EGYPT
OIL&GAS
NEWSPAPER

PROUDLY THE OFFICIAL PUBLICATION

EGYPS
EGYPT PETROLEUM SHOW
14 - 16 February 2022 | Egypt International Exhibition Center

CELEBRATING

175

ISSUES

INDUSTRY INSIGHTS

ENERGY TRANSITION FOR OIL PLAYERS:
A CHALLENGE TO SURVIVE OR A CHANCE TO REVIVE?

SCAN TO DOWNLOAD EOG MOBILE APP

Congratulations to Egypt Oil and Gas on its 175th issue. This long journey has been fulfilled through hard work and talent. Over the years, the EOG's publications have managed to obtain widespread recognition in the Oil & Gas industry, and I am sure it will continue as a marketing partner to the Egyptian Sector.

H.E. TAREK EL MOLLA
Minister of Petroleum and
Mineral Resources

"On behalf of Energean, I congratulate Egypt Oil & Gas (EOG) Newspaper on the issuance of its 175th edition. Over the last decade, EOG has served as the most reliable and comprehensive source of information for the Egyptian energy sector, providing timely and insightful analysis that has helped shape a holistic view of the most important issues facing the sector. Egypt is one of our core countries of operation, where we have an active investment program, and I look forward to continuing to work with EOG as we progress our key development projects and advance the energy transition in the wider Mediterranean region.

MATHIOS RIGAS
CEO
ENERGEAN

Congratulations Egypt Oil & Gas on your 175th issue! Over the years, you have proven to be a trusted and reliable partner to the oil and gas sector, demonstrated through your various initiatives, activities and publications that deliver great value to the whole industry. Keep up the good work EOG!

ENG. KHALED KACEM
VP Egypt & Chairman
SHELL – EGYPT

In celebration of Egypt Oil and Gas 175th issue, I would like to congratulate The Egypt Oil and Gas E team and its great leader Mohamed Fouad for a fantastic great journey.
Over the years, tremendous coverage, analysis and debates, all conducted with professionalism and passion.
EOG developed solidly to become the voice of Egypt's Oil & Gas Industry. On behalf of TAQA and the Egyptian Gas Association, many congratulations and Thank you Egypt Oil & Gas.

KHALED ABU BAKR
Executive Chairman
TAQA ARABIA

Congratulations to the entire team at Egypt Oil and Gas on your 175th issue. Your publications showcase the petroleum sector's important role in the Egyptian economy and in providing energy that is critical to Egyptians and others across the globe. You are one of the most important sources of information and insights that I rely on. Thank you for what you do and congratulations again.

DAVID CHI
Vice President and Country Manager
APACHE

On behalf of the U.S.-Egypt Business Council, I want to applaud Mohamed Fouad and the team at Egypt Oil and Gas on their 175th issue. Our council leadership and membership include many leading oil and gas companies doing business and investing in Egypt, and we truly value your publication as a highly trusted resource for the energy industry in Egypt. Congratulations on this significant milestone and keep up the great work!

STEVE LUTES
Executive Director
US-EGYPT BUSINESS COUNCIL

Congratulations to the team at Egypt Oil and Gas Newspaper for their milestone 175th edition. The EOG team has grown considerably and the coverage expanded over the time since issue #1. The Egypt Oil and Gas Newspaper has become the industry standard, with readership from all over the world able to stay connected with Egypt's successful and ever-evolving oil and gas sector.

THOMAS MAHER
President and COO
APEX INTERNATIONAL ENERGY

Egypt Oil and Gas has continued to be the most reliable source of news and information for the Oil & Gas sector in Egypt! Its role has extended beyond media to the level of a real positive influence on the business environment and an enabler for the industry players to collaborate and achieve synergies

SAMEH SABRY

Senior Vice President and Managing Director Egypt

WINTERSHALL DEA

At Methanex Egypt, we consider Egypt Oil and Gas the leading industry magazine with its insightful articles and excellent technical analysis that acquaint readers and sector executives with the latest industry news and trends. In an age of information overload, their print, online and social media channels cut through the noise providing reliable and focused knowledge exchange platforms for the Egyptian oil and gas audience. We are proud of our collaboration with EOG that has allowed us to maintain a consistent positive presence in the market on many key business occasions and events and we look forward to more cooperation and success in the future. Happy 175th Issue.

MOHAMED SHINDY

Managing Director

METHANEX EGYPT

On the occasion of the 175th issue of Egypt Oil and Gas Newspaper and on behalf of Kuwait Energy Egypt, I express my sincere congratulations to all of the publishers, editors, writers and readers to reaching such milestone. EOG has succeeded in moving beyond just a simple information provider newspaper to an integral part of the community. EOG has been an effective tool that is engrained in the Egyptian petroleum sector and offers timely, consistently accurate news, data and analysis. In addition, it played a dynamic role in supporting Egypt oil and gas sector and promoting its achievements.

KAMEL EL SAWI

President

KUWAIT ENERGY EGYPT

Having been around for some time, I have not seen a media partner that contributed to the business as much as Egypt Oil and Gas Newspaper. It is much more than a news agency. It became a real source of data and information that was compiled and analyzed professionally to showcase the great efforts exerted by both government agencies and companies that took the industry to a different level of performance. It created a platform for industry leaders to discuss challenges and opportunities and to propose plans for improving the business environment. Sure, this achievement could never be realized without the visionary leadership of Egypt oil and Gas and the very dedicated team behind this success story.

SAMIR ABDELMOATY

Country Manager

UOG EGYPT

I would like to congratulate Egypt Oil and Gas distinguished team for the 175th edition bringing over the years premium information and updates of the Egyptian Oil and Gas sector showcasing the successes of the sector, investment opportunities , engaging interviews with sector leadership highlighting how collectively the modernization of the sector is delivering tangible impact on the Country GDP building on its unique talent pool, geographic location and becoming a significant regional hub! Schlumberger is proud to be a strategic performance partner of choice and together creating amazing technology that unlocks access to energy for the benefit of all.

KARIM BADAWI

Managing Director Egypt and East-Mediterranean

SCHLUMBERGER

Congratulations on the 175th issue of EOG. We consider EOG as an integral part of the DNA of Egypt's O&G community. It's a one-stop shop to monitor the macro and micro dynamics of the sector with quality information. It also plays a pivotal role as a hub, connecting all stakeholders to facilitate positive outcomes for the industry.

TAMEER NASSER

Director and General Manager Egypt & Sudan

BAKER HUGHES

Congratulations Mohamed Fouad and EOG Team on this remarkable achievement. EOG newspaper has been the voice of the industry throughout recent years and more recently has been the glue that kept us connected despite the constraints imposed by Covid-19.
I wish EOG continued success in bringing the sector stakeholders together and leveraging the diverse knowledge and experience to enhance the performance of the sector towards the benefit of Egypt and the various stakeholders.

SAMI AMIN

Egypt Managing Director

SUBSEA7

On behalf of NESR - National Energy Services Reunited Corp - I would like to congratulate each member of Egypt Oil and Gas team for the 175th Issue milestone.
Egypt Oil & Gas Newspaper has firmly established itself as a premier source of exclusive and high-quality news, covering the entire spectrum of the Petroleum Industry; it never failed to provide consistently accurate news, data and analysis while ensuring that all the latest industry challenges and current trends are highlighted.
Wishing EOG every success for the future.

ISMAIL EL KHOLY

Chairman

NESR – EGYPT

EDITOR'S LETTER

175 Months of Success

This month, Egypt Oil & Gas (EOG) Newspaper marks its 175 issues. Our success lies within this huge milestone that we would like to celebrate with all our partners. Egypt Oil & Gas has been connecting the industry pieces since 2007, and it will continue to do so and provide its readers with insightful analyses.

HE. Eng. Tarek El Molla, The Minister of Petroleum and Mineral Resources alongside with high level industry leaders shared their supportive words with us to show how EOG is changing the industry's landscape in partnership with their reputable institutions.

Energy transition, decarbonization, and reducing CO2 emissions are hot topics that have been discussed widely during the past couple of years. Thus, we dedicated our July issue to discuss energy transition and its impact on the oil and gas industry globally and nationally.

We had a good change to interview Dr.Hala El Manakhly, Risk Management Assessor Expert and Eng. Mohamed Hanafy, Services Director at Triangle Energy. They shared their thoughts about Egypt's path towards energy transition. In our industry insights section, we discussed the challenges and opportunities of energy transition and how it will impact the future of the oil and gas industry.

Our Research and Analysis team prepared a full report tracking the developments of giant Zohr since its discovery in 2015 until 2020.

This month we added a new section to our issue. The section a legal section that tackles different oil and gas related topics.

Wish you all informative read!
Happy Eid Adha!

MAHINAZ EL BAZ
Acting Editor-In-Chief
Research & Analysis Manager

CONTENTS

EGYPT'S PATH TOWARD ENERGY TRANSITION

Bulding 130, 2nd District, Fifth Settlement, New Cairo, Egypt

(+20) 2 25602193 (+20) 2 25602194 (+20) 2 25650489

/EgyptOilandGas /EgyptOilandGas /Egypt-Oil-&-Gas /EgyptOilandGas /EgyptOilandGas

info@egyptoil-gas.com www.egyptoil-gas.com

EGYPT OIL&GAS NEWSPAPER

EGYPT'S LEADING OIL & GAS MONTHLY PUBLICATION

Research & Analysis Manager
MAHINAZ EL BAZ

Managing Editor
IHAB SHAARAWY

Senior Editors
RANA AL KADY
SHAIMAA BEHERY

Senior Writer
JASMINE SHAHEEN

Staff Writers
FATMA AHMED
LOBNA HEFNY

Research Analysts
AMINA HUSSEIN
REHAM GAMAL
TASNEEM MADI

Statistician
NADA ABBAS

Chief Reporter
WAEL EL-SERAG

Business Development Director
AYMAN RADY

Marketing Manager
TAMARA EWISS

Creative Art Director
OMAR GHAZAL

Art Director
MAGED KHATTAB

Graphic Designers
MARIAN WAEL

3D Visualizer
TAMER GAMAL

Photographer
AMIR WILLIAM

Operations & Financial M.
ABDALLAH ELGOHARY

Managing Director Assistant
NOHA HESHAM ZAYED

Web Master
OLFAT KAMEL

Web Developer
AYMAN ELASH

Administration
TAGHREED MOUNIR

Accountants
MAHMOUD KHALIL
MOHAMED NAGY

Distribution Officers
MAHSOUB KENZI
MOHAMED EL-SAYED
MAHMOUD NABIL
OSAMA MOHAMED

Publisher
MOHAMED FOUAD

TOP 5

EGYPT'S PETROLEUM EXPORTS GROW BY 33.8% IN Q1 2021

Egypt's petroleum exports have gone up by 33.8% in Q1 2021, recording $1.819 billion against $1.359 billion in Q1 2020.

Crude oil exports increased and accounted for $399 million, natural gas exports recorded $564 million, and mazut exports recorded $522 million.

Egypt's petroleum exports have gained interest from several countries as they accounted for $421 million in Malta, $272 million in India, $226 million in Greece, $201 million in China, and $105 million in Italy.

On the other hand, Egypt's petroleum imports declined during Q1 2021 by 11.4%, to reach $1.879 billion compared to $2.121 billion in the same period last year. Crude oil imports declined and recorded $643 million compared to $1.32 billion in the same period in 2020. Additionally, petroleum imports from Saudi Arabia fell to $720 million, followed by Kuwait with $290 million, the US with $82 million, Algeria with $12 million, and Iraq with $2 million.

OAPEC: EGYPT MOST GROWING ARAB LNG EXPORTER IN Q1 2021

The Organization of Arab Petroleum Exporting Countries (OAPEC) has announced that Egypt topped the list of the most growing Arab exporters of liquefied natural gas (LNG) during Q1 2021.

Egypt exported about 2 million tons of LNG in comparison to 0.4 million tons during Q1 2020, which reflects an increase of 400% on annual basis. This growth rate is the highest during the last period after Egypt had been affected by the covid 19 repercussions due to low oil prices.

The increase was achieved thanks to the operation of IDKU plant with its full capacity of 7.2 million tons per year, in addition to the reoperation of Damietta LNG plant after an eight year-halt.

Damietta plant is expected to contribute to the growth of Egypt's exports during Q2 2021, but this is subject to the dynamics of oil prices.

AL-SISI ISSUES NEW DECREE FOR E&P ACTIVITIES IN RED SEA

President Abdel Fattah Al-Sisi issued Law No. 160 of 2020 empowering the Minister of Petroleum and Mineral Resources, Tarek El Molla, to contract with international oil companies (IOCs) for exploration and production (E&P) activities in the Red Sea.

Accordingly, the minister will contract with Ganoub El Wadi Petroleum Holding Company (Ganope), Shell E&P B.V., and Mubadala Petroleum, and Tharwa Petroleum Company for E&P activities in Block 4 of the Red Sea.

PARLIAMENT APPROVES BILLS OF E&P IN SOUTH GHAREB, EASTERN DESERT

The House of Representatives has approved two draft laws, submitted by the government, authorizing the Minister of Petroleum and Mineral Resources to contract for exploration and production (E&P) activities in South Ghareb and the Eastern Desert.

The first draft law allows the Petroleum Minister to contract with General Egyptian Petroleum Corporation (EGPC) and BP Egypt company for petroleum E&P operations in A and B blocks, at a space of about 40 kilometer square in the South Offshore Ghareb, at the Gulf of Suez.

The second draft law enables the Petroleum Minister to contract with Ganoub El Wadi Petroleum Holding Company (Ganope) and the Egyptian National Petroleum for Exploration and Development (ENPEDCO) to conduct E&P activities in Wadi Deb area in the Eastern Desert.

MOP AWARDS UOG NEW DEVELOPMENT LEASE IN ABU SENNAN

Minister of Petroleum and Mineral Resources, Tarek El Molla, awarded United Oil and Gas (UOG) Company a development lease that covers the ASD-1X discovery in Abu Sennan.

This is the eighth development lease in the Abu Sennan concession. Production from the ASD-1X well shows a combined initial gross rate of 1,295 barrels of oil per day (bbl/d) from the Abu Roash C (ARC) and Lower Bahariya reservoirs. As a result of the fast turnaround within less than two months, UOG expects the well would pay for itself within less thconcession. The ASD-1X exploration well safely reached a total depth (TD) of 3,750m measured depth (MD) on March 30, several days ahead of schedule and under budget. The well encountered 22 meters net pay, and on preliminary testing flowed at gross rates of 1,619 bbl/d from the Lower Bahariya reservoir and 1,215 bbl/d from the ARC reservoir.

A BLAST FROM THE PAST

In July 2003, the first phase of the Arab Gas Pipeline (AGP) was launched. The story began in 2000 when an agreement was reached to establish a gas pipeline to export Egyptian natural gas to Europe. The first phase connected Al-Arish in North Sinai to Al Aqaba in South of Jordon with investments of $220 million and a capacity of 10 billion cubic meters per year (bblcm/y).

