC Bulletin launching its new series of interviews with OAPEC ministers and officials. The minister covered a wide range of issues from the UAE's purpose to join OAPEC to the future of the energy industry.**

"The UAE joined OAPEC in 1970 because it believes in the importance of coordinating petroleum policies among the Arab countries," said the minister as a start, adding that during these 50 years, the UAE took part in establishing many of OAPEC joint ventures (JVs), and "in line with our wise leadership directives, the UAE will continue to provide support to the oil markets, whether Arab or global." HE Al Mazrouei stressed that the UAE has been sharing and exchanging expertise with all brotherly Arab countries while boosting oil investments in these countries at the same time.

On OAPEC JVs, the Minister elaborated that the UAE participated in establishing: Arab Maritime Petroleum Transport Company (AMPTC), Arab Shipbuilding and Repair Yard Company (ASRY), Arab Petroleum Investments Corporation (APICORP), Arab

Petroleum Services Company (APSCO); in addition to the Arab Petroleum Training Institute (APTI) and other JVs. He said that these institutions have played an influential role throughout the years by providing logistic and technical support to the Arab oil markets, as well as, putting together a huge database on exploration activities, reserves, prices, pipelines, refineries, economic indicators, and other important pieces of information that are vital to those working in the field.

HE Al Mazrouei pointed out that over the past five decades, OAPEC JVs have actively contributed to boosting the progress of the Arab petroleum industry through joint or individual petroleum projects they executed and/or funded in many OAPEC and non-OAPEC countries.

Talking about the UAE's adoption of

## WE PROVIDE ALL SUPPORT FOR THE STABILISATION OF OIL PRICES, BOTH ON ARAB AND GLOBAL LEVELS



the circular economy policy that has been endorsed by the country's Council of Ministers, the minister said that this policy is a comprehensive framework that sets a course to take the UAE towards achieving a sustainable management and effective use of natural resources through consumption and production approaches and techniques that ensure a quality lifestyle for current and future generations and promote efficient consumption of natural resources while reducing waste. He said that the UAE's interest in this economic and developmental transition is reflected in its national and strategic economic plans, especially the national energy strategy, which targets increasing the contribution of clean energy in the national energy mix to 50% by 2050 and improving consumption efficiency by 40%. He also referred to projects on converting

waste into energy, and industrial waste into resources to be used in other industries under the umbrella of circular economy.

HE Al Mazrouei gave more details by stating that one of the most significant projects in this regard is the establishment of the world's largest and most sophisticated plant for the conversion of solid waste into energy, costing about 2 billion Dirhams. He added that the project aims at making Dubai the world's most sustainable and smart city by 2021. The minister said, "about one million and 900 tons of household waste will be treated annually; whereas emissions will be processed safely and, in an environment-friendly way, in line with the highest international standards." It is worth mentioning that the UAE, through ADNOC, has developed and operated "Al Reyadah", the first commercial project of



its kind to capture and use CO<sub>2</sub> in boosting oil production, at a capacity of about 800 thousand tons of carbon captured from the Emirates Steel Plant.

The minister then moved to talk about COVID-19 and its repercussions saying that the pandemic has caused a sharp decline in global demand for fuel and its products to unprecedented low levels, especially in 2020. He clarified that it is normal to see negative impacts of low prices especially on oil producing and exporting countries, however, it is with God blessings and the directives of our wise leadership (through a bundle of flexible economic policies) that the UAE succeeded in managing its economy in

the face of these global challenges, including sharp oil price volatility. HE Al Mazrouei elaborated that these policies enabled the country to diversify its sources of income and prepare its economy for the post-oil era, which cleared any fears of declining prices. In the short run, the minister expected global prices to stabilise due to improved demand for fuel as a result of growing vaccination rates that led in turn to reducing the spread of the pandemic, lifting of lockdown, and the gradual return to pre-pandemic lifestyle.