In 2004, Egypt, Jordan, Syria and Iraq agreed to extend the pipeline to Iraq in order to export its natural gas to Europe but this agreement wasn't implemented due to the US war on Iraq. The second phase of the project was completed in 2007 connecting Al Aqaba to Al Rehab City in Jordon with a length of 390 kilometers at a cost of $300 million.

In 2006, Egypt, Syria, Jordon, Lebanon, Turkey, and Romania agreed to extend the AGP to the Syrian-Turkish borders and then to the Nabucco pipeline to be delivered to Europe. By 2008, an extension started operation connecting Al Rehab city to Syrian -Jordanian borders at a cost of $35 million. After that in 2008, the fourth phase was commenced to extend the pipeline to Homs and it was planned to reach Turkish borders and then to Europe.

In 2011, the pipeline was halted after several attacks in different areas due to the war in Iraq and Syria.

NUMBER OF THE MONTH

Raven Field Current Gas Production

600 mmcf/d

The production from the West Nile Delta Project (WND) continued in the fifth field. Production from the Raven field started in **April 2021** with an expected gross rate of **900** million cubic feet per day (mmcf/d) of natural gas and **30,000** barrels per day (bbl/d) of condensates. The onshore facilities of the WND project, including the new Raven facility, currently have a total gas processing capacity of around **1.4 billion** cubic feet of gas per day (bcf/d).

The Raven field, which was discovered in **March 2004**, is part of the WND development project that involves five gas fields including Taurus, Libra, Giza, Fayoum.

EXPLORATION

PHAROS ENERGY ENCOUNTERS OIL AT BATRAN-1X

Pharos Energy plc encountered oil at Batran-1X exploration well in the Abu Roash Lower "G" (LARG) and the Upper Bahariya (UB) reservoirs in Egypt.

The Batran-1X commitment exploration well was drilled 4 kilometers west of the Main Tersa-1X well on a fault-bounded and three-way-closed dip potential.

The well encountered 15.85 meters of net oil pay in the LARG and UB sands. In addition, oil was encountered whilst drilling in the Abu Roash "A", "D" and "E" sands.

The Batran-1X well will be completed as a potential future producer in the LARG and UB reservoir sections, using a workover rig as part of El Fayum field activities ramp up phase.

PRODUCTION

SIDPEC'S PROFITS BOUNCES BACK WITH EGP 151.7 MM IN Q1 2021

Sidi Kerir Petrochemicals (Sidpec) has earned a net income of EGP 151.7 mn in Q1 2021 against a net loss of about EGP 31.3 million in Q1 2020.

Net sales jumped by 38% compared to Q1 2020, recording EGP 1.3 billion. The company stated that it sold about 8,103 tons of ethylene during the quarter, indicating an increase of 119% compared to Q1 2020. Meanwhile, the company's polyethylene sales dropped by 12% during the quarter, selling only 46,389 tons.

Sidpec also sold about 9,049 tons of butane to the Egyptian Natural Gas Company (GASCO), and about 2,017 tons of naphtha to Alexandria National Refining and Petrochemicals Company (ANRPC) in Q1 2021.

PETROSANNAN BOOSTS OIL, NATURAL GAS PRODUCTION IN FY 2020/21

Petrosannan Company, a joint venture (JV) between Naftogaz of Ukraine (NJSC) and the Egyptian General Petroleum Corporation (EGPC) has increased its oil and natural gas production by 20% and 40%, respectively during the fiscal year (FY) 2020/21.

The company adopted a program to increase hydrocarbon production, intensify well productivity, and increase the resource base. Petrosannan adopted several measures to do so that included oil fields water flooding, fracturing campaigns to increase well productivity and drilling to increase oil and gas production in the Alam El Shawish area.

ACHIEVEMENTS

CAIRO GAS RECEIVES TWO ISO CERTIFICATES IN UAE

Cairo Gas has announced that it received two ISO Certificates for its United Arab Emirates (UAE) branch. Namely, the certificates are ISO 45001: 2018, and ISO 14001: 2015.

The ISO 45001: 2018 certificate is for occupational health and safety systems (OH&S), while the ISO 14001: 2015 certificate is for an environmental management system that is used to enhance its environmental performance.

GASTEC GETS ISO CERTIFICATES IN HSE

Gastec company has been awarded the ISO certificate 45001:2018 regarding occupational health and safety management and managed to renew its ISO certificate 14001:2015 regarding the environment management system.

Chairman of the Board of Directors and Managing Director Abdel Fattah Farahat mentioned that Gastec is highly interested in health, safety, environment and quality (HSEQ) measurements in all its operations.

Farahat elaborated that this interest aligns with the Ministry of Petroleum and Mineral Resources strategy to apply the best international HSE standards within the industry.

DOWNSTREAM

MOP TO SUPPLY 1,332 VILLAGES WITH NATURAL GAS UNDER HAYAT KAREEMA INITIATIVE

The Ministry of Petroleum and Mineral Resources is aiming to connect 1,332 villages with natural gas as a part of Hayat Kareema initiative, Tarek El Molla, Minister of Petroleum and Mineral Resources, stated during a meeting with Prime Minister Moustafa Madbouly.

Out of the 1,332 villages, 199 villages are currently underway to be connected with natural gas at a cost of EGP 3.3 billion. The natural gas delivery project will reach another 423 villages, as soon as the sanitation projects are completed, at a cost of EGP 5.5 billion, and 710 other villages at a cost of EGP 7.5 billion.

The ministry has already connected 59 villages to natural gas in addition to another 12 villages that are underway.

COOPERATION

EL MOLLA IN JORDAN TO DISCUSS WAYS TO ENHANCE JOINT COOPERATION

The Minister of Mineral Resources, Tarek El Molla, met with Jordan's Energy Minister, Hala Zawati, in Amman, Jordan to discuss ways to enhance bilateral cooperation in the oil, gas and mineral resources fields.

Both ministers agreed that the Egyptian petroleum sector will support training of Jordanian cadres in the oil and gas field. Both ministers also witnessed the signing of two appendices to contracts to supply natural gas supply and operate expansions of the natural gas network in Jordan carried out by the Jordanian Egyptian FAJR for Natural Gas Transmission and Supply Co. Ltd.

El Molla praised the cooperation between the two countries, especially in the field of natural gas, which has witnessed remarkable economic development in both countries.

EGYPT ALLOCATES EGP 2.1 B FOR GREEN INITIATIVE INCENTIVES

Egypt has allocated EGP 2.1 billion in the coming fiscal year's budget to finance the first phase of the green initiative, which aims to replace 250,000 vehicles to run on natural gas in the governorates of Cairo, Giza, Qalyubia, Alexandria, Suez, Port Said, and the Red Sea, Mohamed Maait, Minister of Finance.

The Ministry of Finance plans to expand the project in Port Said Free Zone in addition to allowing other governorates to join the initiative as soon as they have the necessary infrastructure. The ministry also stated that they would allow any new company operating in Egypt to join the initiative, provided that its vehicles meet the minimum local component requirement of 45%.

AGREEMENTS

EGAS SIGNS CONTRACT FOR CONVERSION OF 2262 BUSES

Prime Minister, Mostafa Madbouly has attended the signing ceremony of an agreement to convert 2262 buses, affiliated to Public Transport Authority, to run on natural gas in Cairo and Alexandria for about EGP 1.2 billion.

The agreement was signed by the Egyptian Natural Gas Holding Company (EGAS) on behalf of the Ministry of Petroleum and Mineral Resources, and ministries of finance, local development, military production and Public Transport Authority of Cairo and Alexandria, in the presence of Tarek El Molla, Minister of Petroleum and Mineral Resources.

This agreement came within the framework of President Abdel Fattah Al-Sisi's directives to modify and replace cars to run on natural gas in order to achieve the economic optimum benefit from natural gas and to maximize its added value. The Ministry of Finance will fund the project over six operational stages effective from the fiscal year (FY) 2021/22.

EGPC RENEWS OIL IMPORT CONTRACT WITH IRAQ'S SOMO

The Egyptian General Petroleum Corporation (EGPC) renewed its contract with the Iraqi government to import about one million barrels (bbl) of crude oil per month.

The contract was renewed last April under the same terms of the 2017 contract when EGPC and Iraq's State Organization for Marketing of Oil (SOMO), signed the first contract to supply 12 million barrels (mmbbl) of Basra crude to the local market for a year and with payment facilities for a period of three months.

KORRA ENERGI INKS SUPPLY DEAL FOR FLARE GAS RECOVERY

Korra Energi has struck a deal with an unnamed US company to supply the equipment and technology system for the flare gas recovery project.

The project is currently being implemented for Amreya Petroleum Refining Company (APRC) and in cooperation with the Egyptian Maintenance Company (San Masr).

The project's production capacity is estimated at 100,000 barrels (bbl) of butane and 3,500 bbl of condensates annually, in addition to 1.4 billion cubic feet per year (bcf/y) of hydrogen to be used as an alternative fuel for natural gas in furnaces.

CAIROGAS SIGNS NG PROTOCOL WITH BANQUE MISR

Cairogas company announced that its Chairman of the Board of Directors and Managing Director, Mohamed Fathy, has signed a cooperation protocol with Banque Misr to fund the project of natural gas delivery to the industrial customers in Badr city.

According to the agreement, Banque Misr will provide installment facilities for the customers who

want to apply for natural gas connection with easy conditions.

KIMA TO RESTRUCTURE EGP 6.8 B IN OUTSTANDING DEBT

The Egyptian Chemical Industries (Kima) has agreed in principle with a consortium of six local banks to restructure EGP 6.8 billion in outstanding debt.

The company did not disclose the six banks involved in the process but expects the lending banks to complete their review of the restructuring process during the second half of July.

INVESTMENTS

EGYPT PREPARES A STRATEGY FOR GREEN HYDROGEN PRODUCTION

Minister of Petroleum and Mineral Resources, Tarek El Molla, announced that Egypt is currently preparing a green hydrogen production strategy and is ready to be one of the producing countries of green hydrogen due to its distinct climate.

El Molla added that the strategy targets producing green hydrogen in all types, noting that it is being prepared by the national committee commissioned by Prime Minister, Mostafa Madbouly.

The minister also declared that the Ministry of Petroleum along with the Ministry of Electricity and Renewable Energy are conducting workshops and that a working paper is being prepared as initial step. This paper will be announced soon once completing an integrated strategy with the other state's sectors.

SHAKER: GREEN HYDROGEN INVESTMENTS TO REACH $3-4 B

Minister of Electricity and Renewable Energy Mohamed Shaker hinted that Egypt's green hydrogen projects could cost about $3-4 billion in the early stages.

Shaker remarks came on the sidelines of the first forum of the heads of African Investment Promotion Agencies (IPAs) in Sharm El Sheikh. Shaker said the ministry intends to present the feasibility studies of the projects to the Sovereign Fund of Egypt (SFE) and several other parties.

He also pointed out that the ministry targets the production of 42% of energy from renewable resources by 2035. This will open doors for partnerships with the private sector.

EL MOLLA DISCUSSES PETROCHEMICAL COMPLEX PROJECT PLAN WITH HONEYWELL

Tarek El Molla, Minister of Petroleum and Mineral Resources, has received a delegation from the International Honeywell Corporation, specialized in providing technical support for petroleum projects, to discuss and review steps that will be implemented in the Red Sea Petrochemical Complex project in Ain Sokhna, after signing a land allocation contract.

The delegation was headed by Rajeev Gautam, President and CEO of Honeywell Performance Materials and Technologies (PMT). El Molla emphasized the significance of coordination and integration between Honeywell Corporation and the companies that will jointly implement the project, in order to develop a work program and an action plan upon specific goals.

Both sides also tackled Honeywell's involvement in the field of Egyptian cadres training on the latest international technologies in the various petroleum fields, in addition to ways of boosting cooperation between the sector companies and the international companies in other projects inside and outside Egypt.

ENOC, PETROMIN COMPETE FOR WATANIYA PETROLEUM STAKES

Dubai's state energy firm, Emirates National Oil Company (ENOC), and Saudi Arabia's Petromin Corporation have entered the bidding race for a majority stake in the army-owned gas station operator, Wataniya Petroleum.

Both companies join Abu Dhabi National Oil Company (ADNOC) and Taqa Arabia in a bidding race that is expected to be finalized before the end of 2021. The company that will win the bidding round would partner with the Sovereign Fund of Egypt (SFE) in taking joint full ownership of Wataniya Petroleum, which has more than 200 stations.

The winning company will acquire a stake of 80-90% at Wataniya, whereas the SFE will retain the remaining 10%-20% stake for itself.

ENI

ENI, PARTNERS MERGE MELEIHA, MELEIHA DEEP CONCESSIONS

Eni has signed an agreement with the Egyptian General Petroleum Corporation (EGPC) and Lukoil to merge the Meleiha and Meleiha Deep concessions into a new concession called Merged Meliha in the Western Desert.

The merged Meleiha concessions will be extended to 2036, with the possibility of reaching further to 2041. The agreement will unlock considerable resources and allow to further exploit the region's gas reserves, strengthening Eni's role as the largest gas producer in Egypt.

In order to further expand its role in Egypt, Eni will construct a new gas treatment plant that will be connected to the Western Desert Gas Complex in Alexandria and will allow it to further exploit the region's gas reserves. The company will also capitalize on the skills of local contractors who are already involved in the implementation of significant projects in Egypt such as the Zohr gas field.

ENI COMPLETES DRILLING, TESTING OF MAHA 2 WELL OFFSHORE INDONESIA

Eni successfully drilled and tested the Maha 2 appraisal well in West Ganal block offshore Kalimantan, in Indonesia. The field is operated by Eni and located 16 km Southeast of Jangkrik FPU.

The Maha-2 well drilled in 1,115 meters water depth, encountered 43 meters of gas-bearing net sands in Pliocene reservoirs, with, production test delivering flow rates of up to 34 million standard cubic feet per day (mmscf/d). Eni will use the test and coring data in its studies for the field development plan, and other plans to drill two further appraisal wells. The most likely outcome is a subsea completion and tie-in to the Jangkrik FPU.

ENI ANNOUNCES NEW OFFSHORE DISCOVERY IN NORWAY

Eni has announced a new significant oil and gas discovery in production license PL027 in the Southern North Sea of Norway, after drilling three wells; wildcat Prince 25/8-20 S, King 25/8-20 B, and the appraisal side-track 25/8-20 C in the King Paleogene prospect.

The exploration well is considered as commercial discovery. The Prince Wildcat well encountered an oil column of about 35 meters in Triassic Skagerrak formation within good to moderate reservoir sandstones. In addition, Wildcat well king well held a gas column of about 30 meters and a light oil column of about 55 meters with excellent reservoir properties.

Meanwhile, additional King appraisal proofed a gas column of about 40 meters and an oil column of about 55 meters. The well wasn't formation tested, but extensive data collection was made indicating production potential of about 10,000 barrels of oil equivalent (boe) per well. The wells also have total hydrocarbons potentials of 220-360 million barrels of oil equivalent (mmbloe).

UOG

MOP AWARDS UOG NEW DEVELOPMENT LEASE IN ABU SENNAN

Minister of Petroleum and Mineral Resources, Tarek El Molla, awarded United Oil and Gas (UOG) Company a development lease that covers the ASD-1X discovery in Abu Sennan. This is the eighth development lease in the Abu Sennan concession.

Production from the ASD-1X well shows a combined initial gross rate of 1,295 barrels of oil per day (bbl/d) from the Abu Roash C (ARC) and Lower Bahariya reservoirs. As a result of the fast turnaround within less than two months, UOG expects the well would pay for itself within less than a year.

The ASD-1X exploration well safely reached a total depth (TD) of 3,750m measured depth (MD) on March 30, several days ahead of schedule and under budget. The well encountered 22 meters net pay, and on preliminary testing flowed at gross rates of 1,619 bbl/d from the Lower Bahariya reservoir and 1,215 bbl/d from the ARC reservoir.

ENAP SIPETROL

ENAP APPOINTS NEW CEO, GM IN EGYPT

ENAP has appointed Denisse Abudinén Butto as the new CEO of ENAP Sipetrol and General Manager (GM) at ENAP Sipetrol Egypt branch, succeeding the current GM at Egypt Branch, Roberto McLeod, after his retirement.

Abudinén has proved to have international experience in Latin America as well as Middle East (Egypt), with over 13 years in the energy, oil and gas, and renewable industry. She is well-versed in managing relationships at the senior level with governments, regulators, boards, unions, and international and national companies.

Over the years, Abudinén held several positions in ENAP such as; Head of ENAP Corporate Strategy and Business Development and Head of Strategy and Business Development – E&P.

PHAROS ENERGY

PHAROS PRODUCES 4,010 BBL/D FROM EL FAYUM CONCESSION

Pharos Energy production from El Fayum concession averaged 4,010 barrels of oil per day, (bbl/d) starting from January 1 to April 3. The company has also kept its production guidance for 2021 at 4,000-4,400 bbl/d, prior to any investment from a farm-in partner.

As for the Batran commitment exploration well, it is being operated targeting 15 million barrels of oil (mmbbl). The well, located in a prospect near to the Tersa field, has encountered oil whilst drilling in the Abu Roash A, D, and E reservoirs. Pharos also updated its progress on the waterflooding program, stating that it is currently in Phase 1B, referring to a good progress is being made on farm out negotiations and the company is expected to make an announcement soon.

HALLIBURTON

HALLIBURTON EGYPT GIVES BACK TO COMMUNITY THROUGH LOCAL ENGAGEMENT ACTIVITIES

As part of Halliburton's ongoing sustainability commitment and focus on environment, social, and governance improvement, Halliburton Egypt started several projects and initiatives with a goal to enhance local communities.

The company hosted a day where students learned about the oil and gas industry at Ain Shams and Alexandria Universities. Halliburton sponsored a full-semester safety course at both schools.

In June, Halliburton embarked on a renovation project at Kattamiya Primary Public School to improve the overall school experience and welfare for students and staff. Halliburton volunteers painted areas of the school and performed maintenance repairs, in addition to improving the school's waste collection and disposal. The renovation project took almost ten days to complete and was celebrated by school management and the local Halliburton team.

The Egypt team sponsored multiple activities in the medical sector including support for the Cairo University Pediatric Hospital (Abu Rish) through a monetary donation, sponsored cancer awareness projects, and a blood drive for employees at Halliburton's Kattamiya base. The team also organized a dialysis support event for Marsa Matrouh public hospital in collaboration with Khalda Petroleum Company and under patronage of Matrouh Governor led Khaled Shoieb.

EXXONMOBIL

GASTEC, CARGAS, EXXONMOBIL SIGN PROTOCOL FOR NATURAL GAS SUPPLY

Gastec, Cargas and ExxonMobil companies have signed a cooperation protocol for adding facilities to supply natural gas inside ExxonMobil fuel stations.

According to the agreement, the three parties will start the first phase of establishing facilities for supplying cars with compressed natural gas (CNG) in an average of 50 stations, followed by another phase targeting ExxonMobil stations across Egypt.

Tarek El Molla, Minister of Petroleum and Mineral Resources, highlighted that the expansion of using CNG helped in increasing the usage of natural gas, integrating new technologies, finding innovative solutions such as mobile stations, and enhancing cooperation between companies of the petroleum sector and private ones.

SAVANNAH ENERGY IN TALKS TO ACQUIRE EXXONMOBIL'S CHAD, CAMEROON ASSETS

Savannah Energy PLC, the African-focused British independent energy company, is in advanced exclusive talks with ExxonMobil to acquire its upstream and midstream asset portfolio in Chad and Cameroon.

Savannah Energy is proposing to buy a 40% operated interest in the Doba oil project in Chad, and a 40% interest in the Chad-Cameroon oil transportation pipeline. The Doba oil project produced gross 33,700 barrels of oil per day (bbl/d) on average, while the Chad-Cameroon pipeline transported a gross of 129,200 bbl/d in 2020.

EXXONMOBIL MAKES NEW OIL DISCOVERY OFFSHORE GUYANA

ExxonMobil announced that it has made a new discovery at Longtail-3 in Guyana. The well is located approximately two miles south of the Longtail-1 well.

The company elaborated that it encountered 70 meters of net pay including newly identified, high quality hydrocarbon after drilling operation. On this regard, Mike Cousins, senior vice president of exploration and new ventures at ExxonMobil commented that Longtail-3, combined with our recent discovery at Uaru-2, has the potential to increase our resource estimate within the Stabroek block, demonstrating further growth of this world-class resource and our high-potential development opportunities offshore Guyana. He added that the company will continue to leverage core competitive advantages in its ongoing exploration campaign, delivering substantial value to the Guyanese people, their partners and shareholders.

ENERGEAN

ENERGEAN'S PRODUCTION IN EGYPT EXCEEDS FOUR-MONTH GUIDANCE

Energean's Production in Egypt has amounted to 31,700 barrels of oil equivalent per day (bbloe/d) in Q1 2021, exceeding its four-month guidance of 27,000-30,000 bbloe/d.

During the same period, the company's total production has amounted to 44,200 bbloe/d. By April 30, Egypt's net receivables reached $167 million, of which $97 million were classified as overdue. Following the closing of the Edison E&P acquisition in December 2020, Energean has since collected $122 million in revenues.

ATON RESOURCES

ATON, ENERGOLD SIGN DRILLING CONTRACT FOR ABU MARAWAT CONCESSION

Aton Resources has signed a contract with Energold Drilling to carry out a minimum of 4,250 meters of diamond drilling at its Abu Marawat Concession in September.

The drilling program will be focused on the Rodruin and Hamama projects, starting with drilling Rodruin with 3,350 meters and following up on the 2018 reverse circulation percussion drill program. The company plans to test the high-grade veins sampled at the surface on the North Ridge for the first time.

As for the Hamama drilling program, it will consist of 900 meters of drilling to delineate additional oxide and transitional resources at the Hamama east and central areas, which have not been effectively drill-tested to date. The potential for relatively high-grade oxide mineralization has been indicated by channel sampling of surface trenches.

EGYPT'S PERFORMANCE IN ENERGY TRANSITION INDEX (ETI) 2021

OVERALL ETI PERFORMANCE DEVELOPMENT

SUB-INDICES PERFORMANCE

SYSTEM PERFORMANCE INDEX

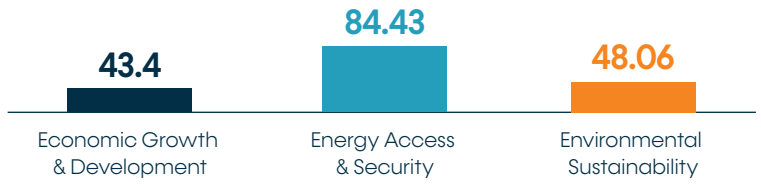
Index Score	Global Rank	Arab Rank
58.6	79	4

TRANSITION READINESS INDEX

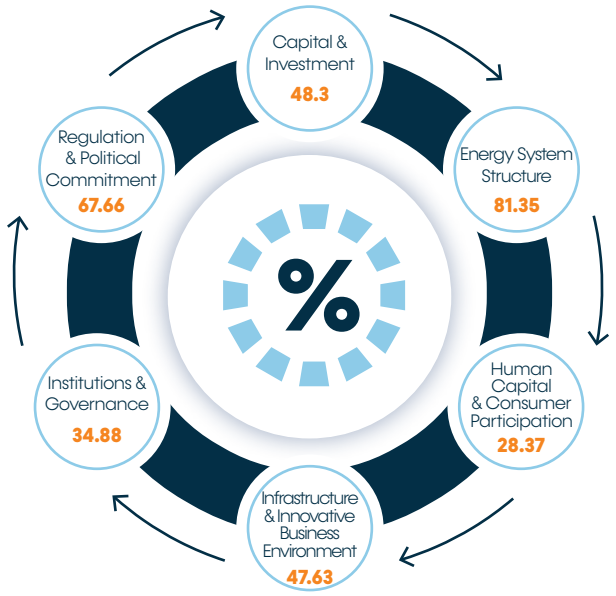
Index Score	Global Rank	Arab Rank
51.3	69	5

SUB-INDICES DIMENSION & INDICATOR SCORES

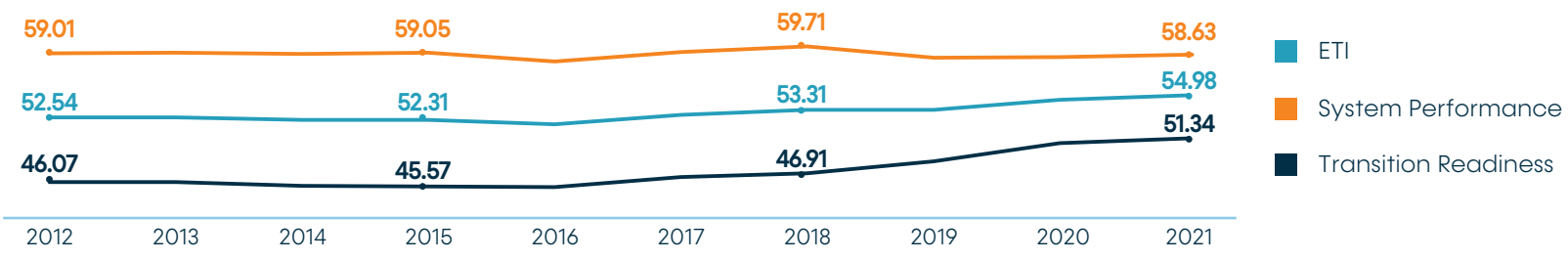
SYSTEM PERFORMANCE



TRANSITION READINESS



ETI & SUB-INDICES TRENDS (2012-2021)



ETI IN BRIEF

- ETI benchmarks 115 countries on the performance of energy systems and their readiness for transition to a secure, sustainable, affordable, and reliable energy future.
- ETI 2021 scores on an ascending scale from 0-100.
- ETI benchmarks countries according to two main sub-indices:
  1. System Performance
  2. Transition Readiness
- Each sub-index highlights a set of dimension and indicator scores

ADDRESSING ZOHR FIELD RESOURCES IN A NEW PROSPECTIVE

BY AMINA HUSSEIN, REHAM GAMAL, AND TASNEEM MADI

ZOHR AT A GLANCE

FIELD LOCATION & AREA

Basin	Mediterranean Sea
Concession	Shorouk
Location	190 km north of the city of Port Said
Area	100 km²

CONCESSION AGREEMENT

2012	EGAS	Jan 2014
Bid Round	Concessionaire	Agreement Date

ABOUT THE DISCOVERY

Discovery Date	Field Type	Production Start
Aug 2015	Natural Gas Offshore	Dec 2017

THE 1ST DISCOVERY WELL

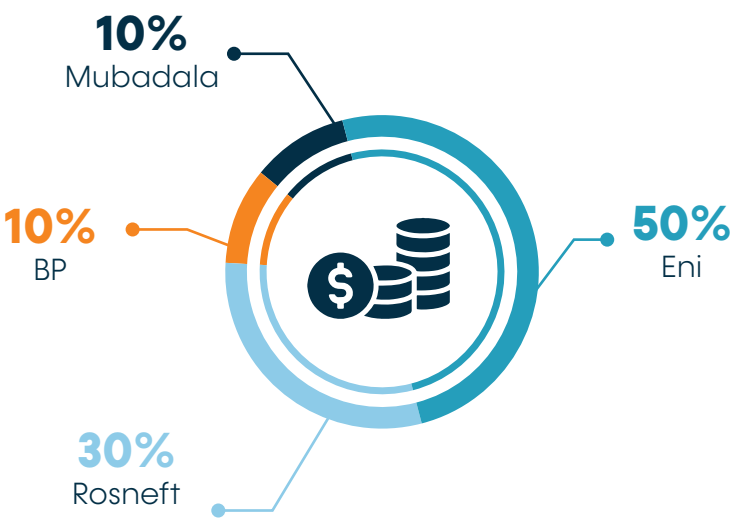
Name	Zohr 1X NFW
Underwater Depth	4,757 feet (1,450 metres)
Drilling Depth	13,553 feet (4,131 metres)
Reservoir Characteristics	Miocene age A deeper Cretaceous upside

1. OPERATING COMPANIES

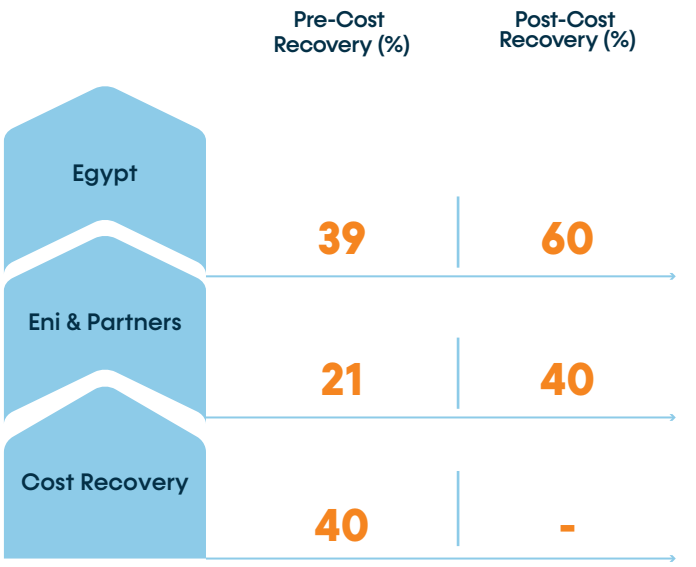
COMPANIES JOINED THE GIANT FIELD OPERATIONS