Moving on to talk about COP26, HE Al Mazrouei noted that the UAE was the first country in the region to sign the Paris Agreement and the first to commit to cutting



## WE'VE CONTRIBUTED TO THE FOUNDATION OF MANY OAPEC JVS



emissions in all economic aspects, within its nationally determined contributions (NDCs). He said, “The national energy strategy 2050, has been drawn up to embody the government’s vision on developing the country as one of the most advanced and sustainable green societies.” The minister added that the goals of the strategy have been defined according to the government’s key national priorities including sustainability, GDP, happiness, welfare, and climate change; whereas, the national programme for managing energy and water demand will provide support through energy and water consumption conservation in the highest consuming sectors.

The minister explained that the UAE has played a big role in cutting the costs of generating electricity from solar power in the region; for example, Al Dhafra project (with a production capacity of up to 2 GW) registered a world record of lowest costs of photoelectric solar power production at 97.4 Fils per kilowatt/hour (which equals 35.1 US cents per kilowatt/hour).

As for advocating international efforts on carbon neutrality, HE Al Mazrouei stated that the UAE was leading the region in this respect “as our wise leadership announced the UAE Net Zero by 2050 Strategic Initiative,” a national drive to achieve net-zero emissions by 2050, making the Emirates the first nation



## WE SUCCEEDED IN CONFRONTING COVID-19 PANDEMIC REPERCUSSIONS ON OIL PRICES



in the region to do so, “and that calls for the efforts of all sectors to set an example for the rest of the world.”

On using carbon-free resources in the region- including nuclear energy for peaceful purposes, the minister said the UAE was the first country in the Middle East to add nuclear power to its electrical grid when it launched its first and second Barakah nuclear energy plants for commercial operations during 2020-2021. The UAE is also considering options for the production of green and

blue hydrogen, while being committed to developing a sustainable market for hydrogen as a fuel through international partnerships with the public and private sectors.

At the same time, the minister said that the UAE is working on various giant oil projects as ADNOC is working on unconventional gas resources as part of their comprehensive gas strategy to make the UAE gas self-sufficient by 2030 (160 trillion scf of recoverable unconventional gas resources have been discovered in November 2019).

HE Al Mazrouei explained that ADNOC plays a key part in meeting the UAE’s natural gas needs; so adding unconventional gas to the UAE’s portfolio (of 1 billion scf per day from Al Ruwais Thiab Concession before 2030) could be contributing to ADNOC’s ambitions to become a pure gas exporter while also providing the country with energy for future generations.

The minister said work is in progress at the giant Ghasha project, the world’s largest sour gas development project. The multi-billion dollars project will play a vital role in achieving the UAE’s gas self-sufficiency in line with ADNOC’s integrated gas strategy, which targets liberating and increasing the value of massive natural gas reserves in Abu Dhabi. It also aims at providing economical and sustainable gas supplies through the implementation of an integrated plan based on boosting production, upgrading performance, and delivering results while observing the best security and safety standards, the ideal use of resources, and improved energy efficiency and demand management.

Elaborating on the future of energy industry in the UAE, HE Al Mazrouei said that the UAE’s National Energy Strategy 2050, launched in 2017, aimed at increasing clean energy contribution to the total energy mix produced in the UAE to 50% by 2050, and

rationalizing individual consumption by 40%. The UAE has long-term approach in planning for energy future and cutting emissions resulting from the energy sector. He underscored that energy resources are varied in the UAE and go hand in hand with the varied technologies used in the country including: solar energy, nuclear energy, hydrogen, hydropower, bio fuel/gas, and waste-to-energy.

On achievements, the minister hailed the efforts of the Energy and Infrastructure Ministry that won them prestigious global awards in the various sectors during 2021. He disclosed that the secret behind this success is the distinguished and consistent taskforces that made winning such awards a natural result since they topped world reports on competitiveness. HE Al Mazrouei said the ministry spares no effort in implementing the world best practices through a research, development, creativity, and artificial intelligence system in collaboration with its strategic partners. He added that the ministry is working to ensure keeping up with the government's aspirations for the next 50 years through drawing up flexible action plans to actively contribute to achieving the centennial vision of 2071, supporting national economy, and achieving happiness and quality lifestyle for both citizens and residents.

The minister concluded his exclusive interview with OAPEC Bulletin by stressing that the Ministry of Energy and Infrastructure aims at continuing its sustainable development progress through harnessing all resources and potentials, while investing in expertise, brains, and exceptional competencies to develop energy, infrastructure, population, and transport sectors in a way that serves the government aspirations and vital interests.