Date	Company	Share Value ($ billion)
Feb 2017	BP	0.375
Oct 2017	Rosneft	1.125
Jun 2018	Mubadala	0.934

CURRENT STAKEHOLDERS



ZOHR FIELD PRODUCTION SHARING



2. ZOHR MAIN INDICATORS

A. FIELD'S RESERVES

Recoverable Reserves at Zohr

25% of natural gas discoveries in the Levant basin & the East Mediterranean region

NATURAL GAS RESERVES IN THE LEVANT BASIN

Egypt | Lebanon
Palestine | Israel
Divided Island of Cyprus

122 tcf

NATURAL GAS RESERVES IN THE EAST MEDITERRANEAN

Reserves **125 tcf**

Represent **> 40%** of natural gas reserves in the world

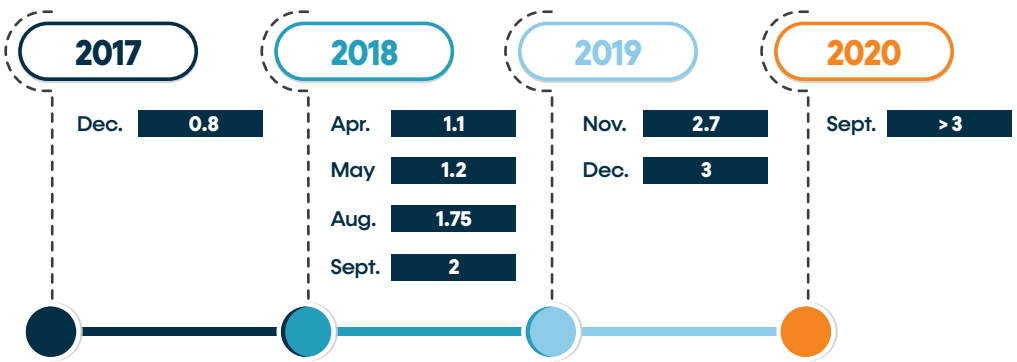
ZOHR IS THE LARGEST AMONG NATURAL GAS FIELDS IN THE EAST MEDITERRANEAN

Field	Location	Year of Discovery	Estimated Reserves (tcf)
Zohr	Egypt	2015	30
Leviathan	Israel	2010	22
Tamar		2009	10
Calypso	Cyprus	2018	6-8
Glafcos		2019	5-8
Aphrodite		2011	5
Gaza Marine	Palestine	1999	1.06

B. DEVELOPMENT OF FIELD'S PRODUCTION RATES

Zohr natural gas production represents **40%** of Egypt's total gas output

ZOHR PRODUCTION RATES (BCF/D)



C. FIELD'S INVESTMENTS & DRILLED WELLS

PHASES OF ZOHR PROJECT

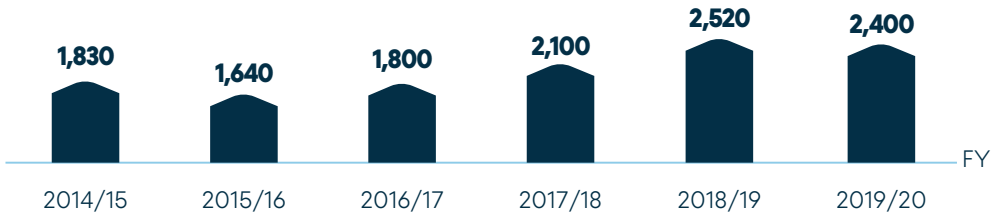
Development Dates	Total Wells	Added Investments ($ billion)	Total Investments ($ billion)
By June 2018	8	4	8
By June 2019	12	3	10.6
Late 2019		-	15.6
Late 2019	14	-	
Late 2020	15 Southern: **5** Northern: **15**	-	

Investments are planned to reach **$16** billion throughout the project period

3. THE EFFECT OF THE DISCOVERY ON THE EGYPTIAN NATURAL GAS MARKET

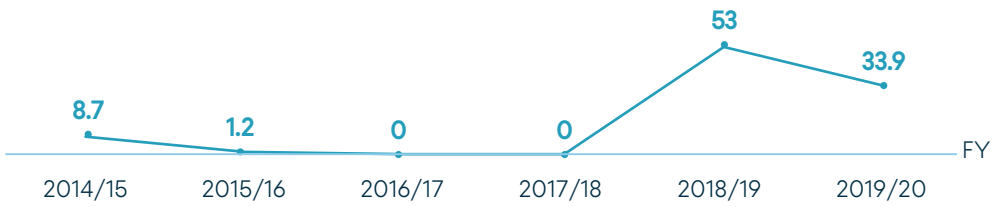
A. CHANGE IN EGYPT'S TOTAL ANNUAL PRODUCTION RATES

ANNUAL NATURAL GAS PRODUCTION (BCF)

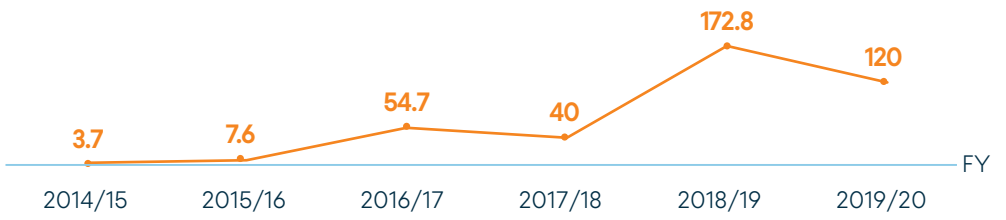


B. EFFECT ON EGYPT'S NATURAL GAS BALANCE

EGYPT'S NATURAL GAS EXPORTS (BCF)



EGYPT'S LNG EXPORTS (BCF)



EXPORTING MARKET STATUS IN EGYPT

FY		
2013/14	Transition from Exporter to Importer	
2014/15		
2015/16	Zohr Field Discovery	Net Importer
2016/17	Natural Gas Imbalance	Government pays a bill of **$ 2.2** billion
2017/18	Halt Imports	Start Exporting Trial Quantities to Jordan
2018/19	Began to Export	Idku facility came back to work
2019/20	Net Exporter	Damietta LNG plant returns to work

4. PRODUCTION AND TREATMENT FACILITIES (INFRASTRUCTURE)

A. EARLY/PREMATURE FACILITIES

EARLY FACILITIES

Consists of **4** Units

- Natural Gas Desulfurization Division
- SRUs*
- Natural Gas Separation & Treatment Division
- Utilities & Flair Division

*Sulfur Recovery Units

B. ZOHR DEVELOPMENT PROJECT

FIELD DEVELOPMENT PROJECT

Project Type

Gas Processing Plant

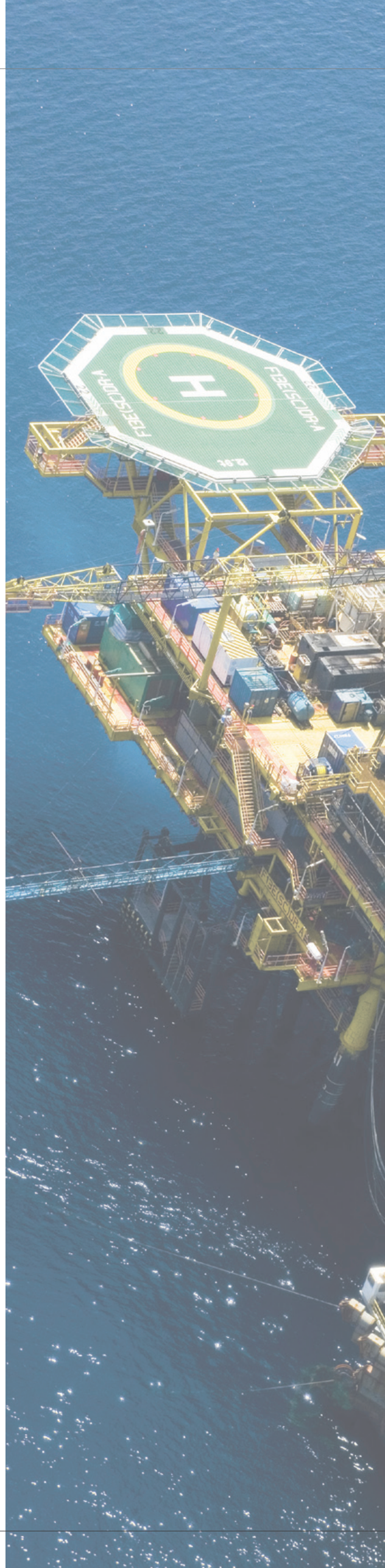
Divided into 3 Main Phases

- Subsea Wells & Production Facilities
- Offshore Platform
- Onshore Treatment Plant

I. SUBSEA WELLS & PRODUCTION FACILITIES

Wells	ROVs*	Infield Lines	Main Export Pipeline
6	**2**	**6** (Diameter: **14** inches)	**1** (Diameter: **26** inches)

*Remote Operated Vehicles



II. THE ONSHORE NATURAL GAS TREATMENT PLANT FACILITIES CONSTRUCTION

Area
2.5 million m²

Operator
Petrojet

CONSTRUCTION PHASES

Phase	Phase's Details	Status
1st	Includes Inlet Facilities, EPF, 4 Production Units, 2 SRUs*, Utilities & Flair	Implemented
2nd	3 Production Units, 2 SRUs*, Utilities & Flair (Total Treatment Units: 8)	–

ZOHR PLANNED & ONGOING MEGA PROJECTS IN 2021*

Project	Status	Operator	Investments* ($ million)
Field Development: Subsea Production Systems: Phase II	Under Construction	PetroShorouk	160
Field Development Project	Planned, & Unawarded - At Study Phase	Petrobel	7,547

*Estimated

III. THE FABRICATION OF THE OFFSHORE FACILITIES

Location
200 km off the Onshore Plant in the Mediterranean Sea Operations, at Depth of 1,500 m

Fabrication Works

Fabrication of Control Platform & Deep-Water Structures

Coating **707** km Subsea Pipelines with Polyethylene & Concrete

EGYPT'S PATH TOWARD ENERGY TRANSITION

BY RANA AL KADY

The oil and gas sector is grappling with a slew of challenges, ranging from occupational health and safety to financial limitations, as a result of COVID-19 and the ensuing economic crisis. Many of these worries are familiar to industry leaders who have built a living out of risk mitigation. The degree to which leaders can continue to rely on longer-term goals like decarbonization and preparing for the energy transition is being challenged as firms regain their ground following the crisis.

Dr.Hala El Manakhly, Risk Management Assessor Expert, has weighed in on the matter, noting that Egypt's transition is well on its way. El Manakhly stated that "as a researcher and HSE EXPERT, I appreciate the importance of the speed of steps to benefit from the renewable energy sources that Egypt has abundant access to. Egypt's vision aims to build a competitive, balanced and diversified economy within the framework of sustainable development."

Additionally, Eng. Mohamed Hanafy, Services Director at Triangle Energy, mentioned that, in accordance with the ways in which Egypt has developed in terms of the energy transition, that "Energy transition has been a key topic in the last few years. The government has set a strong plan to increase generation from renewable sources and diversify the energy mix. One key project that will be a main contributor to this target is the Benban PV Solar complex which is considered one of the biggest solar farms in the region and possibly the world." Hanafy added that, "these actions improve the country's energy mix, making the consumption less reliant on fossil fuels, reducing emissions and the carbon footprint, in addition to providing a sustainable source of energy. I also see the government's initiative to convert thousands of public transport vehicles from petrol to natural gas is in alignment with the energy transition strategy, shifting the demand to a more environmentally friendly alternative."

Although the energy shift will take decades for industrial cycles to complete, several oil and gas firms have already begun to reduce their carbon emissions. For instance, more than 90% of oil and gas participants answered that their firm has or is creating a long-term plan for a sustainable, low-carbon future, as per IRENA's latest energy transition study.

On the same note, Egypt has facilitated the necessary steps and offered incentives to carry out the energy transition process. Regarding this, El Manakhly noted that "an analytical study was carried out to find out the types of renewable energy and the capabilities that Egypt enjoys and that enables it to maintain the momentum of its economic growth, its sustainability and energy security. And identify the main policy challenges of the market, skills and institutional challenges, and reviews the recommended actions to overcome those challenges."

Hanafy similarly noted the undeniably significant steps Egypt has taken thus far. Hanafy stated that he "believe[s] the government has taken some serious steps to attract both foreign investments and international partnerships in renewable energy. This is evident from the multiple alliances and agreements signed with major global companies for these projects."

Of course, with every path to new and innovative energy implementation projects and programs, there is a multitude of advantages and disadvantages. While converting to renewable energy has both advantages and downsides, it is argued that the benefits of using such sources exceed the negatives, especially in the long run. Of course, the flaws are all things that can be remedied with enough time and finances, thanks to Egypt's recent advancements.

"With the resumption of the growth of global economic activity accompanied by precautionary measures, and the resumption of the pace of work in the various sectors, the renewable energy projects started their gradual growth in a noticeable way, with a noticeable increase in the number of countries. At the local level, the year 2020 witnessed a high demand for investment in renewable energy, whether wind or solar energy projects, in addition to an increase in the energy produced by various types of renewable energy projects," stated El Manakhly. To summarize the past 36 months, El Manakhly added that, "the only source that maintained its positive performance, albeit low, was renewable energy. Despite all the challenges imposed by the Corona virus, the Egyptian market was able to maintain its attractive position."

Yet, there are upsides to this unexpected downturn. As a matter of fact, El Manakhly added that, "at the local level, the year 2020 witnessed a high demand for investment in renewable energy, whether wind or solar energy projects, in addition to an increase in the energy produced by various types of renewable energy projects. The only source that maintained its positive performance, albeit low, was renewable energy. Despite all the challenges imposed by the Corona virus, the Egyptian market was able to maintain its attractive position."

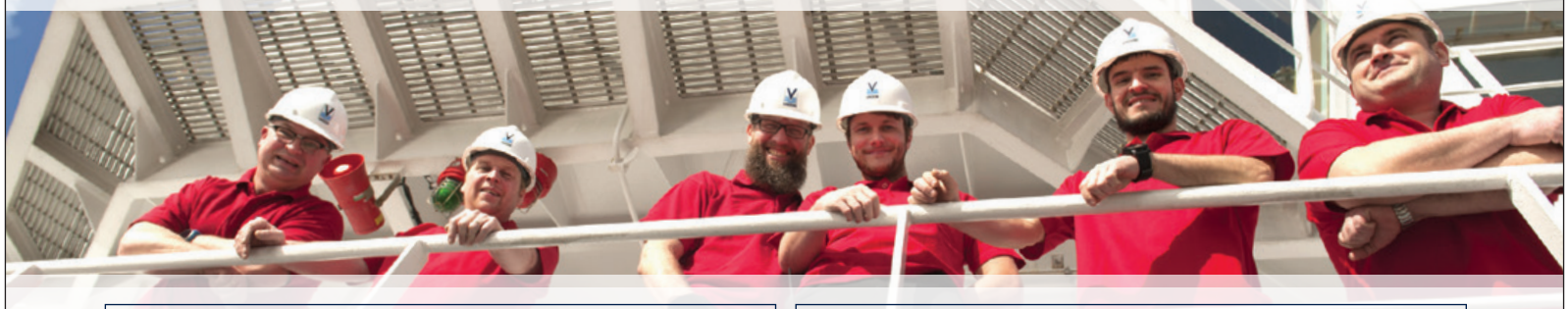
On a similar note, Hanafy was able to sum up the key advantage and disadvantage of the implementation of new and renewable forms of energy in Egypt. Hanafy stated, "the key advantage for the country is the cleaner sources of energy which will reduce emissions and the impact to the environment." He added that, "the key disadvantage in my opinion is the initial set up costs of the renewable energy projects compared to the conventional ones."