**HE ENG. MOHAMED OUN:**

**OAPEC PLAYS IMPORTANT ROLE IN INTERNATIONAL COOPERATION**



OAPEC Secretary General,  
**HE Ali Ben Sabt**



Libya's Oil and Gas Minister,  
**HE Eng. Mohamed Oun**

OAPEC Secretary General, HE Ali Ben Sabt, received a letter from Libya's Oil and Gas Minister, HE Eng. Mohamed Oun, appreciating the important role OAPEC plays in international cooperation. The Minister said in the letter that Libya is looking forward to working actively under the umbrella of OAPEC and cooperating constructively with its counterpart member countries to serve the Organisation's interests and strengthen its cohesion in a way that contributes to its progress.

Also in the letter, HE Oun named Consultant, HE Adel Jibril, as Libya's Representative to OAPEC Executive Bureau.

On his part, HE Ben Sabt sent a replying cable expressing his deep appreciation for the substantial content of the Libyan Minister's letter that underscored Libya's interest in reclaiming and activating its OAPEC membership and cooperating with its counterpart member countries to serve the Organisation's interests and strengthen its cohesion in a way that contributes to its progress.

OAPEC Secretary General added that he was delighted to welcome cooperation with Libya and all OAPEC member countries in order to serve the public interest.

It is worth noting that Libya is a founding member country of OAPEC, along with Saudi Arabia and Kuwait; as the three countries signed OAPEC establishment agreement on 9 January 1968, in Beirut, Lebanon.

Qatar's State Minister for Energy Affairs, HE Eng. Saad Al Kaabi, sent a thanking cable to OAPEC Secretary General, HE Ali Sabt Ben Sabt, in reply to HE Ben Sabt's cable of congratulations on the reappointment of HE Al Kaabi.



Algeria's Minister of Energy and Mines, HE Mohamed Arkab, sent a thanking cable to OAPEC Secretary General, HE Ali Sabt Ben Sabt, in reply to HE Ben Sabt's cable of congratulations on the 67th Anniversary of the Algerian Revolution on 1 November.

Algeria's Representative at OAPEC Executive Bureau, HE Dr Medjelled Miloud, sent a thanking cable to OAPEC Secretary General, HE Ali Sabt Ben Sabt, in reply to HE Ben Sabt's cable of congratulations on the 67th Anniversary of the Algerian Revolution on 1 November.





## HE BEN SABT:

# OAPEC KEEN ON COORDINATING CLIMATE CHANGE ISSUES WITH ITS MEMBER COUNTRIES



OAPEC Secretary General, HE Ali Sabt Ben Sabt, said international negotiations on the UNFCCC have reached a critical point due to the COVID-19 pandemic, as there has been no chance for the Parties to hold official in person meetings since COP25 meetings in Madrid, Spain, in December 2019. He added that this situation has caused confusion to the negotiation scene, especially for the developing countries.

HE Ben Sabt's statements came in his speech at the opening of the 28th Coordination Meeting of OAPEC Environment and Climate Change Experts, held virtually on 13 and 14 October 2021, with the participation of 40 climate change and environmental experts from: Bahrain, Algeria, Saudi Arabia, Syria, and Kuwait. Arab League and GCC Council Secretariat General officials in charge of the environment and climate change dossier participated in the meeting.

The meeting was administered by the Director of Finance and Administrative Affairs at OAPEC, Mr Abdul Kareem Ayed, who is in charge of the environment and climate change dossier. He presented a key paper on the latest developments of the Paris Agreement 2015, and



preparations for the negotiations in Glasgow, the UK in 2021.

HE Ben Sabt added, “In light of the current conditions, we believe that developing countries should enjoy and benefit from a wide range of options including: flexibility, rescheduling their economic agendas to adapt to national conditions, as well as, highlighting the importance of using all energy resources in tackling energy poverty and transition to low-cost, reliable, sustainable, and modern energy for all by the year 2030.”

The Secretary General underscored OAPEC keenness on continued coordination and exchange of views with the member countries and relevant Arab organisations regarding the various aspects of the progress of climate change negotiations to coordinate stances, especially that the COP26 in Glasgow, UK, is fast approaching within a few days.

HE Ben Sabt clarified that the Secretariat General has been organising such coordination meetings on a regular basis before the Conference of the Parties every year; and this year has been no exception with the advent of COP26 that has been postponed due to the COVID-19 pandemic. He explained that this meeting, like other coordination meetings held by the Arab League and the Arab Negotiating Group on Climate Change, provides a platform to discuss issues that need prior coordination and unified stances among OAPEC member countries in order to safeguard their interests and those of future generations of their people.

The Secretary General concluded his speech by congratulating Egypt and the UAE for hosting the next COP27 and COP28 respectively.



## OAPEC JOINT VENTURES' 50<sup>TH</sup> COORDINATION MEETING



OAPEC Secretariat General held its 50th Coordination Meeting for OAPEC Joint Ventures, in Cairo, Egypt, on 23 October 2021. The meeting was chaired by OAPEC Secretary General, HE Ali Sabt Ben Sabt; and it was attended by the CEOs and GMs of Arab Maritime Petroleum Transport Company (AMPTC), Arab Shipbuilding and Repair Yard Company (ASRY), Arab Petroleum Services Company (APSCO) and its subsidiaries.

The JV representatives gave a briefing on their companies' activities and operations, as well as, their financial results, number of Arab and non- Arab staff, training policies, in addition to the challenges they faced in light of the COVID-19 pandemic during 2020 and H1/2021. They have also discussed business challenges the JVs are facing and their potential solutions, as well as, boosting the JVs cooperation with national companies of similar nature in the member countries.

On his part, HE Ben Sabt informed the conveners of the Secretariat General endeavours to activate relations between OAPEC and its JVs in the past period, their positive outcome, recommendations, in addition to the features of the action plan approved by the taskforce formed to boost this cooperation. The JVs Reps lauded the Secretariat General efforts in this regard and the good results achieved so far while stressing their continued support to carry on with activating their cooperation with the Organisation.

The Meeting agreed a number of recommendations that would be included in the annual report on the JVs activities, which would be then submitted to OAPEC Council of Ministers at their next meeting in December 2021 for their consideration. At the end of the meeting, OAPEC Secretary General extended his thanks to the JVs Reps for their constructive collaboration with the Organisation while underscoring the vital importance of this dossier. HE Ben Sabt also reiterated the importance of continued coordination and communication through such meetings to boost and support the JVs businesses and their purposes.