While the precise timing and direction of the energy transition are unclear, the ultimate goal of low-carbon energy system is no longer a question. Depending on their initial position and goals, each oil and gas firm will evolve its strategies in different ways. It is important that the way forward is well-considered.

With regards to future work, El Manakhly had mentioned the importance of Wastewater Treatment (WWT). "I had the honor to participate as an invited speaker at the First International Conference in Egypt for Membrane Technology and its Applications in Aug 2019, where I discussed my PhD Thesis "Apply Physical Process to Treat and reuse the Industrial Wastewater in Irrigation Purpose. That aimed to remove the Petroleum Pollution from wastewater out of washing activities." El Manakhly added that "I have several publications discussed the impact of the wastewater treatment. Economic Positive Impact, serve the Environmental Sustainability and serve the Market Requirement; help to manage water resources due to limited water resources and steady population growth. Reduce the high water consumption. That participates in the green and renewable energy system together."

In conclusion, one of several truths of economic history is that as a new period develops, successful holders can be swept away. The issue for today's oil and gas organizations is figuring out how to adjust to a low-carbon era, where to invest and how to transform their businesses. Exploring such fundamental concerns highlighted above should help them get back on track.

"TOGETHER, YOUR PARTNERS IN EGYPT"



PAN MARINE GROUP

YOUR ONE-STOP SERVICE PROVIDER

PAN MARINE GROUP is a ONE-STOP service provider to our clients in Egypt through the following four companies:

1- Pan Marine Shipping Services
2- Pan Marine Logistics Services
3- Pan Marine Petroleum Services FZ
4- Medkon Lines Egypt S.A.E

Our customers are our greatest asset; we aim to provide them with a one-stop service in the most economical way through understanding their needs, solving their problems, and being a supportive consultant.

ALEXANDRIA | CAIRO | DAMIETTA
PORT SAID | RAS GHAREB | SAFAGA
ABU QIR | SUEZ | SOKHNA

ISO 9001:2015
ISO 14001:2015
ISO 45001:2018
BUREAU VERITAS Certification

www.pan-marine.net

VROON OFFSHORE SERVICES

....CONNECTING MARKETS

VROON OFFSHORE SERVICES excels in the provision of diverse services and solutions for key offshore-support needs, including platform supply, emergency response and rescue, anchor handling tug supply, walk to work, crew transfer and subsea support. In addition, Vroon Offshore Services offers a wide range of complementary offshore services.

With a versatile fleet and highly qualified and experienced colleagues, we are committed to providing seagoing transportation services and engineering & support solutions that are reliable, sustainable, cost effective and enable our customers to be successful.

ABERDEEN | DEN HELDER | GENOA | SINGAPORE

Leaders in Safety

MACN

www.vroonoffshore.com

Head Office: Marhaba Tower, Fouad St., Off Horeiya Road, Alexandria 21131, Egypt
Tel.: +2033913820 (10 Lines) Fax: +2033913829 Email: Offshore@pan-marine.net

ENERGY TRANSITION FOR OIL PLAYERS: A CHALLENGE TO SURVIVE OR A CHANCE TO REVIVE?

BY SHAIMAA BEHERY

Since Paris Agreement invited the world countries to formulate a long-term low greenhouse gas emission strategies to limit global warming to 1.5 to 2.0 degrees Celsius above pre-industrial levels, more countries and businesses began to formulate their carbon neutrality plans. This made zero-carbon solutions competitive across economic sectors that produce nearly 25% of emissions, while the United Nations Framework Convention on Climate Change (UNFCCC) expects such zero-carbon solutions to be more competitive in sectors representing over 70% of global emissions by 2030.

Floating with the stream, major oil and gas companies were in a race with time to make their core hydrocarbon business more resilient while working to expand their low-carbon businesses. Given this globally growing trend, it is interesting to speculate whether this accelerating energy transition represents a deadlock for oil companies or a new window for oil industry to explore new horizons.

SAME GOAL, DIFFERENT WAYS

On the governmental level, the world today is witnessing serious energy transition initiatives and actions.

The Egyptian government for example has set targets for renewables to make up to 42% of the country's electricity mix by 2035, based on rapid solar and wind deployment. France has set a target of zero net greenhouse gas emissions by 2050. Cyprus plans to increase the share of renewable energy sources from 13.9% to 22.9% in the period 2021-2030.

In Asia, South Korea has set ambitious goals for the roll-out of electric mobility and also for establishing itself as a leading exporter of hydrogen and fuel cell vehicles by 2040.

On the companies' level, although it seems challenging, some leading international oil companies (IOCs) haven't stopped with some actions taken to prove their adaptation, they instead took the lead on the way of low carbon energy. For example, BP PLC, Chevron Corp, Royal Dutch Shell PLC and Total SE are on the top of the list of the companies that target reducing the intensity of operated upstream greenhouse gas emissions while adopting lower-emission technologies.

Iman Hill, Executive Director, International Association of Oil and Gas Producers (IOGP), believes that there is no contradiction between producing oil and gas and taking concrete steps to advance the energy transition towards a low carbon future.

"Indeed, fighting climate change and achieving a low carbon future remains a top priority for both society and industry. However, transitioning to a lower carbon world is not an on/off switch, it is a decades-long journey that cannot be made without a partnership with the only source of reliable and affordable energy available to the world right now, oil and gas," Hill told EOG.

"There are different paths to achieving a lower carbon future. Each region, each country, has a unique and diverse energy system as its starting point, with different energy resources, demand dynamics, technologies, capital investment capability, geographies, and cultures. We share the same goal, but the ways we contribute vary," she added.

STATE- OF-THE-ART TECHNOLOGIES ADAPTATION; WAY AMONG OTHERS

Many oil companies advance technologies that allow the digital tracking of the integrated carbon footprint of their operations. Although the widespread adoption of renewable energy still at its outset, the changes and innovations in policies are likely to drive change inside the sector further.

Field electrification is one of the efficient ways that can significantly reduce upstream oil and gas emissions produced by the traditional gas and diesel turbines used for power generation. Norway tops the list of these technology integrators as it managed to reduce almost 2.8 Mt of CO2 emission yearly after electrifying eight local oil and gas fields.

"The industry has to demonstrate that it is producing hydrocarbons with as small environmental footprint as possible, that it continues to mitigate methane emissions from its own operations, that it drives development and scale up of low carbon technologies such as Carbon Capture Utilization and Storage (CCUS) and clean hydrogen, and that it can operate in a cost-efficient way," Hill commented.

"According to the International Energy Agency, CCUS is key to reducing emissions from heavy industries, that account for almost 20% of global CO2 emissions. It is the most cost-effective approach in many regions to curb emissions in iron, steel and chemicals manufacturing," Said Hill.

UNEQUAL RIVALS TO OIL

The main competitors to oil and gas energy are nuclear power, solar power, ethanol, and wind power. These alternative forms of energy haven't yet proven to be economically equal to fossil fuels, as some are less efficient and more expensive, while in the case of nuclear power, it is completely restricted in some destinations. Per the Institute for Energy Research (IER), solar and wind plants need constant backup power sources. Usually, electricity generated from a coal plant is still used to keep these oil alternatives running, in case it gets cloudy, or the winds are down. In addition, solar panels and wind farms also have massive up-front capital costs.

Dr. Mohammed Siddiqui, Professor at King Fahd University of Petroleum and Minerals, sees hydrocarbon fuels will always remain as major energy assets irrespective of transition to non-hydrocarbon based fuels, especially for developing countries.

"Even major energy countries like India and China have to use fossil fuels for an extended period to develop non-hydrocarbon fuels," he told EOG.

THE KNOW-HOW CONVOKES OIL COMPANIES IN THE FOREFRONT

Major oil Players have taken initiatives to emerge amid the increasing green energy demand with trust in their long-rooted experience, capabilities, technologies, relationships, and other incumbent advantages. For example, plan of BP uncovered that it looks forward to profiting instead from wind and solar power. It announced in an unprecedented step a target of a 40% reduction in oil-and-gas production over the coming decade, with greater investment in low-carbon energy and a ramp-up in the wind and solar power.

Some medium-sized companies have recently made this shift, including Orsted and Neste. Orsted, a Danish energy company, has stated that its goal is to become the first offshore wind major, while Neste, a Finnish energy company, has shifted its historical asset base from oil refining and marketing toward biofuels processing.

"Our industry has everything needed to take a leading role in decarbonization, such as our extensive know-how, our data, our project management expertise, engineering capabilities and the practice of innovating which is part of the way we approach our work," said Hill.

STRIKING A RIGHT BALANCE

Highlighting how the substitutes to the Oil and gas are not yet equal isn't by any means a call for ignoring the current global keenness to address climate change. Quite the opposite, it is to throw the light on how the oil companies are still able to keep their places in the racecourse in different ways. Oil companies can contribute to the climate change while keeping their long-term deals, but with Avant-grade mechanisms.

Energy mixed portfolio is believed to be the best solution on the table. Many large oil and gas players hope to steer a middle path toward becoming integrated energy players. Companies in this category are attempting to evolve their business mix, capital allocation, and organizational capabilities.

For example, US Occidental Petroleum has decided to build a plant that will capture and bury 500,000 metric tons of CO_2 each year. ExxonMobil announced its ambition to reduce the intensity of operated upstream greenhouse gas emissions by 15 to 20 percent over the next five years.

"Energy demand grows in parallel with the growing population. We want to help meet the global energy demand while achieving the Paris Agreement goals," Hill said, mirroring the opinion of Siddiqui who believed in the diversified business strategy.

"Diversifying business strategy is key to compete and remain relevant such as oil-to-chemical model. Saudi Aramco and Reliance (India) are aggressively pursuing this model. Chemicals also have a huge market and is a profitable business model with zero effect on climate." Said Siddiqui.

RENEWABLE RESOURCES EMPOWER EGYPT ENERGY HUB ENDEAVOR

BY FATMA AHMED

Over the past few years, Egypt has taken proactive constant steps to become a hub for trading and exporting energy. In 2016, a high committee was formed to implement this strategy as a part of Egypt's vision 2030 for sustainable development. Egypt's plan to become an energy hub will secure the domestic needs of energy, support economic development, provide more foreign currency and perfectly exploit Egyptian infrastructure. In addition, this strategy will provide more opportunities for investments.

This strategy has become more credible after the success stories that were achieved by the energy sector, specifically the oil and gas sector. However, this strategy even can gain more momentum with great potentials and achievements in the renewable energy sector.

These potentials for renewable energy, and the exerted efforts in this regard can fit Egypt well to be an actual energy hub.

NATURAL GIFTS

Egypt has abundant natural resources such as sunny weather and high wind speed; making it a prime location for generating renewable energy. A report issued by International Renewable Energy Agency (IRENA) stated that Egypt has a chain of hydropower stations at a capacity of 2,800 megawatts annually. Egypt produced 7.2% of electricity from hydropower energy in 2015/2016 after representing 50% in the 1950s and 1960s, due to the increase of the thermal energy stations.

In addition, Egypt has potentials for wind energy, especially in the Gulf of Suez, which is considered one of the best areas in the world for generating this kind of clean energy. According to the report, the location's high speed and stable wind that reaches 8-10 meters per second (m/s) in addition to having large inhabited and desert areas helped it to perfect spot for wind energy generation. IRENA also referred to new promising regions that have been discovered in the East and West of the Nile in Beni Suef, Al-Minya and Al- Kharga that have a wind speed of 5-8 m/s.

What's more, according to the IRENA report, Egypt has suitable solar radiation at an average of 2,900 to 3,200 hours annually, enabling it to be one of the best countries to exploit solar energy either in generating electricity or in thermal heating applications. Moreover, Egypt possess biomass from animal dungs and agricultural wastes estimated at 35 million tons per year, 60% of which is used for energy equals to 5 million tons of oil equivalent per year according to the German Corporation of International Cooperation (GIZ).

READINESS FOR BEING ENERGY HUB

During the past two decades, Egypt established important projects for renewable energy after recognizing the need for a sustainable energy mix to address the increase of demand and provide environment-friendly energy. The government adopted the 2030 Integrated Sustainable Energy Strategy, targeting production of 20% electricity from renewable resources by FY 2021/22, 55% by FY 2034/35 and 61% by 2040. In addition, Egypt adopted a new law in 2015 to facilitate the active contribution of major investors related to tariffs, licensing, and dispute resolution. This allowed the increase of direct investments from major multinational companies including Siemens, Total Eren, Schneider Electric, Engie and others.

The Government has developed many hydropower stations since 2015, expected to be finished by 2022 at a capacity of 2,400 megawatts. Moreover, the Government has established many wind farms since 1993, the most important of which is the Zaafarana wind farm, the second biggest wind farm in Africa, with a cost of EUR 110 million through loans from Denmark, Spain, Japan and Germany. The electricity produced from wind energy reached 2,085 gigawatt hours in FY 2015/2016. Egypt tends to install four stations for wind energy with a combined capacity of 2,610 megawatts by 2023 in cooperation with IRENA. According to IRENA report 2018, Egypt has planned to develop a lot of projects until 2023 with a total capacity of 3,350 megawatts and three projects are under construction at capacity of 660 megawatts in addition to a project subject to bidding phase, which is expected to produce 600 megawatts.

Regarding solar energy, Egypt developed one of the biggest projects in the world. This is known as the Benban Solar Park, built in cooperation with 30 companies with investments of $2 billion producing 1,465 megawatts, according to a report issued by the embassy of Egypt in Sweden. The country also targets to complete several solar projects with total capacity of 3,211 megawatts by 2023.

BRIGHT FUTURE

All these reforms pushed Egypt to the 77th position in the Getting Electricity sub-index 2020 of the World's Bank Doing Business, from the 144th in 2016. In addition, Egypt is currently developing a strategy for the hydrogen industry. These significant developments in the energy sector allowed Egypt to increase its production of electricity and consolidate its position as an important energy hup.

O&M COSTS: DOUBLE-EDGED SWORD FOR RENEWABLE ENERGY

BY FATMA AHMED & AMINA HUSSEIN

Recently, the world trend has turned toward renewable energy to overcome the decline of the conventional resources of energy as well as the climate change caused by greenhouse emissions. However, one of the public debates around renewable power spread is to what extent it can be competitive while renewable Resources suffered from high operation and maintenance (O&M) costs.

These costs have fallen sharply over the past decade due to the deployment of new technologies, economies of scale, competitive supply chains and growing developer experience. However, they are still considered high. "Although the renewable energy almost requires less overall maintenance costs, but still a key element for the total cost," Hamdy Hafez, Financial and Reporting Manager at HeidelbergCement stated to Egypt oil and gas (EOG).

According to the International Renewable Energy Agency (IRENA), wind turbine prices have fallen by 55-60% since 2010 and solar photovoltaic (PV) prices have fallen by around 90% since the end of 2009. IRENA stated, in another report, that the growth in deployment of renewable power generation technologies continued in 2019, as costs continued to fall, indicating that renewable power generation increasingly became the default source of least-cost new power generation. Since 2000, renewable power generation capacity worldwide has increased 3.4-fold, from 754 gigawatts (GW) to 2 537 GW by the end of 2019 (IRENA, 2020a). however, does this mean that renewable energy may replace the conventional one?

WIND POWER: OFFSHORE AND ONSHORE

The total installed wind-generation capacity onshore and offshore in the world has jumped from 7.5 GW in 1997 to some 564 GW by 2018, according to IRENA's latest data. In 2016, wind power contributed 16% of electricity produced from renewables. However, its O&M costs are still high due to its turbines. Ihab Elmassry, Renewable Energy Expert, stated to EOG that "the O&M costs for wind farms are very expensive. For instance, the onshore wind farm projects in Europe the O&M cost for wind ranges between $33/kW/year to $56/kW/year"

Onshore wind turbines acquire the largest share of the total installed costs, making up between 64% and 84% of the total costs. The O&M costs play a key role for onshore wind power as it makes up 30% of the global weighted average levelized cost of electricity (LCOE), according to IRENA. The global weighted average (LCOE) for offshore wind recorded $0.053 per Kilowatt hour in 2019. According to IRENA data, the onshore wind power LCOE declined by 9% between 2018 and 2019. In addition, IRENA reported that the LCOE of an onshore wind farm is also impacted by the economic lifetime of the project and the cost of capital. So that the reduction of these costs is very important in lowering LCOEs.

On other hand, offshore wind farms are more expensive than onshore wind due to the complexity of installation, operation and maintenance. Global offshore wind power makes up less than 5% of the total deployed wind. This means that O&M costs are higher than those for onshore wind. The global weighted-average LCOE of offshore wind reached $0.115/kWh in 2019, with a 9% reduction year-on-year in 2019. Additionally, representative ranges for current projects fell between $70-129/kW per year during 2018.

SOLAR ENERGY

There are two technologies for solar energy; solar photovoltaic (PV) and concentrated solar power (CSP). Regarding solar PV, its O&M costs have fallen in recent years. However, the share of these costs in the LCOE has risen in certain markets due to the fast decline of capital costs. According to IRENA data, the global weighted-average LCOE of utility scale PV plants recorded $0.068/kWh in 2019, with a 13% reduction year-on-year in 2019. For the CSP, its O&M costs are higher than solar PV and onshore wind. IRENA reported that the range of O&M costs for CSP plants currently is between $0.02/kWh to $0.04 kWh. However, its share in the LCOE is not large.

IRNEA conducted an analysis stating that the average O&M costs of the LCOE reached 18% in G20 countries. Elmasry explained that "although solar energy enjoys the lowest annualized life cycle costs, the permanent availability is its weak point and that is why there are great efforts are being done to improve and commercialize energy storage technology." He added that solar energy needs certain batteries to store the energy which means more O&M costs.

HYDROPOWER

Hydropower always needs high capital. Its costs mainly rely on the construction and procurement costs related to electromechanical equipment. The global weighted-average LCOE of newly commissioned hydropower projects recorded $0.047/kWh in 2019, increasing by 6% from 2018 in which it recorded $0.045/kWh and 27% higher than the projects commissioned in 2010. Its O&M costs range from 1% to 4% of the investment cost per kW per year. Maintenance represents 20% to 61% of O&M costs.

GEOTHERMAL

Geothermal deployment is still slight. The O&M costs are higher than solar PV and wind due to the decline of reservoir pressure around the production well which reduces power-generation productivity. The global weighted-average LCOE of the projects reached $0.073/kWh in 2019. IRENA estimates the average O&M costs over the 25-year life of the project of $115/kW per year. O&M costs include make-up and re-injection over the 25-year life of the project.

BIOENERGY

IRENA reported that Bioenergy contributed 10% of the total final energy consumption and 1.9% of global power generation in 2015. The global weighted-average LCOE of bioenergy for power projects recorded $0.066/kWh in 2019. O&M costs represent 2% to 6% of the total installed costs per year.

UPCOMING YEARS

According to IRENA, as the sector is growing, increased competition in O&M provision has emerged and has resulted in a variety of strategies to minimize O&M costs. However, it still faces a lot of obstacles, especially in Egypt. Elmassry added to EOG that "PV and Wind have lower reliability compared to conventional power generation as it differs according to the resource availability".

For his part, Hafez recommended that O&M costs should be controlled by applying an effective cost management system which should be supported by an effective database management. He added also that it should be followed up with accurate energy production forecasts and predicting component failure. Despite the experts' agreement that renewable resources should be maximized, they insisted that it is hard to replace the conventional resources of energy completely.

POST COVID-19 ERA- THE AGE OF NEW OPPORTUNITY IN THE EGYPTIAN PETROLEUM SECTOR

DR. MOSTAFA ELSHAZLY Senior Associate- Zaki Hashem and Partners Law Firm- Visiting Lecturer of Business and Energy Law.

Egypt's integration history in the oil and gas sector dates back to late of the eighteenth century when the Egyptian Government was able to dig oil from Ras Gemsah in 1886, which marked the beginning of the country's oil industry. Since then, a long journey of attainments and failures shaped today's history of the Egyptian petroleum sector.

It is worth mentioning that the Egyptian petroleum sector plays a vital role in the Egyptian economy. According to Central Bank of Egypt data for the first half of (H1) 2019/20, the petroleum sector accounts for 12% of Egypt's Gross Domestic Product (GDP), 37% of its exports and 17% of its imports. It also accounts for 10% of total investments. The petroleum sector implemented nine projects with investments of EGP 11.7 billion in H1 2019/20, according to the Ministry of Planning and Economic Development.

With the advent of COVID-19, the world economy was negatively affected, as the pandemic imposed unparalleled financial pain and endured uncertainty across most businesses. Those in the transportation, hospitality and energy sectors rank among the most severely impacted. "A crisis like no other." This is how the International Monetary Fund (IMF) described the COVID-19 crisis. The Egyptian petroleum sector was not far away from the negative impact of the pandemic on the global oil and gas industry, it faced severe challenges; the pandemic paved the way for a staggering decline in the global oil prices, which made the year of 2020 began at around 63$ per barrel($/b), and dropped dramatically, reaching ed 20$ in April 2020. Meanwhile, demand for oil has dried up due to a slowdown of global business activity, reduction in international and domestic travel, all resulting from the lockdowns and other policies to contain the spread of the pandemic. Such situation had led to the glut of oil in the market and drove international oil and gas companies to cut back on their capital expenditures in petroleum E&P projects.

The year 2021 witnessed a slight increase in the oil price which coincided with the spread of Covid-19 vaccines, the gradual stepping down from lockdowns, and Organization of the Petroleum Exporting Countries (OPEC)'s decisions to increase production after limiting it due to decreased demand for oil during the pandemic. All the foregoing would be a crucial tool to bring the oil and gas industry back to normal situation.

The full impact of the gradual increase in the global oil price on the Egyptian petroleum sector, will unfold over the coming months, and I do believe that the longer the oil prices remain high, the more positive impact will be on the exploration and production segment. International Oil Companies (IOCs) might even benefit from a modest temporary price spike, as today's massive decline in investment will result in tomorrow's spot shortages. Thus, wise companies would seize the opportunity to tackle the weaknesses prevailed during the pandemic, so they are better prepared for a peak oil demand scenario by unlock the production.

Despite the global initiatives related to transitioning to a low carbon economy and the development of renewable energy projects, the Egyptian authorities have great hopes towards the oil and gas exploratory industry in Egypt; The industry still seems attractive and represents high potential for IOCs. That is why Egypt has announced, earlier this year, new international bid rounds for petroleum exploration and production (E&P) in 24 Blocks with high potential at the Gulf of Suez, Western Desert and the Mediterranean. Such bid rounds would be managed by the Egyptian General Petroleum Corporation (EGPC) and the Egyptian Natural Gas Holding Company (EGAS).

From legal perspective, Egypt's laws and regulations regarding foreign investment in the oil and gas sector, alongside with other financial incentives beside the recent legislative reforms related to the liberty of the gas market are capable of creating a favourable environment for foreign investors to attract the foreign funds required in the upstream projects. Moreover, according to the 2020 Ease of doing Business Report, the process of starting a new business in Egypt became easier over the past year with the improvement of our "one-stop shop" system.

The constitutional framework for the exploitation of oil and gas resources organised briefly under the Egyptian Constitution of 2014, leaving the relevant laws to regulate the specificities of the oil and gas legal framework. Article 32 of the Egyptian Constitution stipulates that 'All oil and gas resources, are within the control of the state [...] Granting the right of exploitation of natural resources or public utility concessions shall be by virtue of a law for a period not exceeding thirty (30) years.'. In fact the Egyptian constitution states for special treatment for investment and its protection.

Apart from that, the model agreement, which has been adopted, by EGPC and EGAS for the development of its oil and gas resources is based on production sharing scheme. It has been often said that the production sharing model agreement with some regular updates/amendments has succeeded in attracting big players into the oil and gas upstream sector (e.g. BP, ENI, Shell, Apache, Chevron and Exxon Mobil).

All concession agreements in Egypt shall be promulgated by virtue of private laws, which supersedes any other legislation, and this is considered another layer for protection for investors.

To promote investment and introducing financial incentives for foreign investors, Egypt signed a large number of Bilateral Investment Treaties. This number makes Egypt on top of African countries who signed BITs. In addition, Egypt is a signatory to the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards, a valid arbitral award is enforceable without retrial of the merits if it fulfils the conditions of the New York Convention and the Egyptian Arbitration Law (no 27 of 1994). The conditions set out in the Egyptian Arbitration Law are the following: the arbitral award does not contradict a judgment previously rendered by the Egyptian courts on the subject in dispute; b it does not contravene Egyptian public policy; and c it was properly notified to the party against whom it was rendered.

From technical perspective, the blocks which are presented in the recent bid round enjoys high potentiality being located nearby producing wells with high productivity. In this respect, it is worth mentioning that Egypt enjoys a well-established infrastructure that ease the exploitation of the petroleum resources, i.e. the country maintains the largest refining capacity in Africa. Moreover, Egypt has two LNG export facilities with a combined capacity of 586 billion cubic feet per year (Bcf /year). As for the roads, Egypt's road quality, according to a statement by Prime Minister Mostafa Madbouly now ranks second in Africa and 28th place globally, rising 90 ranks since previous years when it ranked 118th .

The significant increase in the domestic oil and gas consumption, resulting from the rise in the industrial and commercial sectors and increasing population is another key driver that encourages pumping investment in the E&P works.

The success stories occurred during the recent years in the Egyptian Petroleum Sector whether in the upstream or the downstream sectors prove in a clear way the favourable investment climate in the country and the fact that Egypt is an ideal destination for foreign direct investment. This is clearly shown in the development of the huge reserves in the Egyptian territorial water and the Exclusive economic zone in Mediterranean Sea, alongside with the enhancement and the expansion of the Egyptian refineries to increase its capacity and efficiency.

From social and political perspective, the relative stable political situation in Egypt, comparing to other neighbouring countries in the Middle East and North Africa (MENA) region, will pave the way to attract more investment in the Egyptian upstream sector in the coming few years.

To conclude, despite the challenges accompanied to COVID -19 pandemic, Egypt is still considered a promising investment destination for oil and gas investments.

تحت رعاية فخامة الرئيس عبد الفتاح السيسي رئيس جمهورية مصر العربية
HELD UNDER THE PATRONAGE OF HIS EXCELLENCY ABDEL FATTAH EL SISI, PRESIDENT OF THE ARAB REPUBLIC OF EGYPT

EGYPS
EGYPT PETROLEUM SHOW

SUPPORTED BY

وزارة البترول والثروة المعدنية
Ministry of Petroleum & Mineral Resources

14 - 16 FEBRUARY 2022 | EGYPT INTERNATIONAL EXHIBITION CENTER

NORTH AFRICA AND THE MEDITERRANEAN: DELIVERING ENERGY TODAY

WHAT TO EXPECT AT EGYPS 2022?

28,000	26,000	450	27
SQM EXHIBITION SPACE	ATTENDEES	EXHIBITORS	NOCS & IOCS
12	1,900+	260+	73
COUNTRY PAVILIONS	DELEGATES	SPEAKERS	CONFERENCE SESSIONS

4 EASY WAYS TO BOOK A STAND

- www.egyps.com/bookstand
- +971 4 248 3214
- egyps.sales@dmgevents.com
- Scan the QR code

SUPPORTED BY: EGPC, EGAS, Ganope, Echem Egyptian Petrochemicals Holding Company

DIAMOND SPONSOR: bp

GOLD SPONSORS: ArcelorMittal, CHEIRON

SILVER SPONSOR: Energean

BRONZE SPONSORS: Axens, Baker Hughes, T.EN Technip Energies

OFFICIAL MEDIA PARTNER: Egypt Oil&Gas Newspaper

ORGANISED BY: dmg events

CHP: FROM WASTE TO POWER

BY JASMINE SHAHEEN

The promise of tomorrow is reshaping a clean world with clean energy, at least that is the case for the oil and gas industry. With the climate crisis in focus, the oil and gas industry needs to step up its game to downsize its greenhouse gas (GHG) emissions. According to McKinsey, oil and gas operations account for 9% of all human-made GHG emissions in addition to producing fuels that contribute to another 33% of global emissions. One effective way the industry can reduce its GHG emissions is through utilizing Combined heat and power (CHP) technology.

UNDERSTANDING CHP

CHP is an energy-efficient technology that generates electricity and captures waste heat to produce electric power and thermal energy that can be used for space heating, cooling, domestic hot water, and industrial processes. Combustion turbines, also known as reciprocating engine CHP systems, burn fuel such as; natural gas, oil, or biogas, to turn generators to produce electricity and use heat recovery devices to capture the heat from the turbine or engine. This type of technology uses an engine that runs on a single fuel type. It has multiple benefits as it lowers energy costs, increases efficiency, and improves reliability while also providing other environmental benefits.

CHP can be used in a wide range of industrial applications with significant and concurrent power and thermal loads. Approximately two-thirds of the energy used in conventional electricity generation is wasted heat that is released into the atmosphere. Furthermore, additional energy is wasted during the transmission of electricity to end-users. CHP can achieve efficiencies of more than 80% by capturing and utilizing wasted heat and avoiding distribution losses, compared to 50% for typical technologies.

In the energy sector specifically, basic processes, such as oil recovery, petroleum refining, natural gas distillation, and pipeline compressor stations, consume a lot of energy, but many facilities still waste it by releasing it into the atmosphere rather than using it to generate electricity. This is where CHP can become a viable option for sites with hot water, steam, or other thermal loads. These highly efficient power-generating systems produce more energy from a given amount of initial fuel, resulting in significant cost savings.

CHP ADVANTAGES

Due to the fact that less fuel is burned to produce each unit of energy output and because transmission and distribution losses are avoided, CHP reduces emissions of greenhouse gases as well as other air pollutants like nitrogen oxides (NOx) and sulfur dioxide (SO2).

CHP technology can be deployed quickly, affordably, and with few geographical constraints. CHP can operate on a variety of fuels, both fossil and renewable. For many years, it has been used primarily in industrial, large commercial, and institutional circles, but it has also quietly been providing highly efficient electricity and processing heat to some of the most vital industries, largest employers, urban centers, and campuses in the US.

CASE STUDY

By examining CHP projects in real life, one can see the efficiency of the technology. One example of such a project is Targa Resources Company, which operates a natural gas distillation facility in Mont Belvieu, Texas. The company studied the possibility of generating on-site power by using CHP to improve the efficiency and reliability of its heating plant as well as the potential to expand its facilities. In 2009, the company installed a 15-megawatt (MW) CHP project, which provides as much as 90% of the facility's electricity.

METHANEX GRADUATE PROGRAM: BUILDING FUTURE TALENTS

In 2019, Methanex Egypt launched a new graduate training program, designed to enrich the pipeline of talent available to Egypt's oil & gas and petrochemicals sector -through a three-year intensive training program with the country's only methanol production company, through its state-of-the-art facility that is considered among the most energy efficient methanol plants in the world. The program is considered an exciting opportunity for candidates who are interested in building a career in the petrochemicals industry. It provides talents with an opportunity to work in a multicultural and high-performing environment, enabling the leadership development and growth potential of fresh graduates and allowing them to develop technical, commercial, and interpersonal skills through on-the-job training, individual learning, and hands-on experience in multiple roles throughout the organization.

Out of the 3000+ graduates applying to the program from all governorates in 2019, 40 young men and women from various Egyptian universities - including Damietta University - were selected to enroll in the program after undergoing an extensive recruitment and selection process to ensure the placement of the best-fit candidates to the program. In all of its recruitment and hiring processes, Methanex Egypt stays committed to its position as an equal opportunity employer.

The program starts with a comprehensive on boarding package including a common track period where all graduates are offered the necessary classroom training, site visits along with e-learning about safety, industry, processes, and plant fundamentals, followed by a function track period where all graduates are divided into groups according to their assigned departments.

Shimaa Ahmed, a technical graduate, described the program, saying: "I consider the Methanex graduate program the perfect start for my career. Joining the program has given me the exposure I need in the petrochemicals industry and has impacted my skills and competencies positively. The program is very well designed to cater to our learning and development needs, starting with the comprehensive onboarding process which enabled us to become familiar with everything happening inside the company as well as the actual work experience that gave us the chance to apply our learning in a supportive environment."

Methanex's graduate program provides a learning and development opportunity through applying the 70/20/10 model: 70% on the job, 20% through coaching and mentoring, and 10% in classroom and e-learning. Ali Mahmoud, a maintenance graduate described his experience in the program saying: "The graduate program was a life-changing experience for me. It is designed in a way that strongly familiarizes us with the company's culture and core values to help us blend in. It also deepens our theoretical knowledge through structured learning, helping us develop a sound base of technical expertise through on-the-job experience, all while being supported by our supervisors through continuous guidance and constructive feedback."

After joining, graduates become part of a strong mentoring culture, where each is assigned a Mentor/ Supervisor to support his/her personal and professional development. Through constant support from the Methanex management team including the Managing Director, Plant Manager and Site Management Team, the program ensures that graduates are continuously learning while always being informed about corporate updates, business changes, expectations, and progress helping them develop a deeper understanding of the methanol industry and make meaningful contributions to the business.

When we asked Salma Ashraf, a finance graduate, about her the program, she said: "It is an eye-opening experience to different career paths; during the past year and a half, I got to explore myself, my potential, and my capabilities. The on-the-ground practice, mentoring, assigned responsibilities, networking opportunities and the chance to rotate in different departments or areas have provided me with a strong base to build my career and succeed in the different roles I may take in the future. Having a supportive team who is willing to invest in me was also a key pillar in my development in such a short period."

Joveh Wassily, a Responsible Care (HSE) graduate added: "The graduate program is a great opportunity to get exposed to both global and local professionals and projects. Working alongside talented professionals has helped me understand concepts and processes faster, realize the importance of agility at work and has increased my productivity. We are involved in key business projects and are included infrequent site visits, a fact that has enriched our practical experience and helped us gain deep insights into the business."

It is worth mentioning that Methanex's commitment to learning and development was not compromised during the COVID-19 pandemic. Being a key pillar of the company's corporate strategy, a comprehensive schedule of professional online training from internal and external industry experts was made available. In addition, all departments and projects' workplans were designed in a manner that ensured the inclusion and contribution of graduates to maintain the required level of exposure, whether onsite or from home, during the pandemic. The Methanex Graduate Program is designed to ensure that after the completion of the three-year program, graduates will have the necessary knowledge and skills to help them build a successful career in the petrochemicals, and oil & gas industries, positively contributing to the new pool of talents within the sector.

Although the 2020 intake was delayed due to the COVID-19 pandemic, it was later resumed in November 2020 via different online platforms such as LinkedIn and other specialized recruitment platforms to enable the recruitment and training of the next generation of young professionals.

ENERGY TRANSITION RESHAPES GLOBAL POWER DYNAMICS

BY IHAB SHAARAWY

Throughout human history, energy transitions have always represented turning points that led to deep geopolitical consequences. The shift from wood to coal for example was the locomotive for capitalism and the imperial ambitions of colonial powers in18th century.

The geographic concentration of oil, natural gas and coal reserves has shaped the international geopolitical scene in the last two centuries when control over the production of, and trade in oil has been a key driver to many conflicts and political alliances.

Today, as climate change forces shift from fossil fuels to renewable energy sources, it's reasonable for the world to prepare for new transformative effects that are likely to dominate the geopolitical landscape of the twenty-first century. Maybe it's too early to define the nature of these changes, however, experts can suggest different credible scenarios that deserve deliberation.

GROWING AT SPEED

Over the past decade, renewable energy consumption has grown at an average annual rate of 13.7%. The pace and scale of the transition to renewables during the past decade have already shot past the most optimistic forecasts as renewables were the only category of energy that grew globally at double digits over the past decade. This can be affirmed by data published by bp's Statistical Review of World Energy 2020. According to the data, the world consumed 8.2 exajoules of renewable energy in 2009, while this had nearly quadrupled to 29.0 exajoules in 2019.

The coronavirus pandemic has even accelerated the trend, as new renewable power hit a record 200 gigawatts in 2020, the same time when the rest of the energy sector shrank.

Amid the recession triggered by the pandemic, demand for oil fell 8.8% and demand for coal 5%, compared to the year before, according to the International Energy Agency, the Paris-based oil watchdog. Clean energy was the only part of the energy sector that had growth in 2020.

In 2021, the world is even poised for a more accelerated energy transition with the coming of the new US presidential administration of Joe Biden, who targets reducing emissions from the US by 50-52% by 2030 compared to 2005 levels.

During a two-day virtual gathering, called by Biden, he urged for the global transition to renewables such as solar and wind, as well as advances in electric cars and other technologies, to be accelerated. His calls were met with ambitious commitments by other world powers including China and European Union.

There are no doubts about the seriousness of such commitments especially in the light of the new advanced technologies and the reduction in renewable energy costs. According to a recent report published by International Renewable Energy Agency (IRENA), the share of renewable energy that achieved lower costs than the most competitive fossil fuel option doubled in 2020 as 162 gigawatts (GW) or 62% of total renewable power generation added last year had lower costs than the cheapest new fossil fuel option.

A NEW GLOBAL ORDER IN THE HORIZON

As renewable energy continued its prompt growth pace, the transition from fossil fuels to renewable energy is expected to involve a much deeper transformation that will not be limited to the world's energy systems, as it is expected to involve major social, economic and political consequences.

World analysts believe the inevitable transition would cause a shift in global power relations and politics similar to those shifts caused by transitions from wood to coal and from coal to oil.

Such expectations can be largely supported when realizing the wide differences between the aspects of renewables and fossil fuels. Unlike fossil fuels which are concentrated in specific geographic locations, renewable energy resources can be found in one form or another in most of the world countries. In most cases, renewable energy resources take the form of flows, which do not run out and are harder to disrupt. Renewable energy sources also may have "democratizing" effects as they can be deployed at almost any scale and can introduce decentralized forms of energy production and consumption.

DIFFERENT SCENARIOS

According to a report published by IRENA in 2019 on the geopolitics of the energy transition, different countries will try to exert influence in the new world energy system through different ways that may include exporting green fuels, controlling the raw materials used in clean energy, or by gaining an edge in technology, such as electric vehicle batteries.

However, experts suggest that it's the technology that will give an edge to countries in the new energy system. Taking this into consideration, we will find no country has put itself in a better position to become the new world's energy superpower than China.

According to the IRENA report, China has a leading position not only in manufacturing but also in innovation and deployment of renewable energy technologies. It is the biggest location for renewable energy investment, accounting for more than 45% of the global total in 2017.

Thanks to its initiative to be carbon neutral before 2060, China looks, for now, to be winning the global race to invent and manufacture the technologies that will allow a new low-carbon world.

China's efforts in this field have helped it to establish itself as the undisputable global leader of renewable energy worldwide. The IEA forecasts that by 2021, more than one-third of global cumulative solar PV and onshore wind capacity will be located in China.

China has even outspent its arch-foe the US by nearly 2-to-1 on energy transition-related investment between 2010 and 2020, according to BloombergNEF data.

The US, which is still resting on the energy boom of the shale oil revolution, still needs a clear strategy if it wants to keep a leading position in new energy markets and technologies, which can happen easily thanks to its robust high-tech sector and wealth of private investment.

Thus, expectations are very high that the two superpowers, who have long been at loggerheads over trade, technology and capital markets, are turning their attention to climate change and energy transition as the next path to commercial supremacy.

Europe, which has made its own commitment to become climate neutral by 2050, is not far behind China, however, according to the International Energy Agency, all of the projected growth in energy demand in the next 25 years will take place in emerging and developing countries.

According to a Bloomberg report, investment in clean energy technologies totaled over $330 billion in 2017 and is expected to accelerate over the coming decades.

The rush toward leadership of renewables should cause the demand for minerals critical to these technologies to soar too. The global lithium-ion battery market for example could more than quadruple to $93 billion by 2025. The booming of the electric vehicle market and expanding energy storage sector are going to push demand for lithium, cobalt, and magnesium.

Hence, mineral-rich countries such as Bolivia, Mongolia, and the Democratic Republic of Congo (DRC) have an opportunity to become part of the global production and value chains necessary for renewable technologies.

A report published by the International Institute for Sustainable Development (IISD), a global think-tank focusing on sustainable development, found that many of the reserves of the 23 key minerals, which will be critical to the development of renewables, are found in states perceived to be both "fragile and corrupt."

The authors of the report, which came under the title "Green Conflict Minerals: The fuels of conflict in the transition to a low-carbon economy," found real risks of tensions and conflicts emerging or continuing around the extraction of these minerals that must be governed in a way that is responsible, accountable and transparent.

The growth of clean energy technologies may fuel outbreaks of violence in states with weak institutions, competition over global resource commons, and weaponization of minerals essential to these technologies in trade disputes.

NEW ALLIANCES

Many analysts see that renewable energy influence will not be limited to the balance of power between countries as it's expected to reconfigure alliances and trade flows.

One of the prime examples that may come to mind when thinking of alliances that may change, if global demand for fossil fuels declines, is the alliance between the United States and Saudi Arabia in which oil plays a key role. The alliance, dates back to 1945, states that the US would provide military assistance in exchange for access to Saudi oil.

In fact, the global low-carbon energy transition is posing critical questions to oil and gas producers in the Middle East, as it may imply sustained pressure not only on their alliances but also on their development models, which rely heavily on hydrocarbon revenues. Without economic reforms, this may translate into macroeconomic unbalances and ultimately put at risk established social systems of this region.

Thus, the biggest resistance for the energy transition is likely to come from countries that produce fossil fuels although it will be decades before oil and gas are removed from the energy system.

NEW BENEFITS AND OPPORTUNITIES

The renewable energy transition is leading to very different global power structures where the influence of some states, such as China, will grow while states that rely heavily on fossil fuel exports and do not adapt to the energy transition will face risks and lose influence.

Renewables could reduce conflicts, and alleviate competition for important natural resources, notably oil, gas, water, and food. On the other hand, cybersecurity and access to important minerals may generate increased concern and tension.

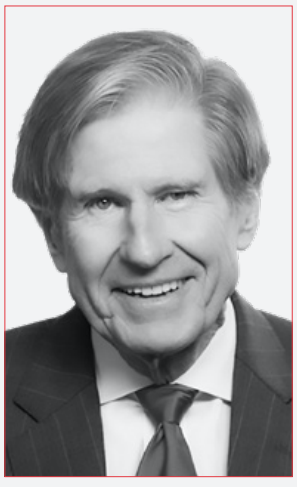
However, the majority of countries can increase their energy independence significantly and generate considerable benefits and opportunities.

It is proven we have big reserves of gas, attractive minerals geology with under-explored geological potential.

H.E. TAREK EL MOLLA

Minister of Petroleum and Mineral Resources

This came during the British Egyptian Business Association (BEBA) webinar focusing on the oil and gas sector's achievements.



In Egypt, good progress has been made to find the right partner to support the funding of the development plan for the discovered resource in El Fayum.

ED STORY

President & CEO of Pharos Energy.

Pharos Energy announced the company's latest operational results as production from El Fayum concession averaged 4,010 barrels of oil per day, (bbl/d) from January 1 to April 3.

Declining oil production due to limited investments in brownfields and oil exploration necessitate the continuity of putting different strategies to ensure more investments in oil production and exploration.

MOHAMED FOUAD

CEO Egypt Oil and Gas

Reflecting EOG Committee's efforts to highlight the importance of investing in brownfields.

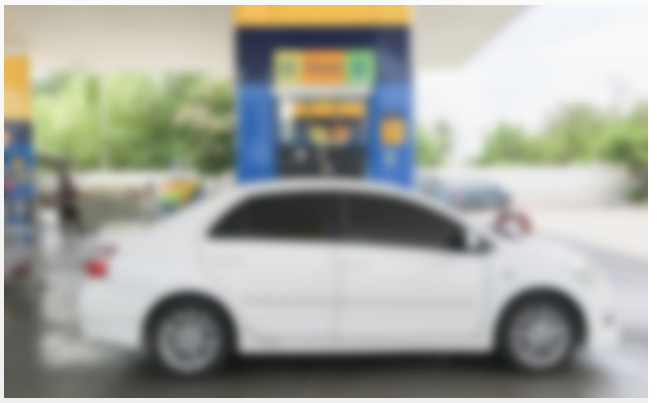
By dedicating our time and talent to volunteerism and supporting charitable organizations, we enhance the economic and social well-being of our communities.

COLBY FUSER

Vice President of Halliburton Egypt and Libya.

As part of Halliburton's ongoing sustainability commitment and focus on environment, social, and governance improvement, Halliburton Egypt started several projects and initiatives with a goal to enhance local communities.

ROLE OF MEDIA IN RAISING AWARENESS OF USING NATURAL GAS AS CAR FUEL



In light of the presidential initiative to support the expansion of using natural gas as an alternative fuel to liquid fuel in cars, and the great effort made by the Ministry of Petroleum to move forward with this ambitious initiative as soon as possible, the ministry has inaugurated several gas stations in many places. And to make the matter even easier, the ministry has agreed to launch new mobile stations to serve remote areas. It has also facilitated the procedures of converting cars to natural gas, in addition to providing many unprecedented incentives that aimed to accelerate the implementation of this national initiative.

However, the Egyptian media still has an important and effective role in raising the citizens' awareness of the size and benefits of this national initiative through its different platforms.

The media has to answer the questions that may be asked by citizens, who may think about converting their vehicles. Everyone may ask himself why should he convert his car to natural gas? What are the advantages and disadvantages?

Therefore, we need to find a way to help him find the answers in a clear and easy way.

We should clarify that natural gas can contribute to preserving the environment and the purity of the air in our cities. We should highlight its impact on public health and its role to cut harmful emissions.

And above all, citizens should also be aware of the economic advantage of his decision to convert his car to run on this clean fuel. Using natural gas can save 50% of fuel costs.

It can only take 4 hours to convert your car to run on natural gas and there is no need to worry about the cost, as you can take advantage of the facilities and incentives provided by the government. It is possible to pay the conversion fees through multiple installment systems that range from one year to five years.

If the media uses its influence to address the citizens' inquiries and worries, it will have a positive impact on the success of this national initiative in a big way. After all, it's the role of the media to inform citizens on matters of their interest and of course to assist the state in implementing such an important initiative.

AYMAN HUSSEIN

General manager of media
Gas Regulatory Authority

A NEW CONCEPT VISION FOR PLANNING, DESIGN AND MANAGEMENT IN EGYPT

Management of Change (MOC) has become one of the most critical success factors for any business or project in today's ever-changing world. The oil & gas business world is changing at a fast pace, new technologies have been developing continually and energy requirement worldwide is changeable based on the economic growth rate and population inflation rate. Also, new market regulations are being launched on a regular basis, and the companies have to cope with the new work environment conditions or sudden global crises.

The companies/establishments that can't cope with or adapt to the accelerated changes professionally and those who do not exploit new growth opportunities are most likely to go out of competition and may disappear. That's why preparing for change should be one of the top priorities for companies today. Management of change is a systematic approach that includes dealing with the transition or transformation of organizational goals, core values, work conditions, processes or technologies. The purpose of the change management approach is to successfully implement strategies and methods for effecting change and helping people to accept and cope with change.

As organizational changes in the workplaces take place daily, change management teams have become principal performance drivers for several companies.

So, I do need to point out some important change management facts and best practices as follows: - Most people resist change as deduced from research, which shows that only 38% of people like to leave their comfort zone when facing a change situation, while the other 62% deal with the same exact situation with more fear and discomfort or resistance to change.

We have 3 common types of institutional/organizational change that include: 1. Developmental change - any change that enhances and optimizes on previously set-up processes, strategies and procedures. 2. Transitional change – a change that moves an organization or institution away from its current state to a new state in order to solve a big problem. 3. Transformational change – a change that fundamentally hits the culture, core values and policies.

When is change management absolutely necessary and obligatory? - Change management is necessary to successfully implement changes and modifications within companies and organizations in the following cases: Application of new types of high technologies, implementation of mergers and acquisitions within large institutions, change in the leadership systems within the organization, change in culture or general policy of the organization and at the times of an unprecedented crisis.

The most common challenges that change management professionals' face are: Determining targets and their priorities, poor leadership/management and lack of compatibility, identifying the resources or tools required to make a successful change, a lack of flexibility and slow decision making, planning the upcoming events, fear and conflicts/collisions, resistance to change and absence of commitment, poor communication in the work atmosphere, matching all the teams with the new strategy, and updating all team members on the new materials, policies and procedures in time.

Finally, the change management best practices that every organization or company should follow are: Determine clear and measurable targets, be truthful and transparent (over 30% of employees say that their employer is not always honest and trustworthy), train and develop the skills for your teams, urging dialogue and communication continuously, listen carefully to what your employees are saying, put your leaders in the right position, choose the best and easiest tool to communicate with your employees, provide more support and empowerment to your employees, encourage the widening of knowledge horizons and experience sharing, document information and making it available to everyone easily, recognize and reward your employees (77% of employees say that they would work harder if they were recognized for their work), and create a socially good work environment.

ENG. MOHSEN AHMED FARHAN

Drilling Department Head
General Petroleum Company (GPC)

EGYPT'S MONTHLY UPDATES ON PRODUCTION, RIGS, AND DRILLING ARE AVAILABLE NOW IN OUR MONTHLY MONITOR.
PLEASE CONTACT US VIA MONITOR@EGYPTOIL-GAS.COM TO SUBSCRIBE FOR YOUR MONTHLY COPY.

EGYPT OIL&GAS RESEARCH & ANALYSIS

VALUE AND VOLUME OF SHARES TRADED FOR OIL & GAS SECTOR IN APRIL 2021

VALUE TRADED (EGP BILLION)

% OF TOTAL VALUE TRADED **0.9**

VOLUME TRADED (BILLION SHARES)

% OF TOTAL VOLUME TRADED **0.64**

NATIONAL DRILLING

CURRENCY	CLOSE PRICE	YTD PRICE CHANGE (%)
USD	4.69	-

ALEXANDRIA MINERAL OILS CO.

CURRENCY	CLOSE PRICE	YTD PRICE CHANGE (%)
EGP	2.99	▼ 4.17

EGYPT GAS

CURRENCY	CLOSE PRICE	YTD PRICE CHANGE (%)
EGP	32.02	▼ 26.51

SIDI KERIR PETROCHEMICALS

CURRENCY	CLOSE PRICE	YTD PRICE CHANGE (%)
EGP	10.35	▲ 11.17

Source of Raw Data: CBE, CAPMAS, Egyptian Exchange, IHS Markit

MAIN ECONOMIC INDICATORS

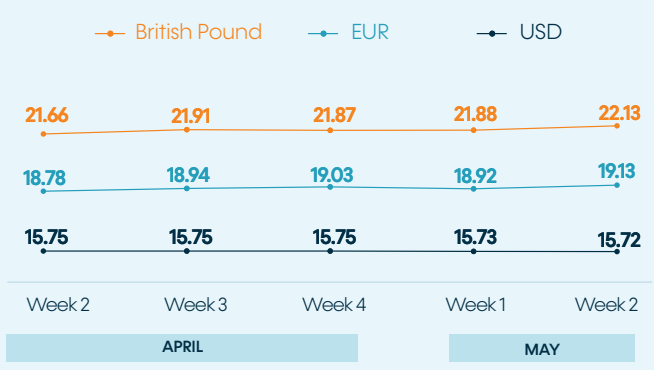
Mar 2021 | Apr 2021

ANNUAL INFLATION HEADLINE CPI (%)
4.5 ▼ 4.1

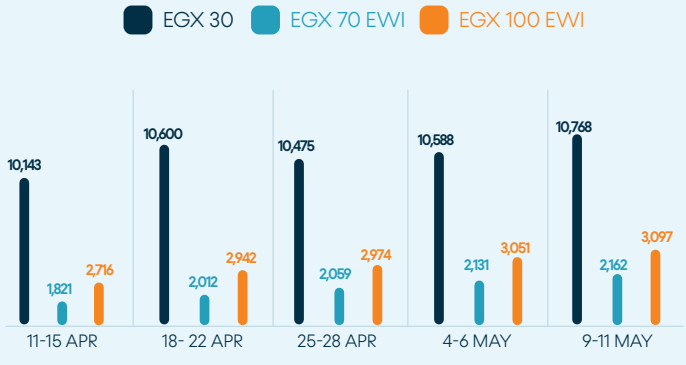
NET INTERNATIONAL RESERVES ($ BILLION)
40.337 ▲ 40.343

NON-OIL PRIVATE SECTOR PMI (POINTS)
48 ▼ 47.7

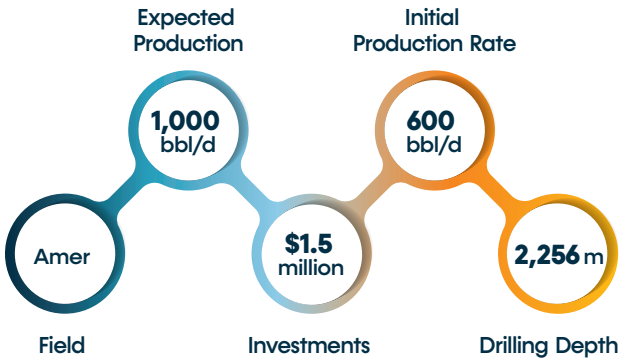
EXCHANGE RATES



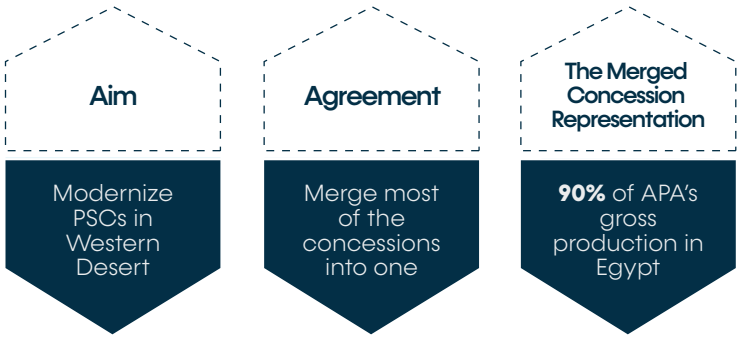
CAPITAL MARKET INDICATORS



GPC SUCCEEDS IN DRILLING AMER-81 WELL IN GULF OF SUEZ



EGYPT SIGNS AN AGREEMENT WITH APA



UOG PERFORMANCE IN EGYPT IN 2020

MAIN ACHIEVEMENTS

$9 million
Revenues

$0.85 million
Profits

2,195 boe/d
Average Production

1 mmboe
Abu Sennan Gross 2P Reserves

24%

WORKING INTEREST PRODUCTION (BOE)

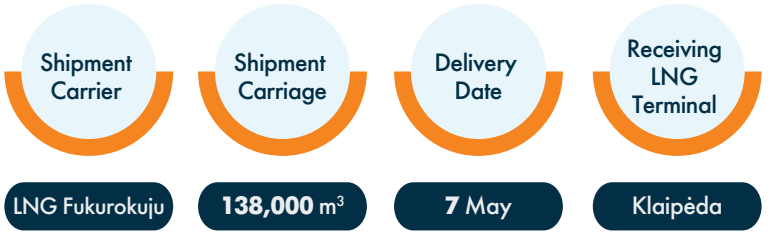
March	1,709
December	2,389

PLANS BY END OF 2021

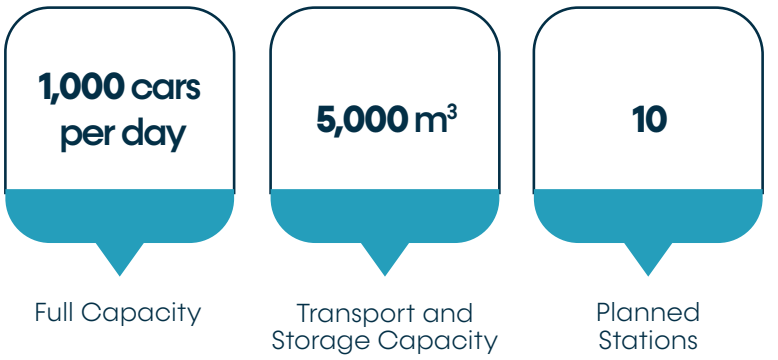
Increase pricing

Increase production: **2,500-2700 boe/d**

LITHUANIA RECEIVES THE 1ST LNG SHIPMENT FROM EGYPT



EGYPT LAUNCHES MOBILE NATURAL GAS STATION



INTERNATIONAL OIL PRICES

	BRENT PRICES ($/BBL)	OPEC BASKET PRICES ($/BBL)	NATURAL GAS PRICES ($/MMBTU)
15 Mar	68.88	68.18	2.48
30 Mar	64.14	63.37	2.62
15 Apr	66.94	64.48	2.66
28 Apr	67.27	64.53	2.93
05 May	68.96	68.20	2.94
18 May	68.71	68.39	3.01

UNDER THE HIGH PATRONAGE OF

HE. ENG. TAREK EL MOLLA

MINISTER OF PETROLEUM & MINERAL RESOURCES - ARAB REPUBLIC OF EGYPT

PART OF THE EGYPTIAN OIL AND GAS SECTOR
MODERNIZATION PROGRAM

4TH UPSTREAM TECHNICAL CONVENTION

UNLOCKING VALUE
IN AN UNCERTAIN UPSTREAM ENVIRONMENT

24-26 OCTOBER 2021

ORGANIZED BY

EGYPT OIL&GAS NEWSPAPER

TECHNICALLY PREPARED BY

EGYPT OIL & GAS COMMITTEE

OFFICIAL RESEARCH PARTNER

Wood Mackenzie
A Verisk Business

SUPPORTING ORGANIZATION

International Association of Oil & Gas Producers

PLATINUM SPONSORS

APEX INTERNATIONAL ENERGY

CHEIRON

TransGlobe Energy CORPORATION

GOLD SPONSORS

ENAP

IPR ENERGY GROUP

wintershall dea

SILVER SPONSORS

NESR

OPERATIONAL EXCELLENCE AWARDS SPONSOR

DragonOil

TECHNICAL WORKSHOP SPONSOR

Kuwait Energy

STRATEGIC PANELS SPONSOR

HALLIBURTON

DELEGATE BAG & NAME TAG SPONSOR

Baker Hughes