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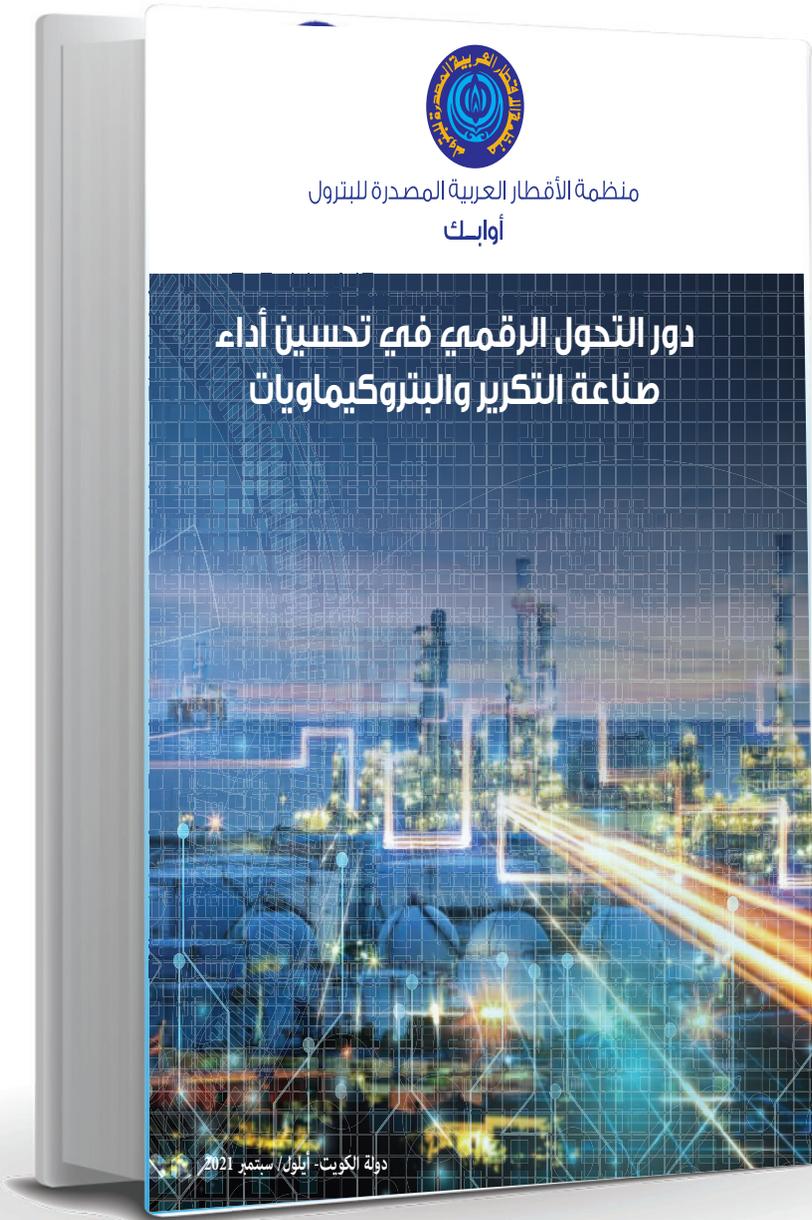
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OAPEC



## THE ROLE OF DIGITAL TRANSFORMATION IN IMPROVING THE PERFORMANCE OF THE REFINING AND PETROCHEMICAL INDUSTRY



Refining and petrochemical industries are faced with various challenges, such as changing, market scenarios, global competition, increased regulatory pressure, decreased oil products demand, and increase in operating and maintenance cost.

To cope with these challenges, refining and petrochemical industry is trying to improve its performance through looking for available methods to minimise costs and ensure high competitiveness.

The purpose of this study is to shed light on the role of digital transformation in achieving the operational excellence in refining and petrochemical industry.

The study includes three chapters. The



first chapter reviews the most important digital technologies applied in the refining and petrochemical industry, such as the industrial Internet of Things, Digital Twin, Augmented Reality, Cloud Computing, Machine Learning, Artificial Intelligence and Robotics.

The second chapter explains the role of applying the digital technologies in improving the performance business operations of refining and petrochemical industry. These include predictive analytics to forecast equipment and asset health and optimize maintenance of critical equipment and AI-based technology to increase the efficiency of operations and facilitate lower carbon footprint.

The third chapter addresses the success factors behind developing a digital transformation strategy and build bridges in several areas, which are related with information, data, processes, technologies, human aspects and much more. The third chapter also reviews the states of applying digital transformation. The chapter also addresses there are several initiatives emerging in the refining and petrochemical industry related to digital transformation in the Arab countries, most of these initiatives are centered in OAPC member countries which have export oriented refining and petrochemical complexes. The objectives of these initiatives are enhancing the operational excellence to continue their role as strategic suppliers to the international markets, through improving plant availability, and minimizing unscheduled shutdown of the units, optimizing maintenance of critical equipment, and reducing the carbon footprint.

The study includes several case studies of



applying digital technologies in refining and petrochemical industry in some world regions, and Arab countries. These case studies provide lessons learned from the experiences of others in applying digital transformation in its operational aspects.

The study concluded that the digital transformation could bring a significant benefit to the refining and petrochemical companies. One of the most important factors that enable refining companies to improve its performance is embedding digital capabilities in all aspects of their operations. Furthermore, digital technologies could help refiners to reduce costs, improve revenues and margins and make their work environments more efficient, reliable, and safe.

Also, the study recommends that the OAPC's member countries must issue the necessary regulations for sharing historical data between different refining and petrochemical companies to be used for predictive analysis which can forecast equipment and asset health and helps the operator to predict the failure of an equipment before it happens